UNIVERSITY OF LJUBLJANA
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QUALITATIVE AND QUANTITATIVE ANALYSIS OF SUICIDE IN ILLICIT DRUG USERS
Doctoral Thesis

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KVALITATIVNA IN KVANTITATIVNA ANALIZA SAMOMORA MED UPORABNIKI PREPOVEDANIH DROG
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Dedication

Dedicated to my parents, tireless supporters Annamaria and Angel, without whose financial support my study abroad and this study would not have been possible.
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Preliminary remarks

In order to obtain an insight into the overall suicide mortality among illicit drug users (IDUs) in Slovenia, different approaches are used and the results of different studies are included.

First study includes preliminary data on national suicide mortality among IDUs and the differences between suicide among general population and IDUs, which were further presented to the group of professionals – psychiatrists. Expert's opinion on data and their beliefs regarding suicide among IDUs are assessed with a focus group methodology.

The suicide mortality rates are calculated within cohort study performed on IDUs seeking drug related treatment in the period 2004–2006, while the cohort was followed up for 8 years (2004–2011 period), with the linkage database method. The differences between suicide victims and survivors in cohort are also observed and assessed with the use of univariate analysis non time-related and with multivariate analysis time-related (suicide timing with Cox model).

The differences in suicide between the IDUs seeking treatment and those IDUs who were out of drug related treatment system are assessed after linkage method using special register on mortality, which includes national drug related deaths data from 2002 to 2007. For this study purpose only suicides for 2004–2007 period are observed. Difference in risk for suicide between IDUs seeking treatment and treatment naive IDUs is calculated for year 2004, using estimate of problem IDUs in 2004 in Slovenia.
Povzetek

Izhodišča
Samomor je eden izmed desetih vodilnih vzrokov za prezgodnjo umrljivost v Evropi. Slovenija je država z eno najvišjih stopnij samomorilnosti v EU, medtem, ko povezava samomora in rabe prepovedanih drog ni širše raziskovan in poznan pojav.

Namen, cilji
Namen raziskave je bil prispevati k razširitvi znanja o značilnostih žrtev samomora med uporabniki prepovedanih drog (UPD) in prispevati k uspešnejšemu načrtovanju preprečevanja ter obravnavanja samomorilnosti med UPD. V kvalitativnem delu raziskave je bil cilj ugotoviti mnenje skupine psihiatrov glede nacionalnih podatkov o samomoru med UPD in ugotoviti prepričanja strokovnjakov o samomoru med UPD. Cilji kvantitativnega dela raziskave so bili: spremljanje umrljivosti zaradi samomora med UPD, zdravljenih v Centrih za preprečevanje in zdravljenje odvisnosti od prepovedanih drog; izračunati specifične umrljivosti zaradi samomora (ocena presežne umrljivosti zaradi samomora) v kohorti UPD, ki se zdravijo; ugotoviti delež umrlih zaradi samomora glede na spremenljivke (socio-demografske, raba drog, tvegano vedenje, okužbe in vrsta obravnave) in preveriti razlike v zunanjih vzrokih smrti zaradi samomora med UPD, ki so se zdravili in tistimi, ki se niso.

Metode
bila izračunana na 1000 opazovanih let. Izračunane so bile Standardizirane stopnje umrljivosti zaradi samomora (SSUS). Pričakovana števila samomorov so bila izračunana s pomočjo specifičnih stopenj umrljivosti zaradi samomora v splošni populaciji po spolu in starosti. Za stratifikacijo stopenj umrljivosti (stopnje umrljivost v 5 letnih starostnih skupinah za starost od 15 do 59 let in po spolu) so bila preračunana za vsako kategorijo posebej (obdobje opazovanja, število smrti in opazovane stopnje umrljivosti) tako opazovana števila samomorov kot LO. Za izpeljavo SSUS so bile opazovane smrti zaradi samomora primerjane s pričakovanimi glede na spol in starost. SSUS je bila izračunana z uporabo 5 letnih starostnih skupin (15-59 let). Pričakovana stopnja samomorilnosti je bila izračunana s pomnožitvijo opazovane stopnje umrljivosti zaradi samomora v splošni populaciji in LO opazovanega obdobja v kohorti, po spolu in starosti (indirektna metoda).

Specialni register umrlih je služil kot dopolnilni vir podatkov o umrljivosti zaradi samomora in za ugotavljanje ter ločitev samomorov med tistimi UPD, ki so se zdravili od tistih, ki se niso zdravili.

Za razlike med žrtvami samomora in preživelimi v kohorti so bili uporabljeni t-test za numerične in test hi-kvadrat za kategorične spremenljivke. Za analizo preživetja je bil uporabljen Coxov model sorazmernih tveganj s pomočjo katerega je bil ocenjen vpliv spremenljivk na samomor.

Primerjava samomorov v skupini UPD (med zdravljenimi in nezdravljenimi) je bila izvedena s pomočjo Student t-testa (med dvema skupinama) za numerične in test hi-kvadrat za kategorične spremenljivke (primerjava stolpcov razmerij z z-testom in prilagoditev p- vrednosti po metodi Bonferroni, če tabela več kot 2 x 2).

Statistične analize so bile opravljene z upabo 20.0 različice SPSS paketa, Excela in MedCalc za Windows.

**Rezultati**

Psihiatri v fokusni skupini so poznali slovenske podatke o samomoru v splošni populaciji, podatke o samomoru med UPD in razlik v samomoru med splošno populacijo in UPD niso poznali.

GSU zaradi samomora/1000 LO za UPD v kohorti (15-59 let) je bila 1.1 (95% CI: 0.8-1.6), kar pomeni več kot en samomor na 1000 članov kohorte letno. SSUS je bila 4 (95%
CI: 2.8-5.6) krat višja kot stopnja za samomor v enako stari slovenski populaciji. GSU zaradi samomora/1000 LO za moške (15-59 let) je bila v kohorti, v obdobju 2004-2011 1.3 (95% CI: 0.9-1.9), kar je bilo 3.7 (95% CI 2.6-5.4) krat višja stopnja za samomor kot v slovenski populaciji moških enake starosti. GSU za samomora/1000 LO za ženske (15-59 let), je bila v kohorti, v obdobju 2004-2011 0.6 (95% CI: 0.2-1.6), kar je bilo 7 (95% CI: 2.6- 18.7) krat višja stopnja za samomor kot v slovenski populaciji žensk enake starosti. Umrli zaradi samomora (N=31) so bili ob vstopu v kohorto v povprečju stari 30 let, statistično značilno starejši (T=2.92, P=0.003) v primerjavi s preživelimi (26.7 let). Žrtev samomora so bile statistično značilno pogostejše predhodno že zdravljene v primerjavi s preživelimi (Chi²=6.62, p=0.01).

Starost ob vstopu v kohorto je bil pomemben dejavnik tveganja za samomor, razmerje ogroženosti je bilo statistično značilno višje pri bolnikih, ki so v kohorto vstopali starejši (HR=1.06, 95% CI: 1.02-1.11, p=0.007), moški spol se ni izkazal kot statistično značilen dejavnik tveganja za samomor (HR=1.94, 95% CI: 0.68-5.58, p=0.217).

87 žrtev samomora, ki so umrle v obdobju 2004-2007, je bilo v povprečju starih 34.9 let, 71% je bilo moških, 52% jih je umrlo zaradi samomora z zastrupitvijo. Namerna smrt zaradi zastrupitve s heroinom je bila redka. Med nezdravljenimi UPD (N=63) so prevladovali samomori zaradi zastrupitve, pri zdravljenih UPD (N=24) so prevladovali samomori, ki niso bili posledica zastrupitve, razlika je bila statistično značilna (Chi²=14.43, p<0.001). V redkih primerih zastrupitve so vsi zdravljeni UPD umrli zaradi zastrupitve z narkotiki, nezdravljeni so pogostejše umrli zaradi zastrupitve z nenarkotiki, razlika je bila statistično značilna (Chi²= 4.13, p=0.042).

**Zaključki**

Psihiatri v fokusni skupini so izrazili zanimanje za podatke in kazalnike s področja samomora med UPD, ki bi jih lahko uporabili v vsakdanji klinični praksi.

Uporaba treh nacionalnih baz podatkov je omogočila identifikacijo primerov, ki bi z uporabo posamezne baze kot edinega vira podatkov ostali neprepoznani. V kohorti je bil zunanji vzrok smrti zaradi samomora bolj podoben tistem u v splošni populaciji in zdi se, da zdravljenje vpliva na metodo samomora med UPD. Smiselno bi bilo sprejeti ukrepe in razviti specifične programe prilagojene potrebam UPD, ki bi bili usmerjeni v preprečevanje, zgodnje prepoznavanje in obravnavo samomorilnosti med UPD.
Abstract

Background
Suicide is one of the top ten leading causes of premature death in Europe. Slovenia is a country with one of the highest suicide rates in EU, while association of suicide and illicit drug use are not widely investigated and known phenomena.

Aims
The aims of this research were: to find out the opinions of a group of psychiatrists about national data on suicide among illicit drug users (IDUs) and to find out expert’s beliefs on suicide among IDUs; to monitor the suicide mortality in the cohort of IDUs treated at the Centres for the Prevention and Treatment of Drug Addiction and to estimate excess of suicide mortality among this population; to determine proportions of deceased due to suicide with respect to the following variables: socio-demographic, drug use, risky behaviour, infection and type of treatment; and to determine differences in the causes of death due to suicide among IDUs who were seeking treatment and those who were not.

Methods
A focus group methodology was used to find out the opinions and beliefs on suicide among IDUs in a group of psychiatrists.
Information on the subjects included in the present study was obtained from three data sources (using a record linkage procedure). Vital status was determined by data linkage with cohort of IDUs enrolled in opioid agonist outpatient treatment from 1st January 2004 to 31st December 2006, and General Mortality Register for every year of 8 years of observation period. Standardised Mortality Ratio (SMR) was calculated for suicide in cohort. Special mortality register served as complementary source of suicide mortality data and to identify and separate suicides in drug users seeking treatment from those who didn’t.
T-test for numerical data and the chi-square test for categorical data were used for univariate analysis considering only the outcome (suicide, survivors). The multivariate analysis time-related (suicide timing) was performed using Cox regression.
Comparisons of suicides between the groups of IDUs (seeking treatment and not) were performed using Student T-test (between two groups) for numerical data and the chi-square test for categorical data. Statistical analyses were performed using the 20.0 version of the SPSS package, Excel and MedCalc for Windows, version 12.5.

Results
The psychiatrists in the focus group showed awareness of Slovenian data on suicide in general population, but were not aware of the differences between data that refer to the general population and those referring to the IDUs.
Suicide Crude Mortality Rate (CMR)/1000 PY for the cohort members (15-59 years) was 1.1 (95% CI: 0.8-1.6). SMR was 4 (95% CI: 2.8-5.6) times higher than that of Slovenian population of same age. Suicide CMR/1000 PY for males (15-59 years) in the cohort was, in the period 2004-2011, 1.3 (95% CI: 0.9-1.9), a rate 3.7 (95% CI 2.6-5.4) times higher than that of Slovenian population of same age. Suicide CMR/1000 PY for females (15-59 years) in the cohort was, in the period 2004-2011, 0.6 (95% CI: 0.2-1.6), a rate 7 (95% CI: 2.6-18.7) times higher than that of Slovenian population of same age.
Suicide victims were in average 30 years old at cohort entry, 3.3 years older than survivors, the difference was statistically significant (T=2.92, P=0.003). Suicide victims were more frequently treated in the past than survivors, the difference was statistically significant (Chi²=6.62, p=0.01).
Age at cohort entry was an important risk factor for suicide, hazard risk for suicide was significantly higher in patients entering cohort when older (HR=1.06, 95% CI: 1.02-1.11, p=0.007), male gender did not represent a statistically significant risk factor (HR=1.94, 95% CI: 0.68-5.58, p=0.217).
87 suicide victims were in average 34.9 years at death, 71% were males, 52% died due to overdose. Suicide due to heroin overdose was rare. Untreated IDUs (N=63) died more frequently due to suicide by overdose, while IDUs seeking treatment (N=24) died more frequently due to suicide by causes other than overdose; the difference was statistically significant (Chi²=14.43, p<0.001). Untreated suicide victims died more frequently due to overdose by no narcotics, while treated victims died in all cases due to overdose by narcotics; the difference was statistically significant (Chi²= 4.13, p=0.042).
Conclusions

The use of three national databases allowed the possibility to identify cases which would otherwise remain hidden using a single database. In cohort, suicide other than overdose predominated, methods of suicide were more similar to those in the general population and seeking treatment seemed to influence the method of suicide in IDUs. Specific suicide prevention intervention tailored to the needs of IDUs, especially heroin addicts, should be developed.
List of abbreviations

AOT - Agonist opioid treatment
BDZs - Benzodiazepines
CI - Confidence interval
CMs - Cohort members
CMR - Crude mortality rate
CMs - suicides - CMs deceased due to suicide
CMs - survivors - survived CMs
CPTDA - Centres for the prevention and treatment of drug addiction (centres)
DFTCs - Drug-free treatment centres
DRD - Drug related deaths
EMCDDA - European monitoring centre for drugs and drug addiction
ETDUs - Evidence of treatment of drug users
EU - European Union
GMR - General mortality register
GPsys - General psychiatrists
HCV - Hepatitis C virus
HIV - Human immunodeficiency virus
ICD-10 - International classification of diseases, tenth version
IDUs - Illicit drug users
INSIDE-GR - IDUs in cohort
OECD - Organisation for Economic Co-operation and Development
OR - Odds ratio
OUTSIDE-GR - outside cohort, IDUs without AOT contact
PY - Person years
RR - Relative risk
NIPH - National institute of public health
SMr - Special mortality register
SMR - Standardised mortality ratio
WHO - World health organization
1. Introduction

1.1. Suicidal act

The World Health Organization (WHO) defines suicide as an act deliberately initiated and performed by a person in the full knowledge or expectation of its fatal outcome (killing oneself) (1, 2).

Suicide *per se* is not a mental disorder, but it is linked to mental health problems (3). In fact, mental disorder represents a major contributing factor for suicide, as up to 98 % of suicide victims have a psychiatric disorder at the time of suicide (3-8). Risk factors for suicide beside mental disorder include also physical illnesses (1, 2).

Suicidal act is generally acknowledged as the result of an interaction of biological, psychological and socioeconomic factors (9).

1.2. Suicide mortality

Suicide represents a significant cause of death in many European Union (EU) countries, in 2010 around 60,000 suicides were reported across 35 countries: the 27 EU member states, five candidate countries and three European Free Trade Association countries (10). According to the Organisation for Economic Co-operation and Development (OECD), the highest rates of suicide for 2010 were in the Baltic States and Central Europe: the countries with the highest death rates were Estonia, Hungary, Latvia, Lithuania and Slovenia, with more than 17 deaths per 100,000 inhabitants. Besides countries with the highest death rates, Austria, Czech Republic, France, Poland, Belgium and Finland were reported as countries where death rates were higher than EU average (27 EU member states) (10). Countries with the lowest death rates were southern European countries (Cyprus, Greece, Italy, Malta, Portugal, Spain) and the United Kingdom, where rates of suicide reached eight deaths or less per 100,000 inhabitants (10).

In the last 30 years suicide rates globally decreased across the EU (3, 10), but suicide as unnatural and preventable death, still remains one of the top ten leading causes of
premature death in Europe (3, 4, 10, 11).
The average suicide rate in Slovenia between 1985 and 1994 was 31 per 100,000 inhabitants per year (12), in the last decades the suicide rates gradually decreased; in 2010, suicide rate resulted in 20.3 suicides per 100,000 inhabitants per year (13). In spite the fact that national suicide rates in last decades decreased (3, 10), Slovenia is still an example of a high suicide rate country, where suicide has to be considered a major public health problem (3, 13, 14).

1.3. Risk of suicide and illicit drug use

According to Bertolote et al. (5), a review of studies reporting diagnoses of mental disorders in cases of death due to suicide, where 82 % of the cases were from Europe and North America, revealed that most prevalent were mood disorders (30.2 %), followed by substance abuse (18 %), schizophrenia (14 %) and personality disorders (13 %). Therefore, drug use disorder represents worldwide one of the strongest predictors of suicide (11, 15-18). Suicide is a leading cause of death among people who abuse alcohol and drugs (19), those treated for substance abuse are around 10 times at greater risk to die by suicide than general population (19). Among illicit drug users (IDUs), suicide represents an important cause of death (15-17, 20). Darke et al. (17) reviewed studies from Europe, Australia and USA, in which suicide as a cause of death in IDUs was reported, and concluded that in the majority of studies more than 10 % of deaths were attributed to suicide. Moreover, overdose and suicide represent two of the largest causes of death among opioid users (17). Especially heroin use is acknowledged as an important risk factor for suicide (16, 17). People who inject heroin are about 14 times at greater risk for eventual suicide than their peers in general population (19).

According to Darke and Ross (16), the major risk factors for suicide are the same in general population and in IDUs. According to several studies (16, 17, 21) demographic characteristics (male gender, young age), psychopathology (addiction, major depression, borderline personality disorder, antisocial personality disorder, posttraumatic stress disorder), family dysfunctions and social isolation are same risk factors in both population, but of higher prevalence among IDUs than in general
IDUs in addition face also additional risk factors for suicide related to their polydrug use (16, 17, 22-24). Consequently, IDUs are exposed to higher relative risk for suicide (16, 17) and suicide mortality rate for IDUs results higher than that of peers in general population (15).

According to the American expert consensus panel (25) risk factors for suicidal thoughts and behaviours among IDUs are: previous suicide attempts (most potent risk factor), substance abuse (severity of condition, intoxication or withdrawal, early onset of substance abuse, polydrug use, substance-induced effects), psychopathology (co-occurring mental disorder as depression, anxiety disorders as posttraumatic stress disorder, severe mental disorders as schizophrenia, bipolar disorder or anorexia nervosa, personality disorder as borderline or antisocial personality disorder), history of childhood abuse (especially sexual abuse), family history of suicide, stressful life circumstances (low level of education, job loss or unemployment or other financial losses, legal problems and imprisonment, divorce or separation, conflicting relationship, low social support and social isolation).

Protective factors for suicide in IDUs have not been well researched, among those identified the profoundly explored is “reasons for living”; other known protective factors are: being clean and sober, presence of a child in the home and/or childrearing responsibilities, intact marriage, employment, trusting relationship with a counsellor, physician, or other service provider, attendance at support groups, religious attendance and/or internalized spiritual teachings against suicide (25). Protective factors vary with cultural values (25).

According to Ross et al. (26) IDUs in agonist opioid treatment (AOT) are at high risk for suicide (20). IDUs during treatment face increase in risk for suicide when having coexisting mental health problems (25). Data from literature reveal high prevalence of suicidal thoughts and suicide attempts among IDUs in AOT (20, 27).
1.4. Drug related deaths and suicides among illicit drug use population

European Monitoring Center for Drugs and Drug Addiction (EMCDDA) definition of drug related deaths.

Among the most established of the EMCDDA monitoring systems, are the Key Epidemiological Indicators, which include also “drug related deaths (DRD) and mortality among drug users” (28, 29).

The concept of ‘DRD and mortality among drug users’ as well as ‘drug related mortality’ is complex and can be used with different meanings which may cause difficulties in interpretation and in drawing conclusions. According to the EMCDDA, Drug related mortality includes two broad components:

- **Deaths directly attributable to the pharmacological action of the drugs**, alone or in combination, happening shortly after the consumption of the substances, so called overdoses or poisonings or DRD or drug induced deaths (28, 29).

  The preferred method to estimate the number of those deaths is to extract cases from existing General Mortality Register (GMR) (28, 29).

- **Deaths indirectly related to the use of drugs**, usually caused by concurrent factors (e.g. infections acquired through injection) or to external circumstances (e.g. traffic accidents where drug use was one of the determinant factors).

  Causality between drug use and death is usually difficult to determine. Sources and methods of data collection for deaths indirectly related to use of drugs are different to those used for ‘drug-induced deaths’, presenting considerable complexity (28, 29).

  Sources of information on DRD, besides GMR, are also Special Mortality Registries developed specifically for drug mortality monitoring in each country by combination of different sources (e.g. forensic, police and others) which allow a high detection rate of cases and is often held by specialised institutes (28, 29).

According to EMCDDA, there are 1.3 million of problem opioid users, mostly heroin users in EU (30). EMCDDA estimates that every year in Europe between 10,000 and 20,000 IDUs die prematurely (31, 32), most frequently between 7,000 and 8,000 cases.
every year by overdose (33). Death rates among IDUs result up to 13 times higher than among the general population (34).

Although the causes of death and mortality rates vary across countries, populations, studies and time, in the EU and worldwide the overdose remains the most common cause of death among IDUs (35-37). Among deceased, heroin users predominate and among overdoses, those due to opioids (mainly heroin or its metabolites) (30-32, 38), while most IDUs are polydrug users (30, 31). The 90% of overdose victims in Europe are over 25 years old 80% of overdose deaths are reported among men (31).

The second most frequent cause of death among IDUs is represented by natural causes (diseases), while between one-fifth and two-fifths is due to suicide and trauma (31, 32). Overdose and suicide represent two of the largest causes of death among opioid users (17), and in majority of deaths the victims are men in their thirties (30, 31). Darke and Ross (16), in a review of the studies on mortality in opioid (mostly heroin) users reporting suicide as a cause of death, revealed that the proportion of suicides among deceased ranged from minimum of 3% to maximum of 35%.

Suicide is in general a most under-reported and misclassified cause of death worldwide (39). The causes of death (underlying and external) in Slovenia are determined by a medical doctor who treated a deceased, a coroner or pathologist, and suicide is recorded only in clear evidence of intent of suicide victim to kill him/herself, otherwise other intent is recorded (accidental or undetermined) (12). Reporting suicide method is less accurate in case of poisoning (40); classification of death by poisoning as intentional is influenced by professionals (41), in fact there is a high proportion of overdoses where intent remains undetermined (30, 31). There is an additional gap in monitoring suicide among IDUs. Suicide in case of routine EU monitoring of IDU mortality is usually recognised only within drug-induced deaths (intentional poisoning or overdose), and only in limited extent as this depends on substance used in suicide (suicide by poisoning with heroin is easy to recognise while suicide by poisoning with different prescription drugs is difficult to link with IDU). In addition, suicides in IDUs due to causes of death other than poisoning (e.g. indirect causes as hanging) are usually recognised as suicides, but often remain hidden as event in IDUs (41, 42).
The 10.654 (95% CI: 9078-12593) aged 15-64 years problem opioid users were estimated in Slovenia for 2004 (43). In addition, the majority of IDUs seeking treatment in Slovenia, like in EU, are opioid users (44, 45). In Slovenia AOT became possible early in the 1990s, twenty years ago implemented nationally by the network of outpatient Centres for the Prevention and Treatment of Drug Addiction (CPTDA) within the primary health level as part of the public health service network (public health institutions, founded by public sources), carried out by health professionals (46).

Similarly, with the findings for EU (30), in Slovenia most frequent cause of death among IDUs is overdose present in two thirds of deceased who are usually heroin users (44, 45). Overdose accounts for up to 50-60% of all deaths among injectors in countries with a low prevalence of HIV/AIDS (30, 31), as is the case of Slovenia with low prevalence of HIV infection (47). In 2006 Slovenia with 26 DRD per million among all adults (15 to 64 years) ranked at twelfth place among thirty European countries (48).

For the purpose of this study, national data on suicide among IDUs were preliminary analysed. Suicides due to overdose represented more than one quarter of all overdoses in IDUs in Slovenia, average age of suicide victims was 45 years (vs 28 years for accidental overdose); male gender, older age and non-use of alcohol during intoxication were the best predictors for intentional fatal overdose (45, 49).

1.5. Differences in suicide between the general population and illicit drug users

A WHO study of patterns of suicide methods in 56 countries for the period 1994–2005 revealed that hanging is the predominant method of suicide in most countries, with highest proportions in Eastern Europe (40). Males commit suicide more frequently than females (3). In general population worldwide males usually die due to violent and highly lethal methods (e.g. hanging, firearm suicide), females for less violent and less lethal methods (e.g. poisoning or drowning) (40).

According to that study, in Slovenia the most frequent method of suicide is hanging, 65% of males and 53% of females die due to hanging (40). In men, the frequencies of methods of suicide are as follows: 12% by firearms, other methods of suicides in 13%,
while poisoning (pesticide excluded) covers 2.5% of suicides. In females the frequencies of methods are: 12% by drownings, other methods of suicides in 13%, while poisoning (pesticides excluded) is present in 9%. Poisoning (pesticides excluded) is an infrequent method of suicide (40).

The same conclusions as those previously reported can be drawn from another Slovenian study: men tended to choose more violent methods as hanging (two thirds of suicides), followed by firearms and poisoning by gas, women choose hanging in half of the cases, followed by drowning, poisoning and suicide by jumping from high places (12).

Rates of suicide and suicide risk factors are higher among IDUs than in general population (17). IDU suicide victims are predominately males, younger are more endangered (16, 17, 21). Poisoning (drug-induced death or overdose) is the most common method of suicide in IDUs, chosen by a half or more suicide victims and is more common in IDUs than poisoning in general population (17). Poisoning by prescription drugs is the most common method of suicide by IDUs, while overdose by main illicit drug used, e.g. overdose by heroin in heroin users is uncommon (17).

For the purpose of this study, national data on suicide among IDUs were preliminary analysed for focus group. Some differences in suicide between general population and the IDU population emerged. Among IDU suicide victim males were more frequently affected, suicide victims died at a younger age than general population (41 years vs 51 years), the most frequent cause of death was overdose (poisoning), overdose by benzodiazepines (BDZs) was the most frequent (one fifth of overdoses) (45, 49).

Studies on suicide have long tradition worldwide (3, 17) and in Slovenia (14), searching for literature under “suicide in Slovenia” in Pub Med identified more than 100 hits (8,13, 50-115). Similarly, as worldwide, studies on suicide and alcohol have a long tradition (12, 13, 21, 56, 60, 61, 70, 73-78, 92-94, 97, 102, 107-109), not surprisingly as Slovenia has traditionally one of the highest alcohol consumption rates and alcohol-related mortality in EU (116, 117) and one third of suicide victims have a diagnosis of alcohol-related psychiatric problems (12, 118). Like worldwide (16) less is known about suicide
and other psychoactive substances (60, 61, 70, 78, 119), especially about suicide among IDUs who are heroin users (49).

1.6. Attitudes to suicide and illicit drug use

An Ireland study revealed that although lay opinion recognises alcoholism, depression, suicide and illicit drug addiction as the most important mental health problems in population, it also expresses personal attitude of strong stigma related to mental health problems (120).

A recent systematic literature review revealed that public stigma of mental illness in the USA continues to be widespread and all drug addicts – alcohol and IDUs – are the most stigmatized (121). Healthcare system is one of the environments were persons with mental disorder experience additional stigma and discrimination (122). Data from literature suggest that some physicians hold negative attitudes towards patients with substance use disorders in treatment (123), while over half among medical students and doctors held negative attitudes towards people with schizophrenia, depression, and drug and alcohol disorders (124).

1.7. Preventing suicide in illicit drug users

Suicides are preventable premature deaths. According to WHO (125), for more effective preventive measures, a comprehensive multisectoral approach is needed (national suicide prevention strategy) with the collaboration of government, civil society and media. The effective strategies for preventing suicides are: restricting access to the most common means for suicide, introducing alcohol policies to reduce the harmful use of alcohol, early identification, treatment and care of people with mental disorders and substance use, training of non-specialized health workers in the assessment and management of suicidal behaviour, follow-up and continuity of care for people who attempted suicide, provision of community support and reporting by media in a responsible way.
Expert consensus panel in the USA recommends that all services providing substance abuse treatment have minimum requirements for screening and identifying suicidal thoughts and behaviours (all drug users in treatment should be screened for suicidality) and to be prepared to develop and implement a treatment plan that addresses suicidality and to coordinate the plan with other providers (25).

Ross et al. (23) in their examination of suicide risk assessment practice among staff working in drug and alcohol residential rehabilitation services in Australia reveal that the majority of staff is commonly made of paraprofessionals, frequently without formal suicide risk assessment training, often in services there are no clearly documented policies and procedures to follow in case of client suspected of being suicidal; in cases where manager reported the existence of policy, the staff was often unaware of it (20). One in five staff reported personal experience of having lost a client due to suicide, one in ten of most recent suicides was reported to be client from those services, one in five services indicated that suicidal ideation and/or recent attempt were sufficient for exclusion from treatment (23). Staff working in drug-related treatment facilities should be prepared to manage, prevent and report suicidal behaviour in a so high-risk population (25).
2. The aim of the study and hypotheses

2.1. The aim of the study

The aim of the study is to contribute to the extension of knowledge about the characteristics of suicide victims among IDUs and to contribute to the successful planning of prevention and treatment of suicidality among IDUs.

The qualitative study’s aim is to find out the opinions of a group of psychiatrists about national data on suicide among IDUs and to find out expert’s beliefs on suicide among IDUs with a focus group methodology.

There are only a small number of studies on IDUs in EU countries designed as cohort studies which allow a deeper insight on mortality of IDUs, with an estimation of mortality rates among IDUs and with a possibility to identify all causes of death among IDUs (42). For this reason, a cohort study was performed at National Institute of Public Health (NIPH), with a possibility to follow up and estimate mortality in IDUs and to achieve the goals listed below, using national databases and through a well-defined cohort (IDUs seeking treatment in CPTDA, centres):

- to monitor mortality among IDUs seeking treatment, to identify specific mortality due to suicides and occurrence of suicides in observed group: mortality of IDUs is usually monitored as consequence of drug-induced causes of death while overall mortality (DRD due to causes other than overdose) remain underestimated. A cohort study of IDUs in treatment offers the possibility to monitor the overall mortality (identification of all causes of death among IDUs), to calculate mortality rates and to assess the excess of suicide mortality (the extent to which the mortality of IDUs in treatment differs from that of their peers matched for age and gender).
- to determine the proportions of deceased due to suicide with respect to variables (socio-demographic, drug use, risky behaviour, infection and type of treatment). Risk and protective factors for suicide in IDUs in Slovenia are not assessed and
known; assessment of differences in variables between suicide victims and survivors in the cohort could offer the possibility to identify those factors which are more characteristic for IDUs deceased due to suicide. The identification of such factors is an important basis for further prevention planning and activities.

– to determine the difference in causes of death among suicide victims seeking treatment in centres (INSIDE-GR) and those not reported to be treated (OUTSIDE-GR); in spite Slovenia is traditionally a country with high suicide rate, the suicide among IDUs in Slovenia is a phenomenon not well investigated and not known. There is no evidence on the impact of treatment or AOT influence on suicide among high-risk population of IDUs.

2.2. Hypotheses

• Qualitative data collected through focus group of psychiatrists will suggest that the issue of suicide among IDUs is not known.

• The values of some indicators (type of treatment, socio-demographic, drug use, risky behaviour, infections, treatment) will be different between suicide victims and survivors.

• Suicide victims not registered as seeking treatment in centres will use a different method of suicide than that used by treated suicide victims.
3. Materials and methods

3.1. Subjects in qualitative analysis

Eight psychiatrists participated in the focus group – four from general psychiatry facilities, another four from addiction treatment centres, 3 from AOT and 1 from the only high-threshold (drug-free) health service in Slovenia. These psychiatrists varied in their level of professional knowledge and their clinical experience in treating IDUs. They worked daily on an outpatient or inpatient basis with patients who differed in gender, age and psychopathology, and altogether they covered all available type of services for the treatment of IDUs.

The group facilitator was an experienced psychiatrist with knowledge of epidemiology, qualitative and quantitative research, suicidal behaviour and illicit drug addiction.

3.2. Procedure in qualitative analysis

This study was carried out by two successive phases. During the initial phase, the national data on suicide among IDUs were preliminarily analysed. In the second phase, the results were presented and discussed at a 120-minute-long focus group meeting. The meeting was divided in two parts, the first concentrating on suicide in the general population and the second on how it affects the IDU population. A focus group methodology was used. The focus group meeting was audio- and video-taped and transcribed. The transcription was then re-read and recoded to complete the process.

Two researchers carried out the process just described, first separately, then together by comparing the structural features, after which a further comparison was carried out until they reached agreement on structural matters.

3.3. Data collection in quantitative analysis

Information on the subjects included in the present study was obtained from three data sources (using a record linkage procedure), all of them were operative nationwide and
all three were run by the NIPH. Additional data were obtained from all available sources. First step was to identify IDUs who commit suicide in the cohort, then in whole Slovenia for the period 2004 - 2007. Second step was to identify treatment status of identified suicide victims in IDUs.

### 3.3.1 Identification of illicit drug users who commit suicide in the cohort – Data base I

The data on mortality were obtained from GMR. The causes of death (underlying cause) were encoded on the basis of the WHO International classification of diseases (ICD-10, tenth revision) (126). According to the EMCDDA, monitoring standards for DRD (drug-induced deaths or direct deaths) require cases of death attributed directly to the use of illicit substances of abuse. In GMR these operative criteria consist of a list of codes from ICD-10, where the underlying cause of death (the condition that initiated the process that led to the death) are: mental and behavioural disorders due to psychoactive substance use (opioids, cannabinoids, sedatives, cocaine, other stimulants, hallucinogens, volatile solvents or multiple drug use: F11-F16, F18, F19; or poisonings: accidental poisoning (X41, X42), intentional poisoning (X61, X62), or poisoning with undetermined intent (Y11, Y12) in combination with T codes of psychoactive substances (narcotics: T40.0 - T40.9; psychostimulants T43.6) (28, 29, 125, 127).

The second source of data used was the Evidence of Treatment of Drug Users (ETDUs) database, where records on IDUs who request AOT are stored. The registration of these data in Slovenia is mandatory, and there are twenty years of tradition supporting this practice. The data on ETDUs are collected by professionals working at centres during a face-to-face interview and with fulfilment of ETDU questionnaire once a year for the subjects in treatment from previous year or at the beginning of treatment. The questionnaire has been harmonized with EMCDDA Treatment Demand Indicator Standard Protocol (128), and was expanded to include additional items on risk behaviour, infectious diseases, sexual behaviour and legal experiences, as well as the sociodemographic and clinical data of patients (contact with
centres, harmful use of illicit drugs, treatments) (47). Records were made anonymous by the Soundex code: Soundex coding allows anonymous representation of a surname and consists of the initial letter of the surname and three digits (129, 130), therefore additional check against double-counting was performed for each subject (47).

For the purposes of the present study existing national cohort study was upgraded. In this way a collection was made of the records of 3,949 IDUs in AOT during the period from 1st January 2004 to 31st December 2006 (IDUs who had entered AOT for the first time in 2004, 2005 or 2006, or had re-entered treatment after more than 3 months, or had been already continuously in treatment before 1st January 2004) (47). Entry into treatment coincided with the questionnaire filling in (except for those who, at the beginning of each year, had always been in treatment, for whom a shorter version was prepared) and with the entry in the cohort (47). IDUs who fulfilled the following inclusion criteria: illicit drug user status (recent or past history of illicit drug use); enrolment in outpatient AOT treatment during 2004-2006 period; presence of complete identifiers, or sufficient/relevant identifiers to link with GMR without any doubt, and being traceable for vital status ascertainment; a well-defined date of onset of observation time (date of the cohort entry), were included in the cohort.

The linkage of cohort and GMR was performed in line with guidelines on cohort studies (28, 29, 42). The use of the Soundex code, together with each patient’s gender, date of birth and code for the municipality of permanent residence, made it possible for any individual case appearing in databases to be electronically monitored by record linkage of the cohort to the GMR for the period from January 1, 2004 through December 31, 2011, updated once a year (28, 29, 42, 129-132). A new data base of subjects was compiled, where data from the cohort were included, with the added vital status of being cohort subjects, which divided the survivors from the suicides, on the last day of observation, December 31, 2011, including the date and causes of death of suicide victims (Picture 1).
3.3.2 The identification of deceased due to suicide among illicit drug users and their treatment status - Data base II

The third source of data was the Special Mortality register (SMr), where data on DRD, meaning in this case those deaths where illicit drug was found in the body at the moment of death, were collected for the period 2002 to 2007 and encoded on the basis of ICD-10 at national level, after SMr closure in 2007. For this study, we used data collected during the period 2004 - 2007. SMr included cases of deaths in Slovenia where, on the Medical Certificate of Cause of Death provided by the physician (reported diseases, morbid conditions or injuries, and related circumstances), the medical information appearing in the record had reported drugs as being one of the causes of death (immediate cause, intervening causes, underlying or associated causes). Afterwards, a unique personal identification number (EMSO), uniformly assigned by the Central Population Register to all the people of the Republic of Slovenia, was added for cases reported by the national General Police Directorate as being DRD that had been investigated by the police. Those personal data were linked to these data on the deceased. The resulting data base, which was derived from two data sources, was linked
with a third source – the data base of medico-legal investigations on drug-related deaths (autopsy, autopsy with toxicology) of the Institute of Forensic Medicine, Faculty of Ljubljana. In addition, our linkage system incorporated the national data on hospitalizations that were attributed to illicit drug poisoning and illicit drug-induced deaths from GMR. Further investigation of suspicious sudden deaths of young people – deaths arising from cardiac arrest or from an unknown cause - were made by written inquiries about drugs addressed to the medical doctor who had written the death certificate. Data base on observed subjects I (DRD among cohort subjects) for the period 2004-2007 was linked with SMr 2004-2007 in a way to obtain Data base on observed subjects II with added treatment status. Additional information on treatment status of suicide victims deceased in 2007 was obtained: suicides from SMr for 2007 were linked to ETDU for 2007 (new patients entering AOT in 2007 were considered) in order to identify treatment status in 2007 (Picture 2).

The personal identifiers (Soundex code, gender, date of birth, permanent residence municipality code) were used for electronically monitored record linkage. Manual control was performed for all cases of identified suicide; matched cases were identified as treated. The codes used to identify suicide mortality included ICD-10 X60.0- X84.9 and Y87.0.
Special Mortality register (SMr) 2002-2007: included cases of deaths in Slovenia with information on drugs as being one of the causes of death (immediate cause, intervening causes, underlying or associated causes) on Medical certificate of cause of death

Data from national General Police Directorate: unique personal identification number of drug-related deaths investigated by the police

Data from Institute of Forensic Medicine: national medico-legal investigations on drug-related deaths (autopsy, autopsy with toxicology)

National data on hospitalizations due to illicit drug poisoning

Further national investigation of suspicious sudden deaths of young people

GMR 2004-2007: drug-induced deaths (overdoses)

SMr 2004-2007

GMR: 2004-2007

Data base on observed subjects I. 2004-2007

SMr 2007 (suicides) and ETDU 2007 (new patients)

In this study, the utilization of SMr was primarily focused on drug-induced deaths (overdoses) and DRD other than poisoning.

Among poisonings (overdoses) recorded as the underlying cause of death, the type of substance involved was identified among the following groups appearing in the lists of ICD-10 codes:

1. **prescription drugs**:
   - T40 Poisoning by narcotics and psychodysleptics (hallucinogens):
     - T40.2 Other opioids
     - T40.3 Methadone
     - T40.4 Other synthetic narcotics
     - T40.6 Other and unspecified narcotics
   - T42 Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs:
     - T42.3 Barbiturates
     - T42.4 Benzodiazepines
     - T42.6 Other antiepileptic and sedative-hypnotic drugs
     - T42.7 Antiepileptic and sedative-hypnotic drugs, unspecified
   - T43 Poisoning by psychotropic drugs, not elsewhere classified
     - T43.6 Psychostimulants with abuse potential
     - T43.8 Other psychotropic drugs, not elsewhere classified
     - T43.9 Psychotropic drug, unspecified

2. **illicit drugs**:
   - T40 Poisoning by narcotics and psychodysleptics (hallucinogens):
     - T40.0 Opium
     - T40.1 Heroin
     - T40.5 Cocaine
     - T40.8 Lysergide (LSD)
     - T40.9 Other and unspecified psychodysleptics (hallucinogens)

3. **other**:
   - T50 Poisoning by diuretics and other and unspecified drugs, medicaments and biological substances:
T50.9 Other and unspecified drugs, medicaments and biological substances

- T51 Toxic effect of alcohol:
  T51.0 Ethanol

Among poisonings, another axis of psychoactive substances involved comprised:

1. narcotics:
   - T40 Poisoning by narcotics and psychodysleptics (hallucinogens):
     T40.0 Opium
     T40.1 Heroin
     T40.2 Other opioids
     T40.3 Methadone
     T40.4 Other synthetic narcotics
     T40.6 Other and unspecified narcotics

2. non-narcotics:
   - T40 Poisoning by narcotics and psychodysleptics (hallucinogens):
     T40.5 Cocaine
     T40.7 Cannabis (derivatives)
     T40.8 Lysergide (LSD)
     T40.9 Other and unspecified psychodysleptics (hallucinogens)
   - T42 Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs:
     T42.3 Barbiturates
     T42.4 Benzodiazepines
     T42.6 Other antiepileptic and sedative-hypnotic drugs
     T42.7 Antiepileptic and sedative-hypnotic drugs, unspecified
   - T43 Poisoning by psychotropic drugs, not elsewhere classified
     T43.6 Psychostimulants with abuse potential
     T43.9 Psychotropic drug, unspecified
3.4. Statistical analysis

Datasets used for statistical analyses were fully anonymised; any information that would compromise the anonymity of the subjects was deleted from the datasets before they were further analysed.

In the quantitative part of the analysis, Person Years (PY) for every subject in the cohort were calculated from the entry in the study until the end of observation period for survivals and to the date of death for deceased. PY is a summation of all cohort member’s follow up periods, which differ for each cohort member depending on when they were recruited into the cohort study and when they died or whether they survived. If a patient died before the end of the study period, the date of death was considered as the end of the individual observation period. If a patient was still registered as survived at the end of the study period, the end of the study period was considered as the end of the observation period (42).

The Crude Mortality Rate (CMR) describes the rate of death occurring in the cohort (133) and is defined as the quotient of the sum of deaths and the sum of all PY (42). CMR is a measure of the number of deaths against the PY of the observed follow up. In this study CMR is expressed as the number of deaths per 1000 PY. The number of deaths are divided by PY and then multiplied by 1000 to derive the CMR expressed as number of deaths per 1000 PY (42, 133).

Mortality rates were calculated within the age group from 15 to 59 years in line with international recommendations (41, 42). Rates and ratios were reported with 95% CI.

Standardised Mortality Ratios (SMRs) for suicide and their 95% confidence intervals (95% CI) were used to compare the suicide mortality of cohort of IDUs to that of the general population for the same age, gender distribution and period (133); it measures the ‘excess’ force of mortality (excess mortality ratio), the extent to which mortality in a cohort differs from that which would be seen in an average population matched for gender and age (42).

The expected numbers of suicide deaths were calculated using sex and age specific general population suicide mortality rates (42). In order to generate stratified mortality
rates (mortality rates for each age in 5 years age category from 15 to 59 years and gender category, both the observed number of suicide deaths and observed PY were recalculated separately for each category (stratified observation-time, number of deaths and mortality rates observed) (42).

Observed suicide deaths were compared by gender and age groups with expected suicide mortality to derive SMRs. The SMRs was calculated using the age groups 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54 and 55-59 years. The expected suicide mortality was calculated by multiplying the suicide specific mortality rate observed in the general population by the PY of follow up seen in the analysis cohort, matched by gender and age (indirect method) (133). The SMRs summarise the impact of mortality in the cohort as opposed to mortality in the general population, but retain the age and gender distribution of the cohort. It is useful in summarising the ‘excess’ force of mortality experienced in the cohort compared with that in the general Slovenian population (42). An SMR compares the observed number of deaths in the cohort to the expected number of deaths for a sample of the same age and gender from the general population at that time. Observed deaths are divided by the number of deaths expected in the general population. SMR greater than 1 indicates an excess of mortality in the sample compared to the general population (42, 133).

T-test for numerical data and the chi-square test for categorical data were used for univariate analysis considering only the outcome (suicide, survivors).

The multivariate analysis time-related (suicide timing) was performed using Cox regression.

Comparisons of suicides between the groups of IDUs (seeking treatment and not) were performed using Student T-test (between two groups) for numerical data and the chi-square test for categorical data (comparing column proportions with z-test and adjusting p-value according to Bonferroni method, if more than 2 x 2 table).

Statistical analyses were performed using the 20.0 version of the SPSS package, Excel and MedCalc for Windows, version 12.5 (134).
3. Results

First the results of the qualitative research data followed by those of the quantitative data analyses will be presented.

4.1 Qualitative analysis

4.1.1. Experts’ beliefs on suicide in general population

Participants of focus group, general psychiatrists (GPs) and those psychiatrists working in treatment centres did not show different views and opinions, thus data on the entire focus group are presented.

The identified themes and subthemes are presented in random order (in Table 1 for the general population, in Table 2 for IDUs) and are set out below with the help of a variety of citations from participants. The identified themes and subthemes are marked in bold in the text.

The participants unanimously agreed that monitoring data on suicide and suicidal behaviour by psychiatrists working as practitioners is important.

In the opinion of the GPs, those data offer one of the most important indicators of public health, as they are vital not only in psychiatry but in other settings, too (cit. 7), so psychiatrists should have a specific interest in them, as suicide is one of the preventable causes of mortality in the medical sphere (cit. 5).

Although the incidence of suicide in Slovenia has been falling since 1998 (103), in 2011 the rate increased (135, NIPH unpublished). The participants strongly believed that the fall in the suicide rate observed in Slovenia between 2000 and 2010 was the outcome of education and programmes leading to the prescription of antidepressants rather than BDZs by general practitioners (cit. 1, cit. 5) (104, 110) and consequences of a
general campaign which presented depression and suicide as themes that deserved discussion (cit. 5) (73, 103).

In the opinion of GPsys, the increase in the suicide rate in 2011 in Slovenia was a consequence of the global crisis and recession, even if the increase in suicide took different forms in different countries and even in different regions of single countries, while in some cases the suicide rate, in spite of the crisis, showed no increase at all (cit. 7). Some participants reported that in a few countries that had enacted and expanded a programme of social transfers, suicide has not increased because of the global crisis, so much so that in some Scandinavian countries during the recession the suicide rate has actually fallen (cit. 5). Participants stressed the impact of social relations, the ability of services to cover all inhabitants and the economic repercussions of suicide.

On the topic of mental disorders constituting a risk of suicide and the importance of knowing the right diagnosis, the participants agreed that a diagnosis of mental disorder is only one of the pieces of information to be acquired (cit. 2, cit. 7). They believed that in Slovenia, as in other countries worldwide, there are people who need psychiatric and other services for their mental health, whereas those services are still not available. In the case of people suffering from a mental disorder or even comorbidity, it is important to get to know these people and to follow up on their condition, as the successful prevention of suicide partly depends on appropriate services that manage to take care of these people, on the accessibility of the services that do care about and are able to help them – not on a correct diagnosis alone (cit. 7). Some participants pointed out that “in addiction, personality or mood disorders are often present, leading not only to double, but even to triple or quadruple diagnoses, and to polydrug addiction – to all that enhances the risk, and this is often neglected” (cit. 2).

The participants agreed too that it is probably best to know all the diagnoses these people have had during the course of their life, not only a diagnosis formulated at a single moment (cit. 4) and to know too all the components of the individual personality and all the relevant circumstances (cit. 4, cit. 7).
The participants strongly believed that suicide by hanging in Slovenia is culturally influenced. Reference was made to "Hanging by a rope or a belt, or whatever represents the national trend. I have an experience of series of examples of hanging, because it is so symbolically Slovenian" (cit. 6). The participants argued that "if we interpret as a threat phrases such as 'I'll go and hang myself' or 'I'll end up under a train', that means there is a transfer from one person to another, and to some extent there is a kind of pattern" (cit. 4). In the opinion of the participants, from a preventive point of view, it is important to know about previous suicide attempts, if any, and about their typology, because, if someone chooses a more aggressive and successful method, it becomes more likely that next time it will again be successful (cit. 2). In the case of hanging, there is no call for help – the act has already been decided – while in the case of taking tablets, it is easy for us to speculate (cit. 1). Participants believed that for those working in prevention it is important to know which method is most frequent and how easily available the various means are. It was remarked that: “In cases of alcohol intoxication, suicide attempts and suicide itself become more likely. If there is more drinking in that culture, the impact of any kind of ban on drinking will be influenced by that” (cit. 3).

According to Korosec Jagodic et al. (111) unemployment was the strongest predictor for suicide, while a higher marriage/divorce ratio represents a protective factor, better psychiatrist availability (4 psychiatrists and more working at outpatient clinics per 100000 inhabitants) was negatively correlated with the suicide rate and the antidepressant/anxiolytic ratio higher than 0.5 reduced suicide rate, while prevalence of alcohol use disorders was significantly related to suicide rate. Slovenian data on protective and predictive factors for suicide (111) were known by the participants, only the limits of psychiatrist availability were not known (cit. 5), but participants believed that those limits were low (cit. 4, cit. 5) and not the same in all regions, because of inequalities in distribution (cit. 5, cit. 7). The participants agreed that the listed factors were not known for the IDU population, and that it would be useful to monitor them in this population (cit. 5). The participants believed too that the factor of IDUs having a job is protective (cit. 2, cit. 7), likewise being part of a family group is protective (cit. 4) and so is the factor of children who are living with IDUs (cit.1, cit. 2), considering that IDUs are subject to a high frequency of divorces and separations (cit. 5).
A review of studies revealed that 45% of suicide victims have contact with primary care providers and one in five suicide victims have contact with mental health services, in both cases within a month before suicide (136). During last month prior suicide 66% of victims with health provider contacts consult a general practitioner, 13% were discharged from a psychiatric hospital and 7% from general hospital (137). On the role of the share of contacts with health services implemented by suicide victims in the month prior to committing suicide, the participants believed that “this depends on how well patients are known, how services obtain information about them, and whether, if they are informed in good time, they direct patients to a psychiatric hospital, so leading to a smaller percentage of future suicide victims among those dismissed from a general hospital” (cit. 4). Others added: “many (future) victims, 13% of the total, were among those who had been dismissed from psychiatric hospitals, in a population that is quite specific, because those patients have a mental disorder, while 7% is the percentage for general hospitals” (cit. 3); it should be borne in mind that those dismissed from psychiatric hospitals “are more stigmatized” (cit. 5).

Some participants believed that improvement could be achieved through the education of general practitioners, “they often call us to say: 'There is a person sitting here; he is telling me that he would just like to kill himself, but he is calm. It doesn’t look so horrible, what can I do?'” (cit.2). Other participants believed just the opposite - that younger practitioners really know the field on the topics of depression and suicide, and that the real problem is centred on monitoring: “There are patients who are known to be at risk, or it seems that they are at risk, but we have no opportunity to look at them in their local environment, where they live, at the right time. Dismissal takes place on Friday, and then suicide happens on Saturday. There is a need to inform home nursing services in the field and to monitor these people” (cit. 7; others agreed).
Table 1. Themes and subthemes identified during the focus group meeting on suicide in the general population

- Monitoring data on suicide and suicidal behaviour: the participants unanimously agreed that monitoring data on suicide and suicidal behaviour by psychiatrists acting as practitioners is important, and is one of the most important indicators of public health, too.
- Fall in suicide rate in Slovenia in the period 2000-2010: participants strongly believed this happened because of antidepressants prescription rather than BDZs’ one by general practitioners, accompanied by a general campaign to increase awareness in public opinion.
- Rise in suicide rate in Slovenia in 2011: in the opinion of participants, this was due to the economic recession and the global crisis.
- Mental disorders as a suicide risk: the participants agreed that a diagnosis of mental disorder is only one item of information; it is important to know these people, then provide follow-up through appropriate services.
- Methods of suicide: the participants strongly believed that suicide by hanging in Slovenia is culturally influenced.
- Previous suicide attempts: in the opinion of participants it is important to know if any such attempts occurred in the past and, if so, of what kind; from the preventive point of view, it should be known which method was the most frequent and which means were available.
- Protective and preventive factors for suicide in Slovenia: the participants were familiar with factors that referred to the general population, but, in the opinion of participants, factors for the IDU population are still not known, whereas it would be useful to know and monitor them.
4.1.2. Experts' beliefs on suicide among illicit drug users

In cases where majority or all participants of focus group share same opinions, these last are described as those of focus group participants, in case of different opinions of participants those are specifically described.

The group participants unanimously agreed that monitoring suicide behaviour and risks of suicide among IDUs is important, but there are difficulties to be overcome, because there is a grey area of statistics and, in the opinion of some participants, it is not known how accurate the numbers are (cit. 2). On the issue of how many suicides occur among IDUs and the proportion they represent of all suicides, some participants pointed to a likely underestimation (cit. 2). The participants were not familiar with estimates of the suicide mortality rate for heroin users, but they agreed that the risks of mortality and suicide in heroin addicts are higher than those in the general population, so that these subjects are in greater danger – their conclusion being that it is important to monitor the risk factors in this group.

The participants agreed that in suicide caused by an overdose, the subject’s intentions are not always clear, particularly in the case of an intravenous injection, so, in their opinion, it often remains an open question whether the overdose was accidental or intentional.

Psychiatrists from drug-free treatment centres (DFTCs) believed that it is difficult to assess whether or not there was an intention to take an overdose, as these suicide victims “usually don’t write a suicide note. Even when legal medicine is involved, it is difficult to assess the intent, as an attempt has already been made to study this, but the study was interrupted or something similar, just because the authors could not find out if taking an overdose had been accidental or intentional” (cit. 1).

One GPsy stressed that drug users are “para suicidal all the time” (cit. 6). Another GPsy believed that, among drug user’s suicides caused by an overdose, there is a higher percentage of what are essentially accidents, so that there is a need to pay close attention to the methods that may lead to such deaths (cit. 5). Psychiatrists from DFTCs
agreed about accidental deaths among suicides, although “we don’t have any data on that, but we can simply look at the anamnestic history acquired from patients. Those who take good care of their condition turn out not to have many overdoses or to have none at all. Those without any suicide attempts also have no overdoses. The way they take doses counts too – the careful ones never have sepsis or an abscess, or anything like that. Those people are careful about how they take drugs” (cit. 1). Psychiatrists from AOT centres, on the other hand, strongly believed that “often in suicide due to an overdose, the overdose is intentional. It is hard to believe in an accidental overdose, in the first place because addicts are really well informed about substances. They know more about drugs and interactions than a psychiatrist does. Addicts would be more likely to make a mistake if a new drug appears on the market, which has not happened (here) for years, or in the sense that a particular drug on the market becomes less pure. To deal with the problem of overdoses, new efforts should be made. What counts most is not the data, but the feelings you get” (cit.2). The psychiatrist from DFTCs believed that drugs can be taken in a very safe way, because in the case of an overdose you have to take a lot (of the substance) at once: “some people are well preserved after taking drugs for thirty years, some of them are really survivors” (cit. 1), and “are functional” (cit. 4). “Addicts are familiar and careful with opiates” (cit. 2, cit. 6). All psychiatrists believed that “the danger of overdose is greater with BDZs and alcohol. Drug users sometimes don’t even know what or how much they are taking with these BDZs” (cit. 1).

The lay attitude in cases of suicide among IDUs is different; it is worse towards drug users than anyone else. Psychiatrists from AOT reported that suicide in IDUs is perceived by lay people as the solution to the problem: “There’s no big damage done, we’ve solved it” (cit. 2), whereas those from DFTCs reported that lay people can feel sorry: “Poor fellow, he had no other choice” (cit. 1). GPs point out the strong stigma (cit. 6) and resignation: “It’s as if all those who knew him considered him as having a terminal illness that would sooner or later come to that, and accepted it as if it was only to be expected” (cit. 5). In the opinion of participants, even the experts’ attitude in cases of suicide by IDUs is different; it is worse in the case of drug users than with anyone else. The participants suggested that experts stigmatize IDUs even more than members of the lay public do, and the attitudes are similar in this case (cit. 7).
psychiatrists from AOT described the negative attitudes and nihilism of health professionals (e.g. neurologists), even when they are talking to experts working in this field: “it’s a waste of time, you can’t cure anybody” (cit. 2). Others stressed the expression of stigma and therapeutic nihilism (cit. 6). Some participants believed that “This has perhaps been less prominent recently” (cit. 1), but they don’t know what this change really depends on. For some of the participants it is a result of the presence of younger experts (cit. 4), for some others it is due to “gradual entrenchment of the perception of addiction as a disease” (cit. 6) and for others the reason is because “it is not appropriate to talk in that way or even to speak about such things” (cit. 7). The participants also reported “a different kind of treatment, not showing direct hostility, but a politically correct attitude” (cit. 5). In the opinion of participants, the treatment approach and way of paying attention when face to face with IDUs rather than other people are different, worse for drug users, who are generally treated with detachment (cit. 5). The psychiatrists from DFTCs believed that approach “depends on the circumstances in which drug users are met (e.g. in an emergency room, regularly convened, during dual diagnosis treatment), because that is what determines the level of empathy and the condition in which these people arrive (e.g. whether they are motivated or are in an overdose situation); even experts have different types of experience with them” (cit. 1). GPs agreed and stated they strongly believe that the approach used “depends on the kind of setting you face them in, as in an emergency clinic they usually come to blackmail you and beg for medicines” (cit. 5). Psychiatrists agreed about the presence of blackmail “with a suicide threat” (cit. 2, cit. 3, cit. 4, cit. 8), and extortion conveyed by phrases like “then I’m going to get high” (cit. 5). GPs pointed out the problems raised by some approaches: “experts in different parts of psychiatry take up a weaker approach – less coherent, less unified – the whole field already has this problem, because it contains very different types of population” (cit. 6). In their opinion, the blackmail, while not appropriate, is still present “because they know that they can take the opportunity” (cit. 6), and they pointed out the need for a unified approach (cit. 6).

The psychiatrists working in addiction treatment strongly believed that this population is more exposed in the current economic crisis, as its members have to face
existential damage (cit. 4); even before the crisis they were considered more problematic than the general population (cit. 2), and, even if they manage to stay abstinent, they are known within their little local environment and it will be difficult for them to get a job (cit. 1). Before the crisis there were tolerant attitudes in a few companies (e.g. Primorje) that employed addicts (cit. 4), but now in some regions (e.g. Primorska) even that small percentage who had ever had a job lost their latest one recently (cit. 2). GPsys pointed out that “in a crisis there is a lot of unemployment even for healthy people, and for someone with a chronic condition it is even harder” (cit. 6), adding that “these people should be protected, just like people who have other chronic illnesses” (cit. 7). In addiction cases, there is a high percentage of comorbidity involving personality or mood disorders, and depression is one of the major risk factors for suicide (cit. 5).

On the issue of the gender ratio among suicide victims, in the case of IDUs the participant’s opinion was that “the protective factors brought by a healthy female population are missing here” (cit. 6), and “a female addict has more problems than a female without any addiction” (cit. 1). Average age of death for female drug users (48 years), in the opinion of some participants: “is strange” (cit. 1). To participants in the group these data were all new information. Psychiatrists from DFTCs commented “we don’t have females of this age in treatment at all, last year we didn’t have a single female aged 59 or more, many of them were under 40” (cit. 1). Psychiatrists from AOT reported “people who are no longer young, those over forty, are usually in substitution therapy, with ageing they go into substitution treatment” (cit. 2) and “the same is true of those with dual diagnosis” (cit. 2). Some correlated an age of at least 48 years with the inability to engage in prostitution or earn money (cit. 8) and with mood oscillation (cit. 4). In the opinion of the GPsys “the population is getting older, substitution programmes have been here for quite a long time, and this population too is getting older” (cit. 3). GPsys suggested that this implies that “we are ill-equipped to treat the population of older addicts. We know very little about them. Probably in this period of long-term treatment something is going on and we have no idea about it” (cit. 7). In their opinion “in substitution treatment there are older people partly because they have already been in treatment for a long time, and in their opinion they will be spending their whole life
on substitution therapy” (cit. 3). Some estimated this condition as “complete nihilism and a status quo” (cit. 2), while, in the opinion of others, “some of them are getting along nicely” (cit. 1). GPsys expressed the view that those over forty are in substitution treatment but not in drug-free programmes, as “this means a stigma. If you’re an old addict, then you have no chance at all with anyone you may be dealing with” (cit. 7), and the psychiatrists from AOT agreed (cit. 2), while others, including those from DFTCs, believed that patients simply “do not want to (enter drug free treatment), they have created one way of life and work, family and all, and they are functioning” (cit. 1, cit. 3). “But we accept it, there is a tolerance that they have got used to, by living like this” (cit. 2), “(as long as) they do not use other things” (cit. 3). The psychiatrists from AOT pointed out that substitution treatment is comparable with the treatment of other chronic mental disorders “years of enrolment in an outpatient service, where he got his dosage of methadone, coming week by week; he was employed, had a family and everything else. This is like the treatment of psychosis; they are functioning on the strength of their therapy” (cit. 4).

Group participants believed that data on suicides committed by IDUs did not differ much from those for the general population, “in men there is more hanging, and in women more BDZs” (cit. 3). In the opinion of the participants, “BDZ abuse is a trend as there is an abnormal quantity of BDZs (being used and abused among IDUs) and BDZs come from the black market, too” (cit. 1, cit. 2, cit. 5). In a DFTC, they have no patients without BDZ addiction (cit. 1). The participants stressed that “it would be interesting to know if they have BDZs from an earlier episode or if it appeared as a disorder involving long-term use” (cit. 6). Some participants suggested “possible dual diagnosis” (cit. 4) and lack of attention as factors that makes the problems worse: “in these AOT you get used to them, you know they are coming, that there is nothing special (about that)” (cit. 6). GPsys stressed the inequality in treatment between younger and older patients (“there are long-term addicts, nobody treats them or really takes sides with them, it is a matter of more maintenance. We saw that nobody wanted to treat them for BDZ addiction, they continue to take BDZs, the prescriptions continue. While the younger people are invited to try detoxification treatment, with the older ones we just say he is already addicted” (cit. 7); the participants from AOT agreed, too (cit. 2). GPsys stressed that the use of
BDZs is a risk factor and a method that can lead to suicide, and that it would be possible to limit access to them (cit. 5). The participants strongly believed that through better information, education and a policy of limiting access, it would be possible to lower the incidence of suicides due to BDZs (cit. 1, cit. 3, cit. 5). The participants from a DFTC reported a new restriction on BDZ prescriptions by general practitioners. In AOT such prescriptions will no longer be allowed; only psychiatrists should prescribe BDZs (cit. 1). Professionals from AOT reported that there had already been limitations in the past on midazolam, more recently on zolpidem. They agree with limitations, but in their opinion, problematic BDZ use mostly comes from the black market: “in our centre we don’t have any cases of midazolam prescriptions, but it is on sale at the entrance to the centre, and we are not able to prevent that” (cit. 2). Other participants agreed that BDZs are resold; GPsys reported their experiences of patients who beg for midazolam and confess to having resold it to improve their income (cit. 1, cit. 5).

Participants commented on results connected with intentional overdoses by saying they are to be expected (cit. 3). Female gender, older age, and intoxication with BDZs were “expected data” (cit. 2, cit. 6). Regarding the data on suicide in treatment populations, the participants believed that AOT lowers suicide frequencies by 10% (cit. 6): “this is a protection, a network system, especially in cases of dual diagnosis” (cit. 4). “Definitely, for those in treatment, once they have settled on a therapy, there is a better chance of having a settled life compared with those who live on the street” (cit. 1). The participants also stressed that: “the experts have a role, because, at the moment when some mood disorder starts, patients can more easily contact a medical doctor who already knows them” (cit. 2), and because patients “are already in treatment” (cit. 5). On the question of the gender ratio, male to female, of 6.7:1 in the opioid agonist treated population, the group participants were surprised (cit. 1, cit. 5, cit. 7). Participants proposed the standardization of data to determine “how many females and males, and in what proportions, are in treatment, and how effective substitution and abstinence in females actually are” (cit. 1); others pointed out that are simply more males in centres. The participants pointed out that centres also treat younger people, but this does not adequately explain such a steep fall in the age of suicides in the treated population (cit. 5). Psychiatrists mentioned the problem of personality disorders and alcohol abuse; the
age factor could be linked with borderline personality disorders (cit. 1). Data on the **method and means of suicide in the treated population** confirm that the black market is the principal substance provider (cit. 1), while the treatment centre is at most a protective factor, because patients have to be tested on prescribed substances if they want to get the benefits (cit. 3).

Generally speaking, the participants were unfamiliar with the data presented on IDUs in general, but some of them were surprised by the (relatively high) age of deceased females (recorded in this study as averaging 47.9 years: cit. 2); others specifically expressed their surprise seeing the divergence between the gender ratios, male to female, of 1.5:1 in IDUs in general, and as much as 6.7:1 in the population of IDUs in AOT (cit. 3, cit. 4, cit. 5), as “the difference was huge” (cit. 4), while in the opinion of others that extreme male-to-female difference for those in AOT made evident by the figure of 6.7:1 marked a similarity with the general population (cit. 2). According to participants: “there has been almost no decrease in the suicidality of males, whereas in females it has been rather great; males, in fact, don’t get as much from these treatments as females do (cit. 5), “which means that we help females but not males” (cit. 2). Participants perceived males as being less settled than females, and as having more additional problems, and more manipulations (cit. 2, cit. 3, cit. 5); a change occurs in male roles in response to treatment, while “females do not usually belong to any criminal association, and are less motivated by money, or by many other factors that are unknown” (cit. 5). Some participants pointed out the protective factors in females (cit. 6). “For females, the therapeutic relationship is a kind of protective factor, which is not true for males, because females feel attachment to that relationship, but males do not” (cit. 2, cit. 5).

Data for the whole of psychiatry show that “males collaborate worse than females” (cit. 6), probably due to their greater impulsiveness, and to having more serious alcohol use problems (cit. 1, agreed: 5, 7), their problems arise earlier, when they are younger (cit. 7), and face “more criminal and justice proceedings” (cit. 5), while, in the opinion of others: “in procedure they can be called ‘rational suicides', this is pure speculation” (cit. 5) Others pointed out the issue of alcohol and dual diagnosis problems (cit. 6); all agreed that “debts are a heavy burden” (cit. 7). The participants strongly believed that it is important to know and to **monitor indicators on suicide**, as this is “a key factor in
monitoring the quality of the (medical) work being done” (cit. 7). “It is important to know why there are more suicides among males, there is a need to work more with males” (cit. 3, agreed: 1, 5). “It might be necessary to examine in which centres there are fewer suicides, and see what they offer” (cit. 1). The participants were absolutely in favour of monitoring indicators in a population that is and was so strongly at risk.

Table 2. Themes and subthemes identified during the focus group on suicide in assessing IDU and AOT population, together with opinions on the data presented

<table>
<thead>
<tr>
<th>IDU population</th>
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<tbody>
<tr>
<td>• Monitoring suicide (behaviour, risks of) among IDUs: all participants unanimously agreed that monitoring is important, but difficult to achieve.</td>
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<tr>
<td>• IDUs account for 4-6% of all suicides: in the opinion of participants that is an underestimate.</td>
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<tr>
<td>• Suicide mortality rate up to 14 times higher for heroin users: participants expressed their surprise and said they were unfamiliar with these data.</td>
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<tr>
<td>• Prevalence of risk factors for suicide: all participants strongly believed that it is higher in the illicit drug addict population than in the general population.</td>
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<tr>
<td>• Intent to commit suicide due to overdose is not always clear (especially suicide by intravenous injection): participants agreed, both GPsys and those from a DFTC strongly believed that among suicides by overdose some are accidental, whereas psychiatrists from AOT believed only in intentional overdose in suicide cases.</td>
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<tr>
<td>• Attitudes (of lay people, and of experts) to suicide in IDUs compared with other people: all participants agreed that lay and expert attitudes differed, but in both cases attitudes were worse when they were addressed to drug users.</td>
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<tr>
<td>• Treatment approach, and quality of attention towards IDUs compared with other people: participants agreed that attitudes are different in the case of perceptions of the first type of population (comprising strong stigma, therapeutic nihilism, and staying detached); attitudes also depend on the type of setting (and may involve IDUs begging for medicines, and using blackmail or threats).</td>
</tr>
<tr>
<td>• Existential damage in IDUs during crisis in Slovenia: psychiatrists working in addiction treatment believed that this population is more exposed in the current economic crisis than the general population, GPsys that these people with chronic condition and high percentage of comorbidity should be believed, just like people who have other chronic illnesses.</td>
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</table>
• In suicide victims among IDUs, the male to female ratio was 1.5 to 1, females died older (at an average age of 48 years) than males (37 years): the participants were surprised, and requested further information.

• 2/3 of all suicides were due to overdoses, most frequently of BDZs (more so in females): attention should be paid to the methods that may lead to accidental death; through education, provision of extra information and limited access, it is possible to curb the problem.

• 1/4 of all overdoses were suicides, with a male to female ratio of 1 to 1, victims were 45 years old on average: the participants had little knowledge of these data, but data on females, older people and intoxication with BDZs were as expected.

• BDZ problem: in the opinion of participants there is a clear trend, centring on an abnormal quantity of prescribed BDZs, with further amounts of BDZs coming from the black market (as a result of resale); in DFTCs there are no patients without a BDZ addiction; while problematic BDZs come from the black market (not from AOT); in the opinion of participants, through extra information, education and limitation of access, suicides that are due to BDZs can be curbed.

AOT population

• 19% of this population will become suicide victims (vs. 30% among IDUs): the participants believed that AOT offers protection and lowers the risk of suicide by 10%.

• Male to female ratio was 6.7 to 1 (vs. 1.5 to 1 in the population of all IDUs): the participants showed little knowledge of these data and were surprised; in their opinion males get less help than females from AOT.

• Males died at an average age of 33 years, and females of 28 (vs 37 and 48 years, respectively, in all IDUs): the participants showed limited knowledge of these data, and pointed out that centres also treat younger people, but that failed to adequately explain the steep fall in average age, and in the high likelihood of comorbidity.

• In this population suicide victims died more often from injuries than from an overdose (vs 2/3 of overdoses in all IDUs), although they have access to the substance: in the opinion of participants, these data confirm that the black market is the principal substance provider, whereas AOT is the most protective factor (patients are tested there on the use of substances).

• Indicators, such as gender and age, are important to monitor in cases of suicide among drug users, given the high risks run by that population; in the opinion of participants it is important to monitor these indicators at AOT, where their measurement is a key factor in checking the medical work’s quality to be done there.
4.2 Quantitative analysis

4.2.1 Description of the cohort

Out of 3,949 CMs, 3,003 (76%) were males and 946 (24%) females. Males were in average 27.23±6.27 years old (median 26.04, mode 23.40, min 12.79, max 66.46) at cohort entry, while females were in average 25.8±6.08 years old (median 24.64, mode 23.54, min 13.28, max 54.64).

2,610 (66.09%) CMs entered the cohort in 2004 (2,198 old patients, 412 new patients), 787 (19.92%) CMs entered the cohort in 2005 (497 old, 290 new patients) and 552 (13.98%) CMs entered the cohort in 2006 (271 old patients, 273 new patients and 8 cases with unknown status).

At cohort entry the main drug of use was: heroin in 80.63% (N=3,184) of cases, cannabis in 6.46% (N=255) of cases, 10.71% (N=423) of CMs were abstinent, while in the following cases the percentage was lower than 1%: cocaine in 36 cases, methadone in 11 cases, other opioids in 12 cases, hypnotics and sedatives in 10 cases, ecstasy in 7 cases, amphetamines in 3 cases, inhalants in 1 case and unknown in 7 cases.

86.65% (n=3,422) of CMs were opioid users (opioids as a main, second or third additional drug), among those 97.5% were heroin uses. The majority of CMs were polydrug users, 65.28% (n=2578) abused three or more drugs.

At the cohort entry, 55.81% (N=2,204) of CMs declared drug injection as way of main drug consumption, 24.49% (N=967) inhalation, 7.93% (N=313) sniffing, 0.84% (N=33) oral consumption; in 10.94% (N=432) of the cases the way of main drug consumption was unknown. 69.1% (N=2728) of CMs had injected illicit drugs in their history of drug consumption, 20.41% (N=806) of CMs had never injected drugs, for 10.51% (N=415) of CMs the status regarding past injection remained unknown.

Among the 3,390 CMs who were asked about sharing needles, almost all (94.98%) denied sharing needles, 2.12% of CMs reported needle sharing. Among the 3,390 CMs who were asked about sharing other paraphernalia, 93.01% of CMs denied sharing other paraphernalia, while 4.81% of CMs reported sharing other paraphernalia.

Regarding the frequency of main drug use, 31.02% (N=1,264) CMs used their main drug every day, 11.32% (N=447) CMs from 2 to 6 days a week, 10.84% (N=428) once a week,
34.74% (N=1,372) CMs did not use their main drug in the last month, 11.09% (N=438) cases have unknown frequency of drug intake.

Mean age of CMs at their first main drug use was 19.39±6.51 (median 18, mode 17, min 9, max 49).

Regarding HIV testing for 5 cases in 2004, 4 cases in 2005 and 2 cases in 2006 the result was HIV positive. One fifth of patients were never tested for HIV. Data on HCV testing were available for only smaller part of the CMs. However, data on HCV testing revealed that only a minority of CMs had been tested (one third each year in 2004-2006 period).

57.43% (n=2,268) of CMs already received methadone treatment prior to last treatment, 23.1% never received methadone treatment in their life.

50.24% (N=1,984) of CMs were unemployed, 19.85% (N=784) were employed, 14.23% (N=562) were still students, 0.96% (N=38) were economically inactive, 3.9% (N=154) of CMs had a different status (e.g. disability retirement) and 10.81% (N=427) had an unknown employment status.

1,275 (32.28%) CMs completed elementary school, 120 (3.04%) did not complete elementary school, 1,527 (38.67%) completed 2-3 years vocational school, 68 (1.72%) CMs achieved higher school degree (college, high school, university), 97 (2.46%) cases had other type of education, while for 862 (21.83%) cases data were missing.

54.42% (N=2,149) CMs lived with their parents, 12.31% (N=486) alone with partner, 10.74% (N=424) alone, 5.6% (N=221) with partner and child, 0.73% (N=29) alone with the child, 1.04% (N=41) with friends, other accommodation (e.g. shelter) in 4.53% (N=179) cases and for 10.64% (N=420) cases data were missing.

For 3,949 CMs the observed period from 1st January 2004 to 31st December 2011 was 27,659.9 PY. For study purpose 3,944 CMs aged between 15 and 59 years were selected, among those 382 cases (9.7%) were followed up for 8 years, while 3,562 of the remaining cases were followed up for an average of 6.9±1.27 years (median 7.26 years, mode 6.47 years).

Table 3 shows comparison of deaths and suicides of CMs aged between 15 and 59 years, stratified by 5 years age groups and by gender.
Table 3. Total number of CMs aged 15-59 years, deceased (numbers) and suicides (numbers) during 2004-2011 period, subdivided by 5 years age groups and by gender

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Total CMs (N)</th>
<th>Deceased CMs (N)</th>
<th>Suicides CMs (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>15-19</td>
<td>6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20-24</td>
<td>129</td>
<td>52</td>
<td>18</td>
</tr>
<tr>
<td>25-29</td>
<td>701</td>
<td>279</td>
<td>35</td>
</tr>
<tr>
<td>30-34</td>
<td>1052</td>
<td>335</td>
<td>24</td>
</tr>
<tr>
<td>35-39</td>
<td>623</td>
<td>160</td>
<td>19</td>
</tr>
<tr>
<td>40-44</td>
<td>257</td>
<td>70</td>
<td>19</td>
</tr>
<tr>
<td>45-49</td>
<td>138</td>
<td>36</td>
<td>11</td>
</tr>
<tr>
<td>50-54</td>
<td>62</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>55-59</td>
<td>32</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Total 15-59</td>
<td>3000</td>
<td>944</td>
<td>140</td>
</tr>
</tbody>
</table>

Males were 3.1 times more represented in the cohort than females, CMs were mostly aged between 30 and 34 years: one third of males and one third of females were from 30 to 34 years old, followed by those aged from 25 to 29 years.

4.2% (N=166) of observed CMs died during 2004-2011 follow up period. Among deceased males were 5.4 times more represented than females. 40.4% of CMs died at the age between 25 and 34 years. 18.7% of deceased committed suicide, 38.7% of them were aged between 25 and 34 years. Among suicide victims 27 out of 31 were males.

4.2.2. Suicide mortality among the cohort population

Table 4 shows numbers of deceased CMs due to selected causes of death subdivided by year of death and change in causes of death in the cohort during observed period.
Table 4. Comparison of the number of deaths due to suicides, accidental poisonings and diseases during 2004-2011 period, listed by year of death and gender

<table>
<thead>
<tr>
<th>Year</th>
<th>Suicide (N)</th>
<th>Accidental poisoning (N)</th>
<th>Diseases (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
</tr>
<tr>
<td>2004</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2005</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2006</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>2007</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2008</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2009</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2011</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>4</td>
<td>31</td>
</tr>
</tbody>
</table>

77.4% of suicides were registered in the first half of observation period, female suicides did not exceed 1 case per year, 67.7% of all suicide victims died when less than 35 years. 71.4% of accidental fatal poisoning (overdoses) were registered in the second half of observation period, 71.1% of accidental overdose victims were younger than 40 years. 57.8% of deaths due to natural deaths (diseases) were registered in first half of observation period, 60% of all died due to diseases were older than 40 years (Table 4). Table 5 shows the stratified observation-time, observed number of suicides and suicide mortality rate in CMs aged 15-59 years.
Table 5. The number of PY, number of observed suicides and suicide CMR per 1000 PY in the cohort, data stratified by 5 years age groups and by gender

<table>
<thead>
<tr>
<th>Age group</th>
<th>PY</th>
<th>N observed suicides</th>
<th>Suicide CMR/1000 PY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>15-19</td>
<td>29.6</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>20-24</td>
<td>933.0</td>
<td>431.2</td>
<td>3</td>
</tr>
<tr>
<td>25-29</td>
<td>5253.4</td>
<td>2083.3</td>
<td>10</td>
</tr>
<tr>
<td>30-34</td>
<td>7328.1</td>
<td>2347.1</td>
<td>5</td>
</tr>
<tr>
<td>35-39</td>
<td>4244.6</td>
<td>1033.2</td>
<td>3</td>
</tr>
<tr>
<td>40-44</td>
<td>1547.9</td>
<td>504.0</td>
<td>4</td>
</tr>
<tr>
<td>45-49</td>
<td>957.8</td>
<td>245.6</td>
<td>1</td>
</tr>
<tr>
<td>50-54</td>
<td>412.7</td>
<td>42.2</td>
<td>1</td>
</tr>
<tr>
<td>55-59</td>
<td>205.2</td>
<td>19.5</td>
<td>0</td>
</tr>
<tr>
<td>Total 15-59</td>
<td>20912.3</td>
<td>6705.9</td>
<td>27</td>
</tr>
</tbody>
</table>

Number of PY of observation in males was 3.11 times higher than in females. The highest number of observed PY in both sexes were for CMs aged between 25 and 34 years, the same is valid for number of suicides, where the highest number was among those aged 25 to 34 years, but the highest suicide mortality rate was between males and females aged 20 to 24 years, followed in males by those aged 40 to 44 years and 50 to 54 years, while in females by those aged 35 to 39 and those 25 to 29 years. The CMR for suicide in the 15–59 age group of this cohort was 1.12 per 1000 PY (Table 5).

Table 6 shows the expected number of suicides in the cohort by applying the reference rates of suicide in the Slovenian population and the age and gender distribution of the cohort population. The expected numbers of suicides were 7.2 for males and 0.6 for females.
Table 6. Suicide mortality rate in Slovenian population, observed person-time cohort (PY) and expected numbers of suicide in the cohort, stratified by 5 years age groups and by gender

<table>
<thead>
<tr>
<th>Age group</th>
<th>Suicide mortality rate* Slovenian population</th>
<th>Observed person-time cohort PY</th>
<th>Expected number of suicide</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>15-19</td>
<td>0.000112</td>
<td>0.000035</td>
<td>29.6</td>
</tr>
<tr>
<td>20-24</td>
<td>0.000236</td>
<td>0.000044</td>
<td>933.0</td>
</tr>
<tr>
<td>25-29</td>
<td>0.000253</td>
<td>0.000039</td>
<td>5253.4</td>
</tr>
<tr>
<td>30-34</td>
<td>0.000250</td>
<td>0.000052</td>
<td>7328.1</td>
</tr>
<tr>
<td>35-39</td>
<td>0.000295</td>
<td>0.000058</td>
<td>4244.6</td>
</tr>
<tr>
<td>40-44</td>
<td>0.000422</td>
<td>0.000079</td>
<td>1547.9</td>
</tr>
<tr>
<td>45-49</td>
<td>0.000490</td>
<td>0.000127</td>
<td>957.8</td>
</tr>
<tr>
<td>50-54</td>
<td>0.000503</td>
<td>0.000167</td>
<td>412.7</td>
</tr>
<tr>
<td>55-59</td>
<td>0.000500</td>
<td>0.000144</td>
<td>205.2</td>
</tr>
<tr>
<td>Total 15-59</td>
<td>0.000346</td>
<td>0.000085</td>
<td>20912.3</td>
</tr>
</tbody>
</table>

Legend: *average 2004-2011 period

Table 7 shows observed and expected numbers of suicides and suicide mortality.

Table 7. Observed numbers of suicides, suicide CMR, expected numbers of suicides in the cohort and suicide SMR, stratified by age (15-59 years) and gender

<table>
<thead>
<tr>
<th></th>
<th>Observed suicides (N)</th>
<th>CMR/1000 PY (95% CI)</th>
<th>Expected suicides (N)</th>
<th>SMR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>27</td>
<td>1.3 (0.9-1.9)</td>
<td>7.24</td>
<td>3.7 (2.6-5.4)</td>
</tr>
<tr>
<td>Females</td>
<td>4</td>
<td>0.6 (0.2-1.6)</td>
<td>0.57</td>
<td>7.0 (2.6-18.7)</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>1.1 (0.8-1.6)</td>
<td>7.81</td>
<td>4.0 (2.8-5.6)</td>
</tr>
</tbody>
</table>

Suicide CMR/1000 PY for CMs (15-59 years) was 1.1 (95% CI: 0.8-1.6), that means more than one suicide per 1000 CMs per year, i.e. a suicide rate 4 (95% CI: 2.8-5.6) times higher than that of Slovenian general population aged 15-59 years. Suicide CMR/1000 PY for males (15-59 years) in the cohort was 1.3 (95% CI: 0.9-1.9), in the period 2004-2011, a rate 3.7 (95% CI 2.6-5.4) times higher than that of Slovenian population of same age and 2.2 times that of females. Suicide CMR/1000 PY for females (aged 15-59 years)
in the cohort was 0.6 (95% CI: 0.2-1.6), in the period 2004-2011, a rate 7 (95% CI: 2.6-18.7) times higher than that of Slovenian population of same age (table 7).

Relative risk (RR) for suicide among CMs was for males 2.16 (95% CI: 0.76-6.15) higher than that for females (z statistic: 1.439, P=0.1502).

4.2.3. The differences between suicide cases and survivors in the cohort

There were no statistical significant differences between the two groups of CMs, CMs-suicides and CMs-survivors (deceased CMs due to DRD other than suicide were excluded from comparison), in: gender, average age at first drug used, main drug used, second main drug used, first drug injection, interruption of education, achieved education, decision for entering treatment, drug use (first drug use, main drug used at treatment entry, heroin as main drug used, opioids as main drug used, manner of main drug consumption, frequency of main drug use, second drug used drug injection (current and lifetime), sharing needle or paraphernalia), sexual intercourse, sexual partners in the last year, condom use, infection status (HIV, HCV), employment, and living situation.

CMs-suicides entered the cohort at mean age of 30 years, 3.3 years older than CMs-survivors and were more frequently previously treated; the differences between the two groups were statistically significant (Table 8).

<table>
<thead>
<tr>
<th>Variables /characteristics</th>
<th>CMs - suicides N=31 (%)</th>
<th>CMs -survivors N=3783 (%)</th>
<th>Total N=3814 (%)</th>
<th>T/Yates’ Chi2</th>
<th>p/Yates’ p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years) at cohort entry (M±SD)</td>
<td>30.0±7.4</td>
<td>26.7±6.4</td>
<td>2.92</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td>Type of treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New patient</td>
<td>1 (3.3)</td>
<td>962 (25.5)</td>
<td>963 (25.4)</td>
<td>6.62</td>
<td>0.01</td>
</tr>
<tr>
<td>Old patient</td>
<td>29 (96.7)</td>
<td>2806 (74.5)</td>
<td>2835 (74.6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.2.4. The differences in suicide cases and survivors identified by Cox regression

3,814 cases of CMs in total were selected, among those 2 cases have missing values. Table 9 shows hazard risk of suicide in 3812 IDUs in cohort regarding gender and age at cohort entry.

Table 9. Hazard risk of suicide in 3812 IDUs (31 suicides) in cohort

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Exp(B)</th>
<th>95 % CI Exp(B)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Gender</td>
<td>0.66</td>
<td>1.94</td>
<td>0.68 – 5.58</td>
<td>0.217</td>
</tr>
<tr>
<td>Age at cohort treatment entry</td>
<td>0.06</td>
<td>1.06</td>
<td>1.02 – 1.11</td>
<td>0.007</td>
</tr>
</tbody>
</table>

Chi-square=9.857 df=2 p=0.007

Risk of suicide was significantly higher in patients entering cohort when older. Estimated hazard or risk of suicide increase by exp(0.06), 1.06 times if a patient was a year older. Male gender was not significantly related to suicide.

4.2.5 Cox's multivariate regression for different survival models

Different survival models were constructed by adding in different groups of deceased individuals where the cause of death was not recorded as intent to commit suicide, while the predictor variables, age at cohort treatment entry and male gender, stayed the same (Model 1: suicide mortality included ICD-10 code X60.0-X84.9 = Table 10; Model 2: suicide mortality included ICD-10 code X60.0-X84.9 and code Y10.0-Y34.9 of undetermined intent = Table 11; Model 3: suicide mortality included ICD-10 code X60.0-X84.9 and code X40.0X49.9 of accidental deaths = Table 12; Model 4: suicide mortality included ICD-10 code X60.0-X84.9 and all other deaths, but excluded deaths due to homicides and due to diseases = Table 13.)
Table 10. Model 1. Hazard risk of suicide in 3947 CMs (31 events: suicides; 2 missing cases)

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at cohort treatment entry</td>
<td>1.06</td>
<td>2.56</td>
<td>0.011</td>
</tr>
<tr>
<td>Male Gender</td>
<td>1.94</td>
<td>1.24</td>
<td>0.216</td>
</tr>
</tbody>
</table>

Likelihood ratio test=8.16 on 2 df, p=0.0169

Table 11. Model 2. Hazard risk of suicide in 3947 CMs (63 events: 31 suicides + 32 deaths of undetermined intent; 2 missing cases)

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at cohort treatment entry</td>
<td>1.05</td>
<td>2.81</td>
<td>0.004</td>
</tr>
<tr>
<td>Male Gender</td>
<td>2.36</td>
<td>2.14</td>
<td>0.032</td>
</tr>
</tbody>
</table>

Likelihood ratio test=14 on 2 df, p=0.00917

Table 12. Model 3. Hazard risk of suicide in 3947 CMs (76 events: 31 suicides + 45 accidental deaths; 2 missing cases)

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at cohort treatment entry</td>
<td>1.06</td>
<td>4.42</td>
<td>0.000</td>
</tr>
<tr>
<td>Male Gender</td>
<td>1.26</td>
<td>0.79</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Likelihood ratio test=18.4 on 2 df, p< 0.001

Table 13. Model 4. Hazard risk of suicide in 3947 CMs (108 events: 31 suicides + 77 other deaths; excluded deaths due to diseases and homicides; 2 missing cases)

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at cohort treatment entry</td>
<td>1.05</td>
<td>4.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Male Gender</td>
<td>1.55</td>
<td>1.67</td>
<td>0.095</td>
</tr>
</tbody>
</table>

Likelihood ratio test=22.4 on 2 df, p < 0.001
Older age at cohort treatment entry proved to be a robust predictor that significantly correlates with the risk of suicide, and remains statistically significant no matter which model is used. Male gender became significant only when used in a second model (suicide + death without determined intent), but not in any other case (Table 10. - Table 13.).

4.3. Suicides among illicit drug users in the period 2004-2007 in Slovenia

In the period 2004-2007 in Slovenia 87 illicit drug-related suicides among IDUs were identified in total with the use of SMr as main source of data: 9 cases were reported from General Police Directorate (5 of those were identified also in GMR with same causes of death), 20 cases were reported by Forensic Medicine (5 of those were identified also in GMR with same causes of death), 2 cases were reported by professionals filling Medical certificate of causes of death after further investigation on suspicious sudden death. 27.6% (n=24) of suicide victims were identified as CMs: INSIDE-GR, while 72.4% (n=63) of suicide victims have not registered AOT contacts (OUTSIDE-GR) during the observed period, among those 41 males and 22 females. 24 subjects from INSIDE-GR were in 21 cases males and in 3 cases females.

4.4. The differences in suicide between illicit drug users seeking treatment and those not seeking treatment

Table 14 shows suicides in IDUs. Among external causes of death due to suicide in groups of females, IDUs in total and OUTSIDE-GR, poisoning was most frequent, intentional self-poisoning by BDZs prevailed, followed by intentional self-poisoning by narcotics. In males intentional self-poisoning by narcotics was most frequent, followed at the same degree by hanging and intentional self-poisoning by BDZs. In INSIDE–GR the most frequent external causes of death due to suicide were suicide by hanging and intentional self-poisoning by gas, presented at the same proportion (Table 14).
Table 14. External cause of death due to suicide by ICD-10 (three place code) in IDUs, 2004-2007, Slovenia

<table>
<thead>
<tr>
<th>External cause of death due to suicide by ICD-10 (three place code)</th>
<th>Males N=62 (%)</th>
<th>Females N=25 (%)</th>
<th>Total N=87 (%)</th>
<th>INSIDE-GR N= 24 (%)</th>
<th>OUTSIDE-GR N= 63 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X61 Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified</td>
<td>11 (17.7)</td>
<td>12 (48)</td>
<td>23 (26.4)</td>
<td>0 (0.0)</td>
<td>23 (36.5)</td>
</tr>
<tr>
<td>X62 Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified</td>
<td>12 (19.3)</td>
<td>6 (23.1)</td>
<td>18 (20.7)</td>
<td>4 (16.7)</td>
<td>14 (21.5)</td>
</tr>
<tr>
<td>X64 Intentional self-poisoning by and exposure to other and unspecified drugs, medicaments and biological substances</td>
<td>3 (4.8)</td>
<td>1 (3.8)</td>
<td>4 (4.6)</td>
<td>0 (0.0)</td>
<td>4 (6.1)</td>
</tr>
<tr>
<td>X67 Intentional self-poisoning by and exposure to other gases and vapours</td>
<td>8 (12.9)</td>
<td>1 (3.8)</td>
<td>9 (10.3)</td>
<td>6 (25.0)</td>
<td>3 (4.6)</td>
</tr>
<tr>
<td>X70 Intentional self-harm by hanging, strangulation and suffocation</td>
<td>11 (17.7)</td>
<td>0 (0.0)</td>
<td>11 (12.6)</td>
<td>6 (25.0)</td>
<td>5 (7.7)</td>
</tr>
<tr>
<td>X71 Intentional self-harm by drowning and submersion</td>
<td>1 (1.6)</td>
<td>0 (0.0)</td>
<td>1 (1.1)</td>
<td>0 (0.0)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>X72 Intentional self-harm by handgun discharge</td>
<td>1 (1.6)</td>
<td>0 (0.0)</td>
<td>1 (1.1)</td>
<td>0 (0.0)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>X74 Intent self-harm by other and unspecified firearm discharge</td>
<td>4 (6.4)</td>
<td>0 (0.0)</td>
<td>4 (4.6)</td>
<td>1 (4.2)</td>
<td>3 (4.6)</td>
</tr>
<tr>
<td>X78 Intentional self-harm by sharp object</td>
<td>3 (4.8)</td>
<td>1 (3.8)</td>
<td>4 (4.6)</td>
<td>2 (8.3)</td>
<td>2 (3.1)</td>
</tr>
<tr>
<td>X80 Intentional self-harm by jumping from a high place</td>
<td>4 (6.4)</td>
<td>2 (7.7)</td>
<td>6 (6.9)</td>
<td>3 (12.5)</td>
<td>3 (4.6)</td>
</tr>
<tr>
<td>X81 Intentional self-harm by jumping or lying before moving object</td>
<td>1 (1.6)</td>
<td>1 (3.8)</td>
<td>2 (2.3)</td>
<td>1 (4.2)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>X82 Intentional self-harm by crashing of motor vehicle</td>
<td>2 (3.2)</td>
<td>1 (3.8)</td>
<td>3 (3.4)</td>
<td>0 (0.0)</td>
<td>3 (4.6)</td>
</tr>
<tr>
<td>X84 Intentional self-harm by unspecified means</td>
<td>1 (1.6)</td>
<td>0 (0.0)</td>
<td>1 (1.1)</td>
<td>1 (4.2)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
Table 15 shows comparison between OUTSIDE-GR and INSIDE-GR suicide victims regarding some sociodemographic and clinical characteristics.

Table 15. Comparison between OUTSIDE-GR and INSIDE-GR suicide victims regarding gender, average age at death and external causes of death, 2004-2007, Slovenia

<table>
<thead>
<tr>
<th>Suicide/Variables</th>
<th>Total N=87 (%)</th>
<th>OUTSIDE-GR N=63 (%)</th>
<th>INSIDE-GR N=24 (%)</th>
<th>T/Chi2</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62 (71.3)</td>
<td>41 (65.1)</td>
<td>21 (87.5)</td>
<td>4.26</td>
<td>0.062</td>
</tr>
<tr>
<td>Female</td>
<td>25 (28.7)</td>
<td>22 (34.9)</td>
<td>3 (12.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in years)</td>
<td>34.9±10.4</td>
<td>36.2±11.3</td>
<td>31.7±7.1</td>
<td>3.24</td>
<td>0.072</td>
</tr>
<tr>
<td>External cause of death</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct, overdose</td>
<td>45 (51.7)</td>
<td>41a (65.1)</td>
<td>4b (16.7)</td>
<td>14.43</td>
<td>0.000</td>
</tr>
<tr>
<td>Indirect</td>
<td>42 (48.3)</td>
<td>22a (34.9)</td>
<td>20b (83.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each letter denotes a subset of categories whose column proportions do not differ significantly from each other at the 0.05 level.

Legend:
According to EMCDDA drug-related mortality is defined as:
- Direct death: death directly caused by drug action on the body (i.e. overdose cases)
- Indirect death: those deaths that occur among IDUs during the time period when their drug had not reached toxic concentrations in the body (126)

71% of all suicide victims were males, the portion of males in INSIDE-GR was greater than in OUTSIDE-GR, but the difference by gender in the two groups was not significant.

Suicide victims died in average at the age of 34.9 years (min 19.1, max 56.7 years), those from INSIDE-GR were in average 4.5 years younger than those from OUTSIDE-GR; the difference was not statistically significant.

51.7% (n=45) of suicides were by overdose (substance-induced), 48.3% (n=42) of suicides were due to other causes rather than overdose (indirect causes). Among INSIDE-GR members, indirect causes strongly prevailed (83.3%), while 65.1% of
OUTSIDE-GR members deceased by overdose; the difference was statistically significant (Table 15.).

In 58.1% (N=36) of suicide cases, males died due to indirect external causes, while females in 76% of cases died for overdoses, with a statistically significant difference ($\text{Chi}^2=6.97$, $p=.008$). Males were on average 35.25±9.87 years when they committed their suicide, one year older than females, who were 34.21±11.91 years; the difference was not statistically significant.

Table 16 shows comparison between OUTSIDE-GR and INSIDE-GR overdose victims regarding type of substance used.

Table 16. Suicide by overdose between OUTSIDE-GR and INSIDE-GR according to the use of narcotics, and type of substance, 2004-2007, Slovenia

<table>
<thead>
<tr>
<th>Suicide, by overdose</th>
<th>Total N=45 (%)</th>
<th>OUTSIDE-GR N=41 (%)</th>
<th>INSIDE-GR N=4 (%)</th>
<th>Chi^2</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type psychoactive substances</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narcotics</td>
<td>18 (40.0)</td>
<td>14a (34.1)</td>
<td>4b (100.0)</td>
<td>4.13</td>
<td>0.042</td>
</tr>
<tr>
<td>Non narcotics</td>
<td>27 (60.0)</td>
<td>27a (65.9)</td>
<td>0b (0.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of substance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>35 (77.8)</td>
<td>33a (80.5)</td>
<td>2a (50.0)</td>
<td>4.08a</td>
<td>0.130</td>
</tr>
<tr>
<td>Illicit drugs</td>
<td>7 (15.6)</td>
<td>5a (12.2)</td>
<td>2b (50.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3 (6.7)</td>
<td>3a (7.3)</td>
<td>0a (0.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Among suicides by overdose, 60% of cases were by non-narcotics (mainly BDZs), 40% due to narcotics. In OUTSIDE-GR, 65.9% of overdoses were by non-narcotics, while in INSIDE-GR all 4 cases were due to overdose by narcotics, with a statistically significant difference (table 16). The portion of males deceased due to suicide by overdose with drugs other than narcotics (53.8%; N=14) was lower than that among females (68.4%; N=13), but the difference was not significant.
Females’ suicides by narcotic overdose were in 3 cases by methadone, in 2 cases by heroin and in 1 case by other and unspecified narcotics, while non-narcotic overdoses were in 7 cases by BDZs, in 3 cases by unspecified antiepileptic and sedative-hypnotic drugs, in 3 cases by unspecified psychotropic drug. Males’ suicides by narcotic overdose were in 4 cases by heroin, in 4 cases by other opioids, in 3 cases by methadone and in 1 case by other synthetic narcotics. Males non-narcotic overdoses were in 6 cases by BDZs, in 3 cases by unspecified psychotropic drug, in 2 cases by other and unspecified drugs, medicaments and biological substances, in 1 case by unspecified antiepileptic and sedative-hypnotic drugs, in 1 case by other antiepileptic and sedative-hypnotic drugs, and in 1 case by other and unspecified psychodysleptics (hallucinogens) (Table 14).

Intentional overdoses were most frequently by prescription drugs (77.8% of cases), followed by illicit drugs (15.6%). The portion of prescription drugs was higher among OUTSIDE-GR, the difference between the two groups was not significant (Table 16.). 84.2 % (N=16) of females and 73.1% (N=19) of males used prescription drugs, while illicit drugs were used in 19.2% of males and 10.5% of females; the difference by gender was not significant.

42 cases of suicides were due to indirect causes (other than overdose), hanging was the most frequent (N=11, 6 cases from INSIDE-GR), other 31 indirect causes were: 9 poisoning by gases (6 from INSIDE-GR), 5 by firearm (4 from OUTSIDE-GR), 6 by jumping from high place (by 3 from each group), 4 by sharp object (2 from OUTSIDE-GR), 3 by crash with motor vehicle (3 from OUTSIDE-GR), 2 cases by lying down in front of objects in movement (1 from OUTSIDE-GR), 1 by drowning (1 from OUTSIDE-GR) and 1 by unspecified means (1 from INSIDE-GR). There were no suicide cases by hanging, neither by discharge of firearms, among females (Table 14).

Table 17. shows comparison between OUTSIDE-GR and INSIDE-GR suicide victims by indirect method of suicide.
Table 17. Suicides from indirect causes of death between OUTSIDE-GR and INSIDE-GR: those due to hanging or else to another indirect cause of death, 2004-2007, Slovenia

<table>
<thead>
<tr>
<th>Suicide, indirect cause of death</th>
<th>Total N=42 (%)</th>
<th>OUTSIDE-GR N=22 (%)</th>
<th>INSIDE-GR N=20 (%)</th>
<th>Chi²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanging</td>
<td>11 (26.2)</td>
<td>5 (22.7)</td>
<td>6 (30.0)</td>
<td>0.29</td>
<td>0.592</td>
</tr>
<tr>
<td>Any other indirect method</td>
<td>31 (73.8)</td>
<td>17 (77.3)</td>
<td>14 (70.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In indirect causes of death due to suicide, comparing suicide by hanging and other indirect causes of suicide, the difference was not statistically significant between the two groups (Table 17.).

There were no statistical differences in indirect causes of suicide neither by gender. Mechanism of death for suicides among females were, according to ICD-10, due to intentional self-harm: by fall (2 cases jump from high places), and in 1 case in each of the following: by cut/pierce (by sharp object), by transport (crash by motor vehicle), by poisoning with gas (carbon monoxide), by other specified, classifiable (lying down in front of moving objects).

According to a national estimate for 2004 in the age group 15-64 years there were 10.654 problem drug users in Slovenia, among those mainly injecting drug or regular users of opioids (heroin), while for the same year, 2263 males and 639 females were reported in OAT (134).

RR for suicide in 2004 was for OUTSIDE-GR 1.20 (95% CI: 0.44-3.28), higher than that for INSIDE-GR (z statistic: 0.361, P=0.7178).
5. Discussion

5.1. Qualitative analysis

The first objective of the work was to find out the opinions of a group of psychiatrists about national data on suicide among IDUs and to find out expert's beliefs on suicide among IDUs with a focus group methodology.

- The first hypothesis: "Qualitative data collected through focus group of psychiatrists will suggest that the issue of suicide among IDUs is not known" was confirmed.

All the participants in the group unanimously and strongly believed that the inclusive monitoring by psychiatrists of data on suicide and suicidal behaviour, and, more specifically, among IDUs are both important, as the prevalence of risk factors for suicide in this subpopulation is higher. In the opinion of participants, by monitoring the indicators on suicide it should be possible to monitor the quality of the work performed at AOT, too. Participants believed that AOT acts as a protective factor for suicide and the treatment provided by the centres is more helpful to females than males.

The group participants were in possession of elements from an evidence-based perspective, as they already had a good knowledge of data published on suicide in the general population in Slovenia (14, 56, 91, 99, 103, 104, 110, 111), and were familiar with the therapeutic situations and with patients in drug use treatment facilities, but they were unfamiliar with data published on suicide among Slovenian or international IDU population or among AOT population (139, 45, 49). For participants, those were new data; as a result, they were generally surprised about results on suicide in IDUs from these data and in the AOT population – results that had been prepared in time for the discussion in the focus group.

Participants agreed that health professionals and lay people had similar and negative attitudes towards IDUs, especially with reference to treatment approaches and to the quality of attention they deserve in comparison with other people, as a consequence of stigma and therapeutic nihilism.
The participants also pointed out the discriminatory nature – again, deriving from stigma and therapeutic nihilism – of treatment provided for those aged over forty, as in the case of elderly heroin addicts who do not usually bother to apply for drug-free treatment and remain in AOT. Mental disorders are strongly linked with stigma, and those most affected are substance users (141). The stigma, especially in IDUs, has negative consequences on the treatment and outcome of addiction diseases and on the chances of finding a job (142-145). Heroin users are usually unemployed, with a low level of education, frequent incarcerations, psychopathology, alcohol use problems and social isolation (146-149). In addition, patients enrolled in AOT are victims of discrimination and prejudice, in many cases even coming from their own family – a factor that has a disruptive impact on compliance with treatment, too (150). Discrimination and stigma accompany IDUs in their attempts to access mental health and addiction treatment’s services (151), thus negatively influencing compliance and increasing the dropout rate from treatment, which in its turn increases the risk of mortality and suicide, given that AOT is a protective factor against mortality (31,152-156); all of these data are in accordance with our findings. In addition to these findings, the participants pointed out that the economic crisis itself, and the consequent rise in unemployment among IDUs, represent an additional risk factor, as IDU-related stigma has a negative impact on the chances of finding a job.

Mortality among IDUs is estimated to be 10 to 20 times that of the general population of the same age and gender (19, 32). According to Darke et al. (17), overdose is a major cause of death among IDUs. Opioid addicts turned out to have death rates 13 times higher than those of the general population (34, 157). 10% or more of IDUs died by committing suicide (17), between 3 and 35% of all cases of death among heroin users were reported to be due to suicide (16), and, similarly, in our case, 30% of all causes of death among IDUs were due to suicide and 19% of all deaths in the AOT population were due to suicide. AOT could have a protective role with respect to mortality if heroin addicts remain in treatment (19, 32, 158-160). In spite of this, suicide can be viewed as a major clinical issue among heroin users, and a major risk and problem for AOT (16).
A discrepancy was evident in beliefs regarding the group of intentional overdoses among IDUs. GPsys and those from a DFTC share the same views, as they believe that among suicides there is a percentage of accidental overdoses, whereas those from an AOT take the opposite view – that, among the acts of suicide committed by taking an overdose, there are only intentional overdoses. The relationship between heroin overdose and suicide is controversial; in fact, in the literature too, some authors have expressed doubts about the relationship between overdose and suicidal intent, whereas others reported an association between heroin overdose and suicide (16). However, according to Darke and Ross (16), heroin overdose only accounted for a small proportion of suicides, while, among heroin users, most suicide victims use means other than heroin (16).

In addition, just as the underlying causes of death in Slovenia are first selected, then encoded according to ICD-10 criteria, and then stored in the GMR database, overdoses in GMR are usually divided by intent into “intentional (suicide)”, “accidental” and “of undetermined intent”. The latest data on suicide could include cases where intent could not be determined as being intentional or accidental, while cases of intentional overdose (i.e. suicide) are encoded when intent is recognized. Almost one third of all overdoses among Slovenian IDUs are well defined and clearly include an intent to commit suicide, and only those cases have been reported in this study, whereas one quarter are accidental and in almost a half of the remaining overdoses there is no clear intention (therefore, there is undetermined intent) (45). Similar data have been reported for EU IDUs (16, 31). While overdose is a leading cause of death in suicides among IDUs, heroin is usually present in a small percentage of cases, while more caution is required when BDZs and antidepressants have been prescribed (16). Polydrug use, especially if it involves the use of BDZs, increases the risk of suicide in heroin users (16, 17, 25). All the participants stressed the great problem raised by the prescription and resale of BDZs, as these phenomena should be recognized as important means of suicide in IDUs. According to Nielsen et al. (161) medical practitioners are an important source of misused medications but not the only one, the monitoring of prescription drugs has only a limited effect on IDUs who rely on non-prescription sources, and the inclusion of BDZs in monitoring programmes is imperative. Charlson et al. (162) examined the mortality
risks associated with the use of BDZs through a review of the literature, and found that in drug misusers there was a significant relationship between the regular use of non-prescribed BDZs and fatal overdoses; a similar conclusion were found in heroin addicts (149), but future research is now needed to evaluate BDZ prescriptions and their extra-medical use, and the consequent risk of overdose (162).

Of the suicide victims among heroin addicts, the percentage of males is dominant (16, 17, 31), and in cases caused by a fatal overdose, over 80% of them are males (163), as was found by our analysis of all cases of accidental and undetermined poisoning, as also among the AOT population, but in cases of intentional overdose in IDUs, 50% of the victims were female. Participants in the focus group gave their responses to standardized data on gender and age. According to Darke & Hall (163), and contrary to popular misconceptions, it is not inexperienced heroin users but long-term heroin addicts who run a high risk of taking a fatal overdose; thus the typical heroin overdose victim is an older heroin addict (38), whereas our participating psychiatrists shared the popular myth that overdose victims are young and inexperienced (163).
5.2. Quantitative analysis

The objectives of this work were based on the use of national databases and through well-defined cohort (IDUs treated in centres):

- to monitor mortality of treated IDUs and to identify specific mortality due to suicides among treated IDUs and the occurrence of suicides among CMs;

- to determine the proportions of deceased due to suicide with respect to variables (socio-demographic, drug use, risky behaviour, infection and type of treatment);

- to determine the difference in causes of death among suicide victims treated in centres and those not reported to be treated.

- The second hypothesis, the values of some indicators (contact with the centre, socio-demographic, drug use, risky behaviour, infections, treatment) will be different between suicide victims and survivors, was not confirmed.

In this study among CMs (heroin addicts in contact with outpatient addiction services) after adjusting for age and gender, suicide mortality SMRs was 4 (95% CI 2.8-5.6) times higher than the general Slovenian population. Findings in this study were similar to those of Pierce et al. (133) with SMRs for suicides of 4.3 (95% CI 3.9 to 4.8). However, the review by Harris and Barraclough (15) reported suicide risk in opioid users up to 14 times than expected, meta-analysis revealed variation in studies between 3-36 times, possible explanations were uncertainties over suicide ascertainment and HIV (high mortality in some countries) (15). Suicide as self-inflicted deaths from drugs are difficult to classify and accidental or undetermined deaths may be recorded instead of suicide (15).

Wilcox et al. (19) in empirical review of cohort studies of substance use disorders and suicide confirmed stronger estimate of the association of suicide with opioid use
disorders. According to Pan et al. (164) SMRs for suicide mortality among opioid addicts admitted to psychiatric centre were 16.2, in previous studies suicide mortality ranged from 6.3 to 18.4 times those in general population (15, 19, 164-167). While suicide rates vary across countries all studies have reported higher suicide SMRs for heroin users compared to the general population (15-17, 19, 37, 129, 164-167).

Death rates are influenced by the selection of the study population (higher in inpatient population) and the timing of the follow-up, cohorts with inpatient drug users mainly show higher mortality than cohorts including out-patient treatment (168). In addition, in case of longer follow up periods the average age of CMs increases and the cause of death changes (168).

In interpretation of results should be bear in mind that Slovenian general population has very high suicide mortality rate, Slovenia ranges among top EU countries with highest suicide rate among general population (3, 10), with an impact on SMRs in the CMs (169). In this study suicide CMR resulted in 1.1/1000 PY. For opioid users in AOT, authors reported suicide CMR from 0 to 6.1/1000 PY (17). Males in our cohort had two times higher CMR, while females had higher SMRs. Several authors reported similarly a higher CMR for male compared to female (170-172), and the majority of these studies report that females have a higher SMRs than males (172-175). A systematic review and meta-analysis of cohort studies on mortality of opioid users by Degenhardt et al. (35) reported higher CMRs and lower SMRs for males than females, the gender difference in SMRs reflects the gender differences in mortality of the general population (176, 177).

Heroin addicts have higher risk of death from suicide comparing to the general population and male IDUs have higher RR for suicide than females (16, 17). Similarly, in this study RR for suicide among CMs was higher for males than females, but the difference was not statistically significant.

Probably due to the small sample, there were no statistical significant differences between the two groups of CMs-suicides and CMs-survivors in some of the variables (socio-demographic, drug use, risky behaviour, infection). Suicide victims entered the cohort at mean age of 30 years, significantly older than survivors (26.7 years).

Age at cohort entry was an important risk factor for suicide in this study, hazard risk for suicide was significantly higher in patients entering cohort older, male gender did not
represent a statistically significant risk factor. Older age at cohort treatment entry resulted as a robust predictor that significantly correlates with the risk for suicide, and remains statistically significant no matter which survival model, by adding different groups of deceased by causes of death other than suicide, is used.

The majority of suicide deaths of IDUs occurred earlier in life, in fact in the cohort the highest number of suicides were in younger age (in particular, 12 cases in age group 25-29 years, followed by 5 in age group 30-34 years). According to Darke et al. (17) younger age is a risk factor for suicide in opioid users, suicide victims are usually in their 20’s. Suicide is prevalent among younger (teenagers and those in their 20s), when also rates of illicit drug use are highest; another demographic peak in suicide is in elderly (17). Degenhardt et al (41) in a WHO study estimated distribution of causes of death attributed to IDUs (overdose, trauma and suicide) in IDUs aged between 15 to 54 years: suicides in IDUs occur in two thirds of all suicides among those aged between 15 to 34 years. Similarly, in present cohort a half of suicides occurred in those aged between 25 to 34 years, one third in those aged more than 35 years and in one fifth in those aged less than 24 years. It can be stated that deceased due to suicide are usually young (15-17, 41). Longer heroin use careers are related to the risk of suicide (16); the majority of suicide victims in this study have previous treatment history.

- The third hypothesis, “suicide victims not treated in centres will use a method of suicide different from that of treated suicide victims”, was confirmed.

In interpreting the results of all IDUs (in and out of the cohort), it should be born in mind that in Slovenia heroin users dominate among problem drug users. In addition, among suicide victims, males prevailed as occur in general population (in EU and in Slovenia) (3, 10, 13), and IDU suicide victims are predominantly males (15-17, 19, 35, 164, 169). Most of cohort studies of mortality in drug users reported higher mortality for males and that deceased due to suicide were usually young (15-17).

71% of suicide victims in our case were males and died on average at 35 years. There
were no significant differences in gender and age at death between treated and untreated IDUs, but IDUs from INSIDE-GR were 4.5 years younger when committed suicide than those from OUTSIDE-GR.

Younger age in INSIDE-GR victims may reflect that addiction was a more serious condition in this group, with a consequent request of treatment. According to Ross et al. (26) IDUs in AOT are at high risk for suicide as they usually request treatment when their substance use is out of control, with frequent peaks of depression, high prevalence of suicidal thoughts and suicide attempts, and with frequent coexisting stressful life events (e.g. unemployment, legal event) (20).

In spite of the fact that among general population in Slovenia hanging is the most common method of suicide, presented in more than a half of suicides (13, 56), in this study IDUs committed suicide by overdose (substance induced) in more than a half of cases, while less than a half cases were suicides due to other cause rather than overdose (indirect causes). As also occurs among the general population, if we exclude overdoses, among IDUs the most frequent indirect method of suicide proved to be hanging, followed by carbon monoxide poisoning.

Data from literature confirm that overdoses and hanging are most common method of suicide among IDUs, drug overdoses represent at least a half of suicide deaths among IDUs (16, 17, 178); similarly, in this study, overdoses and hanging were most frequent.

Fatal poisoning was statistically significantly more frequent in OUTSIDE-GR, while in INSIDE-GR indirect causes of death significantly prevailed. Among suicides by overdose, in 60% suicide victims used non-narcotics, in group of INSIDE-GR all cases were due to narcotics while in group of OUTSIDE-GR two thirds of cases were by no narcotics, the difference was statistically significant. The portion of males deceased due to suicide by overdose with drugs other than narcotics (54%) was lower than that among females (68%), but the difference was not significant.

Males in EU general population usually commit suicide more frequently than females (3). Similarly, among general population in Slovenia males commit suicide more frequently than females, hanging is more typical for men, two-thirds of men commit
suicide by hanging - whereas with females the proportion is below one half (12). Like as in the general population, heroin users who committed suicide are predominantly males (15-17, 19, 164, 179, 180) but majority of suicides are due to poisoning (16, 17, 178). Considering all the overdoses taken by IDU in Slovenia, males are predominant in the accidental and undetermined intent groups, while half of the victims in cases of suicide by overdose are females (45). As males usually employ more violent methods, hanging is more frequent method of suicide in men, whereas females prefer a non-violent method, like overdose (16, 17). In this study there was, in fact, not a single case of hanging or of being shot by a firearm among females.

Overdose by non-narcotics was more frequent than those of narcotics (60 % vs. 40 %). Comparing the two genders, an overdose of narcotics was recorded in almost half the overdoses taken by males, whereas the proportion of overdoses of narcotics was only one third of all the overdoses taken by females. Prescription drugs (of which narcotics and BDZs were the most frequent) were used in almost 80% of all overdoses, and showed an even higher proportion among females, whereas illicit drugs were used in only 16% of all overdoses, and the proportion was higher among males.

In Slovenia abuse of BDZs has as major source through prescriptions by medical doctors, only a small proportion derives from black market directly (181). There are already performed several national activities for decrease in prescriptions of BDZs (103, 104, 181). These data reveal that there is a systemic possibility to reduce the accessibility of BDZs. In addition, there is a need to warn the professionals working with this population after suicide attempt to be pay attention in case of poisoning with BDZs and to ask about illicit drug use and/or to perform testing on substances. So far, no other population did show such a strong deviation in the direction of BDZs (50-115).

In spite of the fact that drug overdose is a major cause of suicide in heroin users, an overdose of heroin itself is not a method of choice for committing suicide among heroin users; the most common method is, in fact, an overdose of pharmaceutical products, while an overdose of heroin is a rare event (16, 17). Similarly, in our case among all suicides only 6 cases were to overdose by heroin (4 taken by males and 2 by females). Although heroin or its metabolites remain leading cause of all overdose deaths also
prescription opioids were found in toxicological reports (e.g. methadone, buprenorphine, fentanyl) in EU (30). In addition, in 2011 from eleven European countries was reported that around 10% of addicts in EU at the moment of their first treatment already used opioids other than heroin (e.g. fentanyl, methadone and buprenorphine) (30), suggesting that prescription synthetic opioids mentioned above are available on the EU illicit market (30). The high proportion of prescription drugs that are used in committing suicide by taking an overdose, and the low proportion – in general, and for females in particular – of registered AOT by suicide victims, point to the frequency of abuse and of recourse to the black market for narcotics and other medicines, partly linked with the nature of the disorder and with the stigma attached to addiction, especially heroin addiction (140).

INSIDE-GR in this study seems to be influenced by AOT regarding suicide by overdoses, as among this group indirect causes of suicide dominated in comparison to OUTSIDE-GR group where overdoses prevailed, but in this study the effectiveness of the treatment was not assessed. According to some authors AOT could have a protective role for all causes of mortality in heroin addicts, especially in case of achieved stabilisation and continuous AOT (32, 35, 158-160, 182, 183). In spite of this, suicide remain one of major clinical issue among heroin users, also among those in AOT (16); among patients in AOT one-third were moderately to severely depressed as assessed on standard rating scales of depression (184).

In our case OUTSIDE-GR had higher RR for suicide than those in INSIDE-GR, but the difference was not significant. Data from literature revealed that mortality for suicide is higher among those heroin addicts who were not in AOT (160-163), AOT lowers mortality rate and protects from death (152-155), where continuity of treatment is relevant (156). Only few studies monitored mortality while in or out of treatment; RR for mortality and suicide was lower during treatment (185-187).

Suicide victims in our case were young, in the middle of the thirties. This is not surprising as young heroin users are extremely at risk for suicide (16, 17, 188, 189). Only one fourth of all suicide victims demanded drug related treatment in AOT, males more frequently than females (12%). The natural story of heroin addiction is
accompanied frequently by cycling or dropping out from treatment or wandering from one treatment to other over time (190), but still important proportion of heroin addicts are out of treatment at any given time (191).

The prevalence of concomitant psychiatric disorders and alcohol abuse among IDUs far exceeds general population estimates (192-195). CMs died younger than those without treatment contact. IDUs in AOT have high rates of psychopathological symptoms (195-197), most frequently depressive symptomatology (195-199). According to a recent article younger heroin addicts at their enter in treatment were characterised by higher scores for violence-suicide than older (198).

Our findings regarding all suicides among IDUs were in line with findings from literature.
5.3. Limitations and strengths

The main limitation of this study was the relatively short period of follow up of CMs, what resulted also in small number of suicide victims, especially among females in AOT. A study involving a longer period of observation and a higher number of suicide victims in all probability, would have given more significant results. In addition, monitoring and comparison of data from such complex databases as have been used in the study often is not feasible because of not comparability or even not availability of some information (e.g. toxicology), or data are not possible to merge. For example, in some cases of suicide due to causes other than drug induced, like suicide by hanging or jumping from high is, only further police investigation or forensic examination could offer the additional information on illicit drug use in such suicide victim and such DRD. Often cases like this are evidenced in GMR as suicide due to hanging or jumping from high but there is no information on illicit drug use and those cases remain hidden as DRD (also due to methodology). In case of identification in SMr such cases are included under different causes of death as those in GMR.

The small number of deaths after stratification by age and gender influence the precision of suicide mortality estimates. A study involving a longer period of observation and higher number of suicide victims in all probability, would have given results that are more significant. However, the current (cohort) study included recognised problem drug users seeking AOT followed for period from 2004 to 2011. The vital status (survived, deceased) of all CMs and for all cause of death was ascertained through GMR which allowed to include all causes of death and not only those due to drug induced deaths which usually were extracted using only GMR (28, 29, 42), linkage with the GMR was updated once a year.

GMR is available in all countries of the EU and also in Slovenia offer the main possibility to identify routinely overdoses (drug-induced deaths) (28, 29, 42). In spite of recognised general good quality of mortality data in GMR, including those for suicide (42), there are limitations in the use of GMR as single source of drug related mortality data, bearing in
mind that DRD besides overdoses (drug induced or direct deaths) include also indirect deaths, those that occurred while the illicit drug was not found in toxic concentrations in the body, which should be considered for overall mortality and those deaths indirectly related to illicit drug use (e.g. suicide) are more difficult to assess (28, 29, 127). The single use of GMR as source of data offer the possibility to identify only those cases of DRD where illicit drugs represent direct cause of death (overdose), while all those cases of suicide in IDUs by means other than overdose by illicit drugs (indirect causes, e.g. hanging) could remain hidden as event in IDUs. (42).

In addition, the EMCDDA definition of DRD includes cases of overdose by illicit drugs, while polydrug poisoning is common (28, 29, 31, 42). In some cases of DRD, information on Medical certificate of death and cause of death (e.g. data on toxicology, different circumstances of death) are incomplete and deficient (39). In case of overdoses a very high proportion of deaths (a half) in Slovenia still remains with undetermined intent (45).

Suicide is most under-reported and misclassified as deaths of undetermined intent, accidents, homicides or unknown cases (39). Under-reporting is related to stigma of the act or to criteria of reporting (e.g. responsibility of death certificate, ascertainment of person’s intention of killing themselves, forensic investigation) (10). In addition, more violent methods (hanging or firearm suicide) are reported more accurately than non-violent methods (e.g. poisoning or drowning) (40).

Suicide is a cause of death in the ICD-10 but in case of routine monitoring of IDU mortality is evaluated with overdose deaths, the reliability of diagnosing cause of death may be influenced by cultural variations in attitudes towards suicide of professionals on consequent impact on classification of death as intentional (41).

In this study, overall mortality in IDUs was upgraded with the cohort study, among IDUs seeking treatment, which measured more complete impact of mortality. With linkage of GMR and ETDUs we obtain all cases of death among CMs. Beside illicit drug induced deaths also other causes of death (indirect drug related causes) among IDUs were identified, cases which remain completely hidden with use of GMR as only source of data.
(due to methodology). The follow up period of cohort study offer inside to acute and long-term effects of illicit drug use on mortality in AOT population (168). Similarly, as EMCDDA conclude for cohort studies among drug users in AOT also our cohort study is not only complementary to drug induced deaths but represents the first indicator of prevalence of suicide among this population, and main parameters of cohort study were CMR and SMRs for suicide (42).

This record linkage study did not require the update of the information at enrolment in form of individual follow up or face to face procedures or measurements. The vital status of CMs was ascertained for every past year. In addition, this record linkage study (linkage of GMR and EDTUs) was time consuming but conducted with relatively limited sources (same institution, same experts) (42). In spite of fact that drug addiction is chronic disorder with the possible change in drug use status during follow up period the bias was reduced including AOT centres and with national coverage.

The records used (GMR, ETDUs) could be under-reported for a variety of reasons (e.g. incomplete data, lack of resources, medical staff facing a work overload, administrative limitations), but this shortcoming was limited by their strengths: national coverage (GMR included all deaths in the country, ETDUs included AOT facilities in the country), continuity (with GMR lasting over decades and EDTUs for almost twenty years), tradition and a mandatory formal foundation (law binding for both, Notification of death: DEM-2 form, Medical certificate of death and cause of death, EDTUs questionnaire), international standards and comparability: use of ICD-10 codes, indicators on mortality (116), indicator on treatment demand (128).

As to SMr, the data supply lasted only for a relatively short period (2002-2007) but it did give the opportunity to collect additional information on DRD through the dense national networking additional data sources. The main advantage of SMr was the identification of additional DRD with the collaboration of other institution and use of additional sources of data. SMr offered additional information on death (toxicology, police investigation of DRD). SMr included those cases of suicide where, besides cases identified with routine procedure (e.g. GMR), death was further investigated. It means that cases included in SMr depended on how accurately suicides were identified and
how strictly departments of pathology from regional hospitals, after performed autopsy in case of suspicion about DRD, sent biological fluids of deceased to Forensic Institute for toxicology examination. For these reasons and due to stigma, suicides in SMr could be under-reported. Comparison of cases from the cohort to SMr in this study revealed that all cases of overdose from the cohort were identified also in SMr, while among indirect causes of suicide deaths 4 out of 20 cases in the cohort were not in SMr.

In our case SMr included cases of DRD due to suicide in country: drug-induced suicides (overdoses) and drug-related suicides other than poisoning. Other advantage of SMr was the possibility to obtain data on drug related suicides (deaths) among IDUs who were AOT treatment naive during 2004-2007 period. SMr offered the possibility to identify those DRDs that remain absolutely hidden with use of GMR as only source of data. In addition, with the use of SMr also cases of drug related suicide (death) of IDUs not seeking treatment were identified, cases which remain hidden also in case of linkage of GMR and cohort. In fact, our best estimate of drug related suicides in Slovenia in the 2004-2007 period was 87 cases, what represents 4.4% (95% CI 3.5-5.4) of all suicides in the country (N=1980). With the use of GMR as a single source of drug related suicides only 19.5% (95% CI: 11.8-29.4%) of drug related suicides cases were identified. SMr represented in this study another complementary mortality register, with more clear causality between illicit drug use and death. In case of use of SMr as only source of mortality, some cases of drug related suicide (deaths) could remain hidden (42).

Actually, there are no standards for SMR and data between countries are not comparable (42).

The main advantage of this study was presented by use of the three database, with the possibility to obtain drug induced and other than drug induced suicides, and causes of suicides among seeking treatment population and among those IDUs who remained AOT naive. The use of single and only source (GMR or SMR) underestimate the mortality phenomenon among IDUs as some cases remain unrecognized, on the other side the cohort linkage with GMR and further linkage with SMR offer wider view on the suicide issue among IDUs. Using and merging different databases we were able to obtain high-quality data on suicides among IDUs.
This cohort was recruited through a AOT and may not be representative of all treated IDU population however the network of outpatient centres with AOT remains the main treatment service for IDU problems in the country.

In drug overdoses as prescription drugs were involved for these cases, with a few exceptions (e.g. methadone) ICD-10 codes do not specify individual drugs, as the codes are structured in a way that groups drugs and drug classes together, for this reason type of substance involved were recoded (narcotics, no narcotics). No information was available either on whether prescription drugs had been prescribed to victim directly or had been acquired from an illegal market, the information was partially covered with recoded type of substance (illicit drug, prescription drug).

Despite all the limitations presented here, these results are estimate of the national epidemiological evidence on suicide among IDUs. Cohort study revealed the suicide issue among drug users otherwise underestimate and hidden using only routine system of general mortality, offering the possibility in this study to find out also suicides due to indirect drug related cause beside to drug induced suicides or suicides due to overdoses among IDUs in AOT. In addition, the differences in causes of death due to suicide between INSIDE-GR and OUTSIDE-GR were studied with the use of a special database (SMr) which offers further insight in suicide issue among IDUs not involved in AOT.

Other limitation of this study is the fact that there were no data if victims were in treatment or not at the moment of the death. In addition, these figures may underestimate the true dimension of DRD due to suicide because of stigma, thus diminishing the real extension of the problem.
6. Conclusions

- The psychiatrists in the focus group showed awareness of Slovenian data on suicide in general population, but they were not aware of the differences between data that refer to the general population and those referring to the IDUs.

There are several differences in suicide data between the general population and the IDU population; the group of psychiatrists in this study showed little awareness of these data, but they did express interest in receiving a steady supply of analytical data of this type, so that they would be able to use them in everyday clinical practice. There is a need for the further monitoring of suicides committed by IDUs, using a different set of risk factors, and the prediction of suicide should include the characteristics of this population. Although AOT is a well-known protective factor against mortality and suicide in heroin addicts, innovative efforts should be made to prevent suicide in this population. Suicide prevention programmes tailored to the needs of IDU should be developed by combining findings from qualitative and quantitative research.

Self-medication with prescription opioids from black market and prescription opioids abuse seems to have greater extend among IDUs population and also consequences of these kind of abuse could be fatal. In general, IDUs who were not in contact with AOT died in greater proportion due to overdose, what suggested to protective factor of the treatment; especially they were paradoxically even more endangered as they died by prescription drugs in greater extent in comparison with those who were in contact in treatment system.

- Cohort study in IDUs seeking treatment allow the identification of all suicides, registered in GMR (all cases of suicide due poisoning and also those suicides due to indirect causes of death), with wider insight on suicide phenomenon in so high risk population.

- SMr allows the identification of suicides: where illicit drug was present in the
body at the moment of death, in IDUs not seeking treatment and to separate IDUs in two groups those with and without seeking treatment. SMr represent complementary source of suicide DRD, as all cases of death in SMr are also present in GMR but frequently coded causes of death are different.

- The use of only GMR do not allow the identification of DRD due to suicides where indirect cause of suicide death is registered neither in case of suicide by poisoning by other substances than illicit drugs.
- Suicide SMR for CMs was 4 times higher than that of Slovenian population of same age.
- Hazard risk of suicide was significantly higher in patients entering cohort older.
- The profile of IDUs deceased by suicide was male, 35 years old, deceased by overdose, due to no narcotics, mostly prescribed drugs, while suicide due heroin overdose was rare.
- IDUs seeking treatment died statistically significantly due to suicide by causes other than overdose than that outside cohort and in rare case of overdose, by narcotics.

Heroin users are more endangered for suicide than their peers in general population. In addition, there are more prevalent set of risk factors and the prediction of external cause (method) of suicide should include characteristics of this population. All risk factors should be accepted and recognised by professionals working with special population. Screening for suicidality, early recognition and prevention of suicidal behaviour and treatment of suicidality among IDUs in AOT would be only part of intervention for decrease of this public health problem.

Although suicides due to overdose as a method of suicide represents the majority of suicide cases in heroin users, and that heroin overdose is the most common cause of accidental fatal poisoning, heroin in fact is rarely used for suicide purposes in this population (16, 21). In contrast overdose by prescription drugs are most frequent method of suicide among IDUs. Poisonings by prescription drugs, among those mostly sedatives, hypnotics and narcotics, were one of the most frequent method of suicide. Caution in prescribing practice, particularly with respect to BDZ and narcotics, is a
priority in treating the IDUs, especially its female component; one precaution would be to lower the availability of any common means for committing suicide, even more so considering the lower willingness of females to enter AOT services. Unfortunately, this approach only covers part of the problem, as diversion from drug-related services and the non-medical use of prescription medicines has grown more common. The destigmatization of drug addiction and the greater availability of drug-related treatment, especially designed for the needs of females, would also have a useful impact in reducing the risk of suicide in this population.
7. Recommendations for the future research

This study confirmed that the use of national databases and linking their data is possible and that the results obtained from the linkage are comparable with the research studies with collecting data for study purpose only. Better assess of drug related mortality and better data collection system are required which could be possible with better quality of data (coding causes and intent of death, more complete information) and GMR's complementary databases (cohort, SMr) as source of data on mortality need to be continuously in place (continuity) in way to improve consistency of procedures used to register DRD and to identify additional DRD which remain hidden using single source of database.

The quality of data on DRD was not assessed in Slovenia, but there is already some professional recommendation in recording the causes of death (200). The underlying cause of death of IDUs should always take into account of the toxicology of the deceased; in drug induced deaths it is necessary to determine the intent of poisoning and substance used, in cases of sudden cardiac arrests or unclear cause of death among young persons, the possibility of drug induced death should also be considered.

To monitor drug related mortality in more reliable approach could be instrument for further measurement of the quality of treatment services.

A qualitative part of the study revealed interesting results, in particular pointed out discrepancy in the understanding of suicide phenomena – experts on one part have a very good knowledge of characteristics and prevention regarding suicide in the general population, while less was known about the characteristics of suicide among IDUs, where this gap was related to sharing myths without scientific bases.

The qualitative part of the study pointed out that different components could have impact on the treatment of IDUs as stigma and therapeutic nihilism.

The qualitative studies are recommended in those cases where phenomenon is less researched, where psychological elements could have impact on decisions and when myths and stereotypes are present, as in the field of suicide among IDUs is the case.
Further studies are now needed to acquire a better understanding of the phenomenon. Special emphasis is required for IDUs who are not in treatment as there is evidence that rates of mortality may be higher among this group (169).
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Statement of Authorship

I declare that I developed my doctoral thesis, titled “Qualitative and quantitative analysis of suicide in illicit drug users”, under the mentorship of Prof. Mojca Zvezdana Dernovšek and Prof. Icro Maremmani.

Mercedes Lovrečič
Annex

Scientific articles which are the result of research in connection with a doctoral thesis


- Lovrecic M, Lovrecic B, Selb Semerl J, Maremmani I, and Maremmani AGI. The filing of addicts at addiction units is correlated with a reduction in mortality due to illicit opioids, but also to prescribed opioids and other substances of abuse. Heroin Addict Relat Clin Probl, in print


Experts’ beliefs on suicide among illicit drug users

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Summary

Background and aims: Both data and studies have documented high rates of suicide in Slovenia. More specifically, suicide accounts for a considerable share of premature deaths in illicit drug users, where heroin addicts predominate. The analysis of national data on suicide among illicit drug users in Slovenia revealed several differences in suicide behaviours between the general population and the illicit drug user population. The aim of this study has been to find out the opinions of a group of psychiatrists about the calculated results and the indicators used in analysis.

Methods: The national data on suicide among illicit drug users were analysed and presented to a focus group. Focus group methodology was used.

Results: The psychiatrists in the group showed little awareness of Slovenian data on suicide and of the differences between data that refer to the general population and those referring to the illicit drug use population.

Conclusions: Those psychiatrists expressed interest in being updated on the periodic analysis of these data and indicators, so that they would be able to use them in everyday clinical practice. Specific suicide prevention programmes tailored to the needs of illicit drug users, especially heroin addicts, should be developed after reviewing the results of both quantitative and qualitative research.

Key Words: mortality; suicide; overdose; illicit drug use; focus group

1. Introduction

Although suicide can by now be considered preventable, it remains one of the top ten leading causes of premature deaths in Europe [39]. Studies on suicide in the general population have shown that males commit suicide more frequently than females, and that males are more likely to employ violent methods (e.g. hanging), whereas females are more likely to employ non-violent ones (e.g. poisoning by drugs) [13,39]. In EU, after decades, Slovenia still has one of the highest suicide rates in the Union [39,42]. Across the EU, suicide death rates are four to five times greater for men than for women [42]. In the general population in Slovenia, males commit suicide 3.5 times more frequently than females and, overall, as many as two-thirds of suicide victims took the decision to hang themselves – more exactly, three-quarters of the male ones and over half the female ones [37,38]. Although the incidence of suicide in Slovenia has been falling since 1998 [4], in the year 2011 the rate actually rose [40]. According to Korosec Jagodic et al. [29], data for Slovenia revealed that unemployment was the strongest predictor of suicide, while the higher marriage/divorce ratio acted as a protective factor, and better psychiatrist availability (4 psychiatrists and more work at outpatient clinics per 100,000 inhabitants) was negatively correlated with the suicide rate. The antidepressant/anxiolytic ratio above 0.5 helped to lower the suicide rate, while the prevalence of alcohol use disorders showed a significant positive correlation with the suicide rate.
The presence of a mental disorder is an important risk factor for suicide. It is generally known that at least 90% and as many as 98% of those who committed suicide had a psychiatric diagnosis at the moment of death [2,3,35]; the most prevalent diagnoses of this type were mood disorders (diagnosed in 30.2% of suicide cases), followed by substance abuse in 18%, schizophrenia in 14%, and personality disorders in 13% [3,43]. 45% of suicide victims had been in contact with primary care providers, and one in five had been in contact with mental health services at most a month before suicide [34]. During the last month prior to suicide, 66% of victims had contacted a general practitioner for a consultation, 13% had been discharged from a psychiatric hospital and 7% from a general hospital [1].

Illicit drug use, especially heroin addiction, is a well-known risk factor for suicide [13], as heroin users, when compared with the general population, are exposed to additional risk factors linked with drug use, and they run a higher relative risk of committing suicide [13,10]. The suicide mortality rate was reported to be 14 times higher in heroin users than in matched peers [25].

Suicides due to overdose accounted for more than one quarter of all overdose in illicit drug users in Slovenia; the average age of suicide victims was 45 (vs 28 for accidental overdose). Male gender, a higher age and abstention from alcohol during intoxication were the best predictors of intentional poisoning [32]. Suicides due to injuries were the most frequent cause of indirect deaths (e.g. traffic accidents, self-injuries) in the opioid agonist treatment population and accounted for half of all indirect deaths [31]. Intentional self-poisoning by benzodiazepines (BDZs) was most frequently chosen by female illicit drug users, whereas in males and also in the total illicit drug population narcotics prevailed, followed by BDZs. Among suicide cases caused by self-injury, hanging was the most prevalent form (it was the first preference of males), followed by jumping from a high place (the leading preference of females); females refrained both from hanging themselves and from the use of firearms [33].

The analysis of Slovene national data revealed several differences in suicide between the general population and illicit drug users. Tables 1 and 2 present the differences between categories of suicide victims in Slovenia. Furthermore, the various sets of risk factors that make possible the prediction of self-harm in the form of overdose or injury should include the characteristics of this population. New risk factors should be accepted and recognized by professionals working with special populations. The aim of this study was, therefore, to find out the opinions of a group of psychiatrists about the results and indicators that emerged from our analyses (table 1 and table 2).

2. Methods

Eight psychiatrists participated in the focus group – four from general psychiatry facilities, another four from specific illicit drug addiction treatment centres (DATCs), 3 from opioid agonist treatments and 1 from the only high threshold (drug-free) health service in Slovenia. These psychiatrists varied in their level of professional knowledge and their clinical experience in treating illicit drug addicts. They worked daily on an outpatient or inpatient basis with patients who differed in gender, age and psychopathology. The facilitator of the group was a psychiatrist with knowledge of epidemiology, suicidal behaviour and illicit drug addiction.

Table 1. Differences in suicide victims in Slovenia between the general population and illicit drug users, by gender ratio, average age at the moment of death and method of suicide

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>% of all suicides in Slovenia</td>
<td>100</td>
<td>4.3% - 6.5%</td>
</tr>
<tr>
<td>Male/female ratio</td>
<td>3.5:1* (3.9:1 in 2006)</td>
<td>1.5:1</td>
</tr>
<tr>
<td>Average age (in years) at the moment of suicide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>51.0</td>
<td>41.3</td>
</tr>
<tr>
<td>Males</td>
<td>50.4</td>
<td>37.0</td>
</tr>
<tr>
<td>Females</td>
<td>55.3</td>
<td>47.9</td>
</tr>
<tr>
<td>Most frequently used method (% of all suicide cases)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Hanging (65%)</td>
<td>Overdose (65%)</td>
</tr>
<tr>
<td>Males</td>
<td>Hanging (65%)</td>
<td>Overdose (53%)</td>
</tr>
<tr>
<td>Females</td>
<td>Hanging (52%)</td>
<td>Overdose (83%)</td>
</tr>
</tbody>
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Source: GMR [33]
This study proceeded in successive phases. During the initial phase, the national data on suicide among illicit drug users were analysed. Data selection relied on two sources that function as routine statistical systems, both run by the National Institute of Public Health (NIPH): the Evidence of Treatment of Drug Users (ETDU) and the General Mortality Register (GMR). GMR includes all deaths in the population; its vital event statistics are mandatory, complete and accurate. ETDU is the main source of data on illicit drug users registered with outpatient drug addiction centres. The third source used was the Special Mortality Register (SMR), where data on drug-related deaths were collected at national level from 2002 till 2007; it was then closed. The principal aim of SMR was to collect indirect causes of death and additional data that had proved to be incomplete or missing at the GMR.

The results were presented and discussed at a 120 minute-long focus group meeting. The meeting was divided into two parts, the first concentrating on suicide in the general population and on how it affects the illicit drug user population. A focus group methodology was used. The focus group meeting was audio and video taped and transcribed. The transcript was then re-read and recoded to complete the process.

Two researchers carried out the process just described, first separately, then together by comparing the structural features, after which further comparison was carried out until they reached agreement on structural matters.

### 3. Results

The identified themes and subthemes are presented in random order (in table 3 for the general population, in table 4 for illicit drug users) and are set out below with the help of a variety of citations from participants.

#### 3.1. Suicide in the general population

The participants unanimously agreed that the monitoring of data on suicide and suicidal behaviour by psychiatrists working as practitioners is important. In the opinion of general psychiatrists (GPs), those data offer one of the most important indicators of public health, as they are vital not only in psychiatry but in other settings, too (cit. 7), so psychiatrists should have a specific interest in them, as suicide is one of the preventable causes of mortality located in the medical sphere (cit. 5).

The participants strongly believed that the fall in the suicide rate observed in Slovenia between 2000 and 2010 was the outcome of education and programmes leading to the prescription of antidepressants rather than BDZs by general practitioners (cit. 1, cit. 5) [27, 49] and the consequence of general campaigns which presented depression and suicide as themes that deserved discussion (cit. 5) [4, 38].

In the opinion of GPs, the increase in the suicide rate in 2011 in Slovenia was a consequence of the global crisis and recession, even if the increase in suicide took different forms in different countries and
The participants agreed too that it is probably best to enhance the risk, and this is often neglected (cit. 2). Diagnoses, and to polydrug addiction – to all that, not only to double, but even to triple or quadruple personal or mood disorders are often present, leading to help them – not on a correct diagnosis alone (cit. 3). Some participants pointed out that “in addiction to help them; not on a correct diagnosis alone (cit. 3). Some participants pointed out that “in addiction to help them; not on a correct diagnosis alone (cit. 3). Some participants pointed out that “in addiction to help them; not on a correct diagnosis alone (cit. 3). Some participants pointed out that “in addiction to help them; not on a correct diagnosis alone (cit. 3). Some participants pointed out that “in addiction to help them; not on a correct diagnosis alone (cit. 3). Some participants pointed out that “in addiction to help them; not on a correct diagnosis alone (cit. 3). 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Some participants pointed out that “in addiction to help them; not on a correct diagnosis alone. The participants strongly believed that suicide by hanging in Slovenia is culturally conditioned. Reference was made to “Hanging by a rope or a belt, or whatever represents the national trend. I have an experience of series of examples of hanging, because it is so symbolically Slovenian” (cit. 6). The participants argued that “if we interpret as a threat phrases such as ‘I’ll go and hang myself or I’ll end up under a train’, that means there is a transfer from one person to another, and to some extent there is a kind of pattern” (cit. 4). In the opinion of the participants, from a preventive point of view, it is important to know about previous suicide attempts, if any, and about their typology, because, if someone chooses a more aggressive and successful method, it becomes more likely that next time it will again be successful (cit. 2). In the case of hanging, there is no call for help – the act has already been decided – while in the case of taking tablets, it is easy for us to speculate (cit. 1). Participants believed that for those working in prevention it is important to know which method is most frequent and how easily available the various means are. It was remarked that: “In cases of alcohol intoxication, suicide attempts and suicide itself become more likely. If there is more drinking in that culture, the impact of any kind of ban on drinking will be influenced by that” (cit. 3). Data for Slovenia on protective and predictive factors for suicide in Slovenia: the participants were familiar with factors that referred to the general population, but, in the opinion of participants, factors for the illicit drug use population are still not known, whereas it would be useful to know and monitor them.
factors for suicide [29] were known to the participants, it was only the limits of psychiatrist availability that were not known (cit. 5), but participants believed that those limits are low (cit. 4, cit. 5) and they are not reached in all regions, because of inequalities in distribution (cit. 5, cit. 7). The participants agreed that the listed factors were not known for the illicit drug use population, and that it would be useful to monitor these factors in this population (cit. 5). The participants believed too that the factor of illicit drug users having a job is protective (cit. 2, cit. 7), likewise being part of a family group is protective (cit. 4) and so is the factor of children who are living with illicit drug users (cit. 1, cit. 2), considering that illicit drug users are subject to a high frequency of divorces and separations (cit. 5).

On the role of the share of contacts with health services implemented by suicide victims in the month prior to committing suicide, the participants believed that “this depends on how well patients are known, how services obtain information about them, and whether, if they are informed in good time, they direct patients to a psychiatric hospital, so leading to a smaller percentage of future suicide victims among those dismissed from a general hospital” (cit. 4). Others added: “many [future] victims, 13% of the total, were among those who had been dismissed from psychiatric hospitals, in a population that is quite specific, because those patients have a mental disorder, while 7% is the percentage for general hospitals” (cit. 3); it should be borne in mind that those dismissed from psychiatric hospitals “are more stigmatized” (cit. 5). Some participants believed that improvement could be achieved through the education of general practitioners, “they often call us to say that: ‘There is a person sitting here; he is telling me that he would just like to kill himself, but he is calm. It doesn’t look so horrible, what can I do?’” (cit. 2). Other participants believed just the opposite – that younger practitioners really know the field on the topics of depression and suicide, and that the real problem is centred on monitoring: “There are patients who are known to be at risk, or it seems that they are at risk, but we have no opportunity to look at them in their local environment, where they live, at the right time. Dismissal takes place on a Friday, and then suicide happens on the Saturday. There is a need to inform home nursing services in the field and to monitor these people” (cit. 7; others agreed).

3.2. Suicide among illicit drug users

The group participants unanimously agreed that the monitoring of suicide behaviour and risks of suicide among illicit drug users is important, but there are difficulties to be overcome, because there is the grey area of statistics and, in the opinion of some participants, it is not known how accurate the numbers are (cit. 2). On the issue of how many suicides there are among illicit drug users and the proportion they represent of all suicides, some participants pointed to a likely underestimation (cit. 2). The participants were not familiar with estimates of the suicide mortality rate for heroin users, but they agreed that the risks of mortality and suicide in heroin addicts are higher than those in the general population, so that these subjects are in greater danger – their conclusion being that it is important to monitor the risk factors in this group.

The participants agreed that in suicide caused by an overdose, the subject’s intentions are not always clear, particularly in the case of an intravenous injection, so, in their opinion, it often remains an open question whether the overdose was accidental or intentional. Psychiatrists from drug-free treatment centres (DFTCs) believed that it is difficult to assess whether or not there was an intention to take an overdose, as these suicide victims “usually don’t write a suicide note. Even when legal medicine is involved, it is difficult to assess the intent, as an attempt has already been made to study this, but the study was interrupted or something similar, just because the authors could not find out if the taking of overdoses had been accidental or intentional” (cit. 1). One GP stressed that drug users are “parasuicidal all the time” (cit. 6). Another GP believed that, among drug user suicides caused by an overdose, there is a higher percentage of what are essentially accidents, so that there is a need to pay close attention to the methods that may lead to such deaths (cit. 5). Psychiatrists from DFTCs agreed about accidental deaths among suicides, although “we don’t have any data on that, but we can simply look at the anamnestic history acquired from patients. Those who take good care of their condition turn out not to have many overdoses or to have none at all. Those without any attempts at suicide also have no overdoses. The way they take doses counts too – the careful ones never have sepsis or an abscess, or anything like that. Those people are careful about how they take drugs” (cit. 1). Psychiatrists from opioid agonist treatment centres (OATCs), on the other hand, strongly believed that “often in sui-
Table 4. Themes and subthemes identified during the focus group meeting on suicide in assessing illicit drug users and the substitution treatment population, together with opinions on the data presented

- **Illicit drug user population**
  - Monitoring suicide (behaviour, risks of) among illicit drug users: all participants unanimously agreed that monitoring is important, but difficult to achieve.
  - Illicit drug users account for 4-6% of all suicides: in the opinion of participants that is an underestimate.
  - Suicide mortality rate up to 14 times higher for heroin users: participants expressed surprise and said they were unfamiliar with these data.
  - Prevalence of risk factors for suicide: all participants strongly believed that it is higher in the illicit drug addict population than in the general population.
  - Intent to commit suicide due to overdose is not always clear (especially suicide by intravenous injection): participants agreed, both GPs and those from a DFTC strongly believed that among suicides by overdose some are accidental, whereas psychiatrists from OATCs believed only in intentional overdose in suicide cases.
  - Attitudes (of lay people, and of experts) to suicide in illicit drug users compared with other people: all participants agreed that lay and expert attitudes differed, but in both cases attitudes were worse when it came to perceptions of drug users.
  - Treatment approach, and quality of attention towards illicit drug users compared with other people: participants agreed that attitudes are different in the case of perceptions of the first type of population (comprising strong stigma, therapeutic nihilism, and staying detached); attitudes also depend on the type of setting (and may involve illicit drug users begging for medicines, and using blackmail or threats).
  - In suicide victims among illicit drug users, the male to female ratio was 1.5 to 1, females died older (at an average age of 48 years) than males (37 years): the participants were surprised, and requested further information.
  - 2/3 of all suicides were overdoses, most frequently of BDZs (more so in females): attention should be paid to the methods that may lead to accidental death; through education, provision of extra information and limited access, it is possible to curb the problem.
  - 1/4 of all overdoses were suicides, with a male to female ratio of 1 to 1, victims were 45 years old on average: the participants had little knowledge of the data, but data on females, older people and intoxication with BDZs were as expected.
  - Problem of BDZ: in the opinion of participants there is a clear trend, centring on an abnormal quantity of prescribed BDZs, with further amounts of BDZs coming from the black market (as a result of resale); in DFTCs there are no patients without a BDZ addiction; while problematic BDZs come from the black market (not from OATCs); in the opinion of participants, through extra information, education and limitation of access, suicides that are due to BDZs can be curbed.

- **Opioid agonist treatment population**
  - 19% of this population will become suicide victims (vs. 30% among illicit drug users): the participants believed that OATCs offer protection and lower the risk of suicide by 10%.
  - Male to female ratio was 6.7 to 1 (vs. 1.5 to 1 in the population of all illicit drug users): the participants showed limited knowledge of the data and were surprised; in their opinion males get less help than females from OATCs.
  - Males died at an average age of 33 years, and females of 28 (vs 37 and 48 years, respectively, in all illicit drug users): the participants showed limited knowledge of the data, and pointed out that centres also treat younger people, but that failed to adequately explain the steep fall in average age, and in the high likelihood of comorbidity.
  - In this population suicide victims died more often from injuries than from an overdose (2/3 of overdoses in all illicit drug users), although they have access to the substance: in the opinion of participants, the data confirm that the black market is the principal substance provider, whereas OATCs are the most protective factor (patients are tested there on the substances).
  - To monitor indicators (such as gender and age) in cases of suicide among drug users: in the opinion of participants it is important to monitor these indicators, given the high risks run by that population, and the same is true at OATCs, where the measurement of indicators is a key factor in monitoring the quality of the medical work being done there.

Suicide due to an overdose, the overdose is intentional. It’s hard to believe in an accidental overdose, in the first place because addicts are really well informed about substances. They know more about drugs and interactions than a psychiatrist does. Addicts would be more likely to make a mistake if there were a new drug on the market, which has not happened [here] for years, or in the sense that a particular drug on the market becomes less pure. To deal with the problem of overdoses, new efforts should be made. What counts most is not the data, but the feelings you get” (cit. 2). The psychiatrists from DFTCs believed that drugs can be taken in a very safe way, because in the case of an overdose you have to take a lot [of the substance] at once: “some people are well preserved after taking drugs for thirty years, some of them are really survivors” (cit. 1), and “are functional” (cit. 4). “Addicts are familiar and careful with opiates” (cit. 2, cit. 6). Psychiatrists believed that “the danger of overdose is greater with BDZs and alcohol. Drug users some-
times don’t even know what or how much they are taking with these BDZs” (cit. 1).

The lay attitude in cases of suicide among illicit drug users is different; it is worse towards drug users than anyone else. Psychiatrists from OATCs reported that suicide in illicit drug users is perceived by lay people as the solution to the problem: “There’s no big damage done, we’ve solved it” (cit. 2), whereas those from DFTCs reported that lay people can feel sorry: “Poor fellow, he had no other choice” (cit. 1). GPs pointed out the strong stigma (cit. 6) and resignation: “It’s as if all those who knew him considered him as having a terminal illness that would sooner or later come to that, and accepted it as if it was only to be expected” (cit. 5). In the opinion of participants, even the experts’ attitude in cases of suicide by illicit drug users is different; it is worse in the case of drug users than with anyone else. The participants suggested that experts stigmatize illicit drug users even more than members of the lay public do, and the attitudes are similar in this case (cit. 7). The psychiatrists from OATCs described the negative attitudes and nihilism of health professionals (e.g. neurologists), even when they are talking to experts working in this field: “it’s a waste of time, you can’t cure anybody” (cit. 2). Others stressed the expression of stigma and therapeutic nihilism (cit. 6). Some participants believed that “This has perhaps been less prominent recently” (cit. 1), but they don’t know what this change really depends on. For some of the participants it is a result of the presence of younger experts (cit. 4), for some others it is due to “gradual entrenchment of the perception of addiction as a disease” (cit. 6) and for others the reason is because “it is not appropriate to talk in that way or even to speak about such things” (cit. 7). The participants also reported “a different kind of treatment, not showing direct hostility, but a politically correct attitude” (cit. 5). In the opinion of participants, the treatment approach and way of paying attention when face to face with illicit drug users rather than other people are different, worse for drug users, who are generally treated with detachment (cit. 5). The psychiatrists from DFTCs believed that approach “depends on the circumstances in which drug users are met (e.g. in an emergency room, regularly convened, during dual diagnosis treatment), because that is what determines the level of empathy and the condition in which these people arrive (e.g. whether they are motivated or are in an overdose situation); even experts have different types of experience with them” (cit. 1). GPs agreed and stated they strongly believe that the approach used “depends on the kind of setting you face them in, as in an emergency clinic they usually come to blackmail you and beg for medicines” (cit. 5). Psychiatrists agreed about the presence of blackmail “with a suicide threat” (cit. 2, cit. 3, cit. 4, cit. 8), and extortion conveyed by phrases like “then I'm going to get high” (cit. 5). GPs pointed out the problems raised by some approaches: “experts in different parts of psychiatry take up a weaker approach – less coherent, less unified – the whole field already has this problem, because it contains very different types of population” (cit. 6). In their opinion, the blackmail, while not appropriate, is still present “because they know that they can take the opportunity” (cit. 6), and they pointed out the need for a unified approach (cit. 6).

The psychiatrists working in addiction treatment strongly believed that this population is more exposed in the current economic crisis, as its members have to face existential damage (cit. 4); even before the crisis they were considered more problematic than the general population (cit. 2), and, even if they manage to stay abstinent, they are known within their little local environment and it will be difficult for them to get a job (cit. 1). Before the crisis there were tolerant attitudes in a few companies (e.g. Primorje) that employed addicts (cit. 4), but now in some regions (e.g. Primorska) even that small percentage who had ever had a job lost their latest job recently (cit. 2). GPs pointed out that “in a crisis there is a lot of unemployment even for healthy people, and for someone with a chronic condition it is even harder” (cit. 6), adding that “these people should be protected, just like people who have other chronic illnesses” (cit. 7). In addiction cases there is a high percentage of comorbidity involving personality or mood disorders, and depression is one of the major risk factors for suicide (cit. 5).

On the issue of the gender ratio among suicide victims, in the case of illicit drug users the opinion of the participants was that “the protective factors brought by a healthy female population are missing here” (cit. 6), and “a female addict has more problems than a female without any addiction” (cit. 1). Average age of death for female drug users (48 years), in the opinion of some participants: “is strange” (cit. 1). To participants in the group these data were all new information. Psychiatrists from DFTCs commented “we don't have females of this age in treatment at all, last year we didn't have a single female aged 59 or more, many of them were under 40” (cit. 1). Psychiatrists from OATCs reported "people who are no longer young, those over forty, are usually in substi-
tution therapy, with ageing they go into substitution treatment” (cit. 2) and “the same is true of those with dual diagnosis” (cit. 2). Some correlated an age of at least 48 years with the inability to engage in prostitution or earn money (cit. 8) and with mood oscillation (cit. 4). In the opinion of the GPs “the population is getting older, substitution programmes have been here for quite a long time, and this population too is getting older” (cit. 3). GPs suggested that this implies that “we are ill equipped to treat the population of older addicts. We know very little about them. Probably in this period of long-term treatment something is going on and we have no idea about it” (cit. 7). In their opinion “in substitution treatment there are older people partly because they have already been in treatment for a long time, and in their opinion they will be spending their whole life on substitution therapy” (cit. 3). Some estimated this condition as “complete nihilism and a status quo” (cit. 2), while, in the opinion of others, “some of them are getting along nicely” (cit. 1). GPs expressed the view that those over forty are in substitution treatment but not in drug-free programmes, as “this means a stigma. If you’re an old addict, then you have no chance at all with anyone you may be dealing with” (cit. 7), and the psychiatrists from OATCs agreed (cit. 2), while others, including those from DFTCs, believed that patients simply “do not want to [enter drug-free treatment], they have created one way of life and work, family and all, and they are functioning” (cit. 1, cit. 3). “But we accept it, there is a tolerance that they have got used to, by living like this” (cit. 2), “[as long as] they do not use other things” (cit. 3). The psychiatrists from OATCs pointed out that substitution treatment is comparable with the treatment of other chronic mental disorders “years of enrolment in an outpatient service, where he got his dosage of methadone, coming week by week; he was employed, had a family and everything else. This is like the treatment of psychosis, they are functioning on the strength of their therapy” (cit. 4).

Group participants believed that data on suicides committed by illicit drug users did not differ much from those for the general population, “in men there is more hanging, and in women more BDZ” (cit. 3). In the opinion of the participants, “BDZ abuse is a trend as there is an abnormal quantity of BDZs being used and abused among illicit drug users and BDZs come from the black market, too” (cit. 1, cit. 2, cit. 5). In a DFTC they have no patients without BDZ addiction (cit. 1). The participants stressed that “it would be interesting to know if they have BDZ from an earlier episode or if it appeared as a disorder involving long-term use” (cit. 6). Some participants suggested “possible dual diagnosis” (cit. 4) and lack of attention as factors that makes the problems worse: “in these OATCs you get used to them, you know they are coming, that there is nothing special [about that]” (cit. 6). GPs stressed the inequality in treatment between younger and older patients (“there are long-term addicts, nobody treats them or really takes sides with them, it is a matter of more maintenance. We saw that nobody wanted to treat them for BDZ addiction, they continue to take BDZs, the prescriptions continue. While the younger people are invited to try detoxification treatment, with the older ones we just say he is already addicted” (cit. 7); the participants from OATCs agreed, too (cit. 2). GPs stressed that the use of BDZ is a risk factor and a method that can lead to suicide, and that it would be possible to limit access to it (cit. 5). The participants strongly believed that through better information, education and a policy of limiting access, it will be possible to lower the incidence of suicides due to BDZs (cit. 1, cit. 3, cit. 5). The participants from a DFTC reported a new restriction on BDZ prescriptions by general practitioners. In OATCs such prescriptions will no longer be allowed; only psychiatrists should prescribe BDZs (cit. 1). Professionals from OATCs reported that there had already been limitations in the past on midazolam, most recently on zolpidem. They agree with limitations, but in their opinion problematic BDZs mostly arrive from the black market: “in our centre we don’t have any cases of midazolam prescriptions, but it is on sale at the entrance to the centre, and we are not able to prevent that” (cit. 2). Other participants agreed that BDZs are resold; GPs reported their experiences of patients who beg for midazolam and confess to having resold it to improve their income (cit. 1, cit. 5).

Participants commented on results connected with intentional overdoses by saying they are to be expected (cit. 3). Female gender, older age, and intoxication with BDZs were “expected data” (cit. 2, cit. 6). Regarding the data on suicide in treatment populations, the participants believed that OATCs lower suicide frequencies by 10% (cit. 6): “this is a protection, a network system, especially in cases of dual diagnosis” (cit. 4). “Definitively, for those in treatment, once they have settled on a therapy, there is a better chance of having a settled life compared with those who live on the street” (cit. 1). The participants also stressed that: “the experts have a role, because, at the moment when some mood disorder starts, patients can more easily contact a medical doctor who already knows them” (cit. 2), and also because patients “are already
in treatment” (cit. 5). On the question of the gender ratio, male to female, of 6.7 in the opioid agonist treated population, the group participants were surprised (cit. 1, cit. 5, cit. 7). Participants proposed the standardization of data to determine “how many females and males, and in what proportions, are in treatment, and how effective substitution and abstinence in females actually are” (cit. 1); others pointed out that there are simply more males in centres. The participants pointed out that centres also treat younger people, but this doesn’t adequately explain such a steep fall in the age of suicides in the treated population (cit. 5). Psychiatrists mentioned the problem of personality disorders and alcohol abuse; the age factor could be linked with borderline personality disorders (cit. 1). Data on the method and means of suicide in the treated population confirm that the black market is the principal substance provider (cit. 1), while the treatment centre is at most a protective factor, because patients have to be tested on prescribed substances if they want to get the benefits (cit. 3).

Generally speaking, the participants were unfamiliar with the data presented on illicit drug users in general, but some of them were surprised at the [relatively high] age of deceased females (recorded in our study as averaging 47.9 years: cit. 2; see also Table 2); others specifically expressed their surprise at seeing the divergence between the gender ratios, male to female, of 1.5:1 in illicit drug users in general, and as much as 6.7:1 in the population of illicit drug users in opioid agonist treatment (cit. 3, cit. 4, cit. 5), as “the difference was huge” (cit. 4), while in the opinion of others that extreme male-to-female difference for those in opioid agonist treatment made apparent by the figure of 6.7 marked a similarity with the general population (cit. 2). According to participants: “there has been almost no decrease in the suicidality of males, whereas in females it has been rather great; males, in fact, do not get as much from these treatments as females do (cit. 5), “which means that we help females but not males” (cit. 2). Participants perceived males as being less settled than females, and as having more additional problems, and more manipulations (cit. 2, cit. 3, cit. 5); a change occurs in male roles in response to treatment, while “females do not usually belong to any criminal association, and are less motivated by money, or by many other factors that are unknown” (cit. 5). Some participants pointed out the protective factors in females (cit. 6). “For females, the therapeutic relationship is a kind of protective factor, which is not true for males, because females feel attachment to that relationship, but males do not” (cit. 2, cit. 5). Data for the whole of psychiatry show that “males collaborate worse than females” (cit. 6), probably due to their greater impulsiveness, and to having more serious alcohol use problems (cit. 1, agreed: 5, 7), they have problems earlier, when they are younger (cit. 7), and face “more criminal and justice proceedings” (cit. 5), while, in the opinion of others: “in procedure are balanced suicides, this is pure speculation” (cit. 5). Others pointed out the issue of alcohol and dual diagnosis problems (cit. 6); all concurred with the view that “debts are a heavy burden” (cit. 7). The participants strongly believed that it is important to know and to monitor indicators on suicide, as this is “a key factor in monitoring the quality of the [medical] work being done” (cit. 7). “It is important to know why there are more suicides among males, there is a need to work more with males” (cit. 3, agreed: 1, 5). “It might be necessary to examine in which centres there are fewer suicides, and see what they offer” (cit. 1). The participants were absolutely in favour of monitoring indicators in a population that is and was so strongly at risk.

4. Discussion

All the participants in the group unanimously and strongly believed that the inclusive monitoring by psychiatrists of data on suicide and suicidal behaviour, and, more specifically, their monitoring of suicidal behaviour and suicide risks among illicit drug users are both important, as the prevalence of risk factors for suicide in this subpopulation is higher. In the opinion of participants, through the monitoring of indicators on suicide it should be possible to monitor the quality of the work being done at OATCs, too. Participants believed that OATCs act as a protective factor for suicide and that treatment there is more helpful to females than males.

The group participants were in possession of elements from an evidence-based perspective, as they already had a good knowledge of the published data on suicide in the general population in Slovenia [4, 27, 29, 37, 44, 45, 49], and were familiar with the therapeutic situations and with patients in drug use treatment facilities, but they were unfamiliar with published data on suicide among Slovene illicit drug users or among the substitution treatment population [31, 32, 33]. For participants, those were new data; as a result, they were generally surprised about results on suicide in illicit drug users and in the substitution treatment population – results that had been prepared in time for the discussion in the focus group.
The participants have shown homogenous concepts in commenting on the differences between lay people and experts, and the negative attitudes taken by both categories when it comes to treatment approaches and to the quality of attention given to illicit drug users compared with other people, as the consequences of stigma and therapeutic nihilism. The participants also pointed out the discriminatory nature – again, deriving from stigma and nihilism – of treatment provided for those aged over forty, as in the case of elderly heroin addicts who do not usually bother to apply for drug-free treatment and remain in substitution treatment. Mental disorders are strongly linked with stigma, and those most affected are substance users [9]. The stigma, especially in illicit drug users, has negative consequences on the treatment and outcome of addiction diseases and the chances of finding a job [20, 21, 46, 47]. Heroin users are usually unemployed, with a low level of education, frequent incarcerations, psychopathology, alcohol use problems and social isolation [14, 23, 24, 28]. In addition, patients in substitution treatment centres are victims of discrimination and prejudice, in many cases even coming under attack from their own family – a factor that has a disruptive impact on compliance with treatment, too [18]. Discrimination and stigma accompany illicit drug users in their attempts to access mental health and addiction services [48], thus negatively influencing compliance and increasing the dropout rate from treatment, which in its turn increases the risk of mortality and suicide, given that opioid agonist treatment is a protective factor against mortality [5, 7, 8, 16, 17, 19]; all of these data are in accordance with our findings. In addition to these findings, the participants pointed out that the economic crisis itself, and the consequent rise in unemployment among illicit drug users, amount to an additional risk factor, as illicit drug user-related stigma has a negative impact on the chances of finding a job.

Mortality among illicit drug users is estimated to be 10 to 20 times that of the general population of the same age and gender [22]. According to Darke et al. [10], overdose is a major cause of death among illicit drug users. Opioid addicts turned out to have death rates 13 times higher than those of the general population [26]. 10% or more of illicit drug users died by committing suicide [10], between 3 and 35% of all cases of death among heroin users were reported to be due to suicide [13], and, similarly, in our case 30% of all causes of death among illicit drug users were due to suicide and 19% of all deaths in the opioid agonist treatment population were due to suicide. Opioid agonist treatment could have a protective role with respect mortality if heroin addicts remain in treatment [12, 22, 30, 36]. In spite of this, suicide can be viewed as a major clinical issue among heroin users, and a major risk and problem for OATCs [13]. According to Harris & Barraclough [25], in heroin users the mortality rate due to suicide was reported to be 14 times higher than that in the general population.

A discrepancy was evident in beliefs regarding the group of intentional overdoses among illicit drug users. GPs and those from a DFTC share the same views, as they believe that among suicides there is a percentage of accidental overdoses, whereas those from an OATC take the opposite view – that, among the acts of suicide committed by taking an overdose, there are only intentional overdoses. The relationship between heroin overdose and suicide is controversial, just as, in the literature too, some authors have expressed doubts about the relationship between overdose and suicidal intent, whereas others reported an association between heroin overdose and suicide [13]. However, according to Darke and Ross [13] heroin overdose only accounted for a small proportion of suicides, while, among heroin users, most suicide victims employ means other than heroin [13]. In addition, just as the underlying causes of death in Slovenia are first selected, then encoded according to ICD-10 criteria, and then stored in the GMR database, overdoses in GMR are usually divided by intent into “intentional [suicide]”, “accidental” and “of undetermined intent”. The latest data on suicide could include cases where intent could not be determined as being intentional or accidental, while cases of intentional overdose (i.e. suicide) are encoded when intent is recognized. Almost one third of all overdoses among Slovenian illicit drug users are well defined and clearly include an intent to commit suicide, and only those cases have been reported in our study, whereas one quarter are accidental and in almost a half of the remaining overdoses there is no clear intention (therefore, there is undetermined intent) [32]. Similar data have been reported for EU illicit drug users [10, 19].

Poisoning by prescription drugs is the most common method employed in suicides committed by drug users, and is more common than in the general population [10] – a finding that is similar to ours. While overdose is a leading cause of death in suicides among illicit drug users, heroin is usually present in a small percentage of cases, while more caution is required with prescriptions of BDZs and antidepressants [13]. Polydrug use, especially if it involves the
use of BDZs, increases the risk of suicide in heroin users [13]. All the participants stressed the great problem raised by the prescription and resale of BDZ, as these phenomena should be recognized as important means of suicide in illicit drug users. According to Nielsen et al. [41] medical practitioners are an important source of misused pharmaceuticals but not the only one, the monitoring of prescription drugs has only a limited effect on illicit drug users who rely on non-prescribed sources, and the inclusion of benzodiazepines in monitoring programmes is imperative. Charlson et al. [6] examined the mortality risks associated with the use of BDZs through a review of the literature, and found that in drug misusers there was a significant relationship between the regular use of non-prescribed BDZs and fatal overdoses; a similar conclusion was found in heroin addicts [23], but future research is now needed to evaluate BDZ prescriptions and their extra-medical use, and the consequent risk of overdose [6].

Of the suicide victims among heroin addicts, the percentage of males is dominant [10, 13], and in cases caused by a fatal overdose, over 80% of them are males [11], as was found by our analysis of all cases of accidental and undetermined poisoning, as also among the substitution treatment population, but in cases of intentional overdose in illicit drug users, 50% of the victims were female. Participants in the focus group gave their responses to standardized data on gender and age. According to Darke & Hall [11], and contrary to popular misconceptions, it is not inexperienced heroin users but long-term heroin addicts who run a high risk of taking a fatal overdose; thus the typical heroin overdose victim is an older heroin addict [15], whereas our participating psychiatrists shared the popular myth that overdose victims are young and inexperienced [11].

5. Conclusions

There are several differences in suicide data between the general population and the illicit drug user population; the group of psychiatrists in our study showed little awareness of these data, but they did express interest in receiving a steady supply of analytical data of this type, so that they would be able to use them in everyday clinical practice. There is a need for the further monitoring of suicides committed by illicit drug users, using a different set of risk factors, and the prediction of suicide should include the characteristics of this population. Although opioid agonist treatment is a well-known protective factor against mortality and suicide in heroin addicts, innovative efforts should be made to prevent suicide in this population. Suicide prevention programmes tailored to the needs of illicit drug users should be developed by combining findings from qualitative and quantitative research.

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Suicide by narcotic poisoning in Slovenia, according to gender, during the period 2004-2007

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Summary

Background. Suicide is a serious public health problem in Slovenia. Illicit drug users are in greater danger than the general population. There are several differences in ways of committing suicide that set the illicit drug population apart from the general population. This study has aimed to compare the external causes of death by suicide (specifying the methods used), and to compare narcotic with non-narcotic overdoses among illicit drug users according to gender in the 2004-2007 period in Slovenia. Methods. Information on the subjects was made available by linking the records kept in three national data sources. Results. More than half of these suicide victims had died because of an overdose; more precisely, overdose by prescription drugs was predominant. In more than half of the cases of suicide committed by males, death was due to an indirect, external cause, whereas in more than half of the cases of suicide committed by females, death was due to an overdose. No other gender differences were found. Females tend to be unregistered by agonist opioid treatment centres. Conclusions. The most common method of suicide was overdose for both genders, with females at greater risk than males. Caution in prescription practice is needed, especially when treating female patients.

Key Words: Suicide; illicit drug use; overdose; violent suicide; hanging.

1. Introduction

Slovenia is an example of a high suicide rate country where suicide has to be considered a major public health problem [23]; for decades now, Slovenia has had one of the highest national suicide rates in the EU [17].

Suicide is also a leading cause of death among illicit drug users [3,4,10,15]; 10% or more of illicit drug users die by committing suicide [3]. Risk factors for suicide in illicit drug users fall into four broad areas: demographic characteristics (male gender, being young), psychopathology, family dysfunctions and social isolation [3]. Heroin addiction is an important risk factor for suicide [3,4], as heroin addicts share the same risk factors for suicide as the general population, but, in addition and to a higher degree, heroin addicts face further risk factors for suicide arising from their polydrug use [3, 4, 22]. Heroin addicts face a suicide risk that is 14 times higher than that of their peers in the general population [10].

Slovenians are prone to suicide, and a majority of problematic illicit drug users in Slovenia (those with drug-related problems that require treatment) are heroin addicts [14]. In Slovenia, agonist opioid treatment (AOT) became possible early in the 1990s, and was implemented nationally twenty years ago by the network of outpatient Centres for the Prevention and Treatment of Drug Addiction at the primary health level, as part of the public health service network (consisting of public health institutions funded by public sources), which is run by health profession
2. Methods

Information on the subjects included in the present study was obtained from three data sources (using a record linkage procedure); all of them were operative nationwide and all three were run by the Slovenian National Institute of Public Health.

The data on mortality were obtained from the first source, General Mortality Register (GMR). The causes of death (especially the underlying cause) were encoded on the basis of the International Classification of Diseases (tenth revision, ICD-10).

The second source of data used was the Evidence of Treatment of Illicit Drug Users (ETDU) database, where records on illicit drug users who request AOT are stored. The registration of these data in Slovenia is mandatory, and there are twenty years of tradition supporting this practice. The data on ETDU are collected by professionals working at Centres for the Prevention and Treatment of Illicit Drug Addiction during a face-to-face interview. For the purposes of the present study, records were made anonymous by basing them on the Soundex code, an indexing system for encoding surnames; this code provides an anonymous representation of a surname, consisting of the initial letter of the surname followed by three digits from a previous national cohort study. In this way a collection was made of the records of 3,950 heroin addicts who had entered AOT for the first time in 2004, 2005 or 2006, or had been in treatment before 2004 and then re-entered after more than 3 months, or had been in continuous treatment right through the period from 1st January 2004 to 31st December 2006 [11]. Entry into treatment coincided with the filling in of questionnaire (except that a shorter version was prepared for those who, at the beginning of each year, had always been in treatment) and with the entry group as cohort.

The use of the Soundex code, together with each patient's gender, date of birth and code for the municipality of permanent residence, made it possible for any individual case appearing in all three databases to be electronically monitored by record linkage of the cohort to the GMR for the period from January 1, 2004 through December 31, 2007. A new data base of subjects was compiled, where data from the cohort were included, with the added vital status of being cohort subjects, which divided the survivors from the deceased, on the last day of observation, December 31, 2007, including the date and causes of death of suicide victims.

For study purposes, drug-induced deaths or overdoses were considered to be the right category for the deaths that were due to the acute pharmacological and/or toxicological effect(s) of the substances consumed, with any of the following sequence of underlying causes of death: mental and behavioural disorders due to psychoactive substance use (opioids, cannabinoids, sedatives, cocaine, other stimulants, hallucinogens, volatile solvents or multiple drug use: F11-F16, F18, F19) or poisonings: accidental poisoning (X41, X42), intentional poisoning (X61, X62), or poisoning with undetermined intent (Y11, Y12) in combination with T codes of psychoactive substances [7]. The codes of suicide mortality included ICD-10 X60.0-X84.9 and Y87.0.

Secondly, we tried to match case reports of cohort cases with all the drug-related deaths included in our third source, SMR, where data on drug-related deaths were collected and encoded on the basis of ICD-10 at national level from 2002 to 2007, after which SMR was closed. For study purposes, we used data collected during the period 2004-2007. SMR included all cases of deaths in Slovenia where, on the Medical Certificate of Cause of Death provided by the physician (reported diseases, morbid conditions or injuries, and the circumstances), the medical information appearing in the record had reported drugs as being one of the causes of death (immediate cause, intervening causes, underlying or associated causes). Afterwards, a unique personal identification number (EMSO), uniformly assigned by the Central Population Register to all the people of the Republic of Slovenia, was added for cases reported by the national General Police Directorate as being drug-related deaths that had been investigated by the police. Those personal data were linked to our data on the deceased. The resulting data base, which was derived from two data sources, was linked with a third source – the data base of medico-legal investigations on drug-related
In this study, the utilization of SMR was primarily focused on drug-induced deaths (overdoses) and drug-related deaths other than poisoning. The overdoses were identified by the substance(s) which played a role in the underlying, or a contributing, cause of death. Besides overdoses (accidental, intentional or of undetermined intent), natural deaths (from diseases), injuries, traffic accidents, suicides other than by poisoning, cases of assault and deaths of undetermined intent other than poisoning were all included.

The codes used to identify suicide mortality included ICD-10 X60.0- X84.9 and Y87.0.

Among poisonings recorded as the underlying cause of death, the type of substance involved was identified among the following groups appearing in the lists of ICD-10 codes: prescription drugs (T40.2-T40.4, T40.6, T42.3, T42.4, T42.6, T42.7, T43.6, T43.8, T43.9), illicit drugs (T40.0, T40.1, T40.5, T40.7, T40.8, T40.9), and other unspecified drugs, medicaments (T50.9), ethanol (T51.0). Among poisonings, another axis of psychoactive substances involved comprised: narcotics (T40.0-T40.4, T40.6) and non-narcotics (sedatives-hypnotics: T42.3, T42.4, T42.6, T42.7), stimulants (T40.5, T43.6), hallucinogens (T40.7, T40.8, T40.9), and others (psychotropic drugs, unspecified (T43.9)).

Statistical analyses were performed on data that had been made anonymous. Comparisons between groups of male and female subjects were performed using the Student T-test (between two groups) for numerical data and the chi-squared test for categorical data (comparing column proportions by applying the z-test and adjusting p-values according to the Bonferroni method if a table was over 2x2).

All statistical analyses were carried out using the 20.0 version of the SPSS package.

### Results

In the period 2004-2007 a total of 85 drug-related suicides were identified: among these, 52.9% (n=45) of deaths were due to suicide by (a substance-induced) overdose, and 47.1% (n=40) suicides were due to a cause other than overdose (i.e. an indirect cause). The mean age of suicide victims was 34.9 years (SD=10.5); the youngest victim was 19.1 years old and the oldest was 56.7; notably, 25.9% (n=22) of suicide victims were in contact with an AOT centre during the period of observation, but as many as 74.1% (n=63) of suicide victims had never registered any contact with AOT during that period (Table 1). 70.6% of those committing suicide were males and 29.4% were females. More than a half of the suicide cases recorded for males were due to indirect external causes, whereas 76.0% of suicide cases recorded for females were due to overdoses, and this difference was statistically significant. The males were, on average, 35 years when they committed suicide, one year older than the females, but the difference was not statistically significant. One third of male suicides were in contact with an AOT center during the period of observation, whereas, in the female group, this was true of only 12% of these subjects, but the difference was not significant (Table 1).

Among all the suicides under review, those due to overdose narcotics (heroin, methadone, other opioids) accounted for 40% (n=18) of cases, whereas 60% (n=27) of cases were due to non-narcotics. Prescription drugs predominated in cases of suicide.
committed by taking an overdose (n=35, 77.8%), followed by illicit drugs (n=7, 15.6%) and other substances (n=3, 6.7%).

The proportion of males who had committed suicide by taking an overdose of drugs other than narcotics was lower than that among females, but the difference was not significant (Table 2).

In females committing suicide by taking a narcotic overdose, the substance used was methadone in 3 cases, heroin in 2 cases, and other, unspecified narcotics in 1 case, while their non-narcotic overdoses were, in 7 cases, of benzodiazepines, in 3 cases of unspecified antiepileptic and sedative-hypnotic drugs, in 3 cases, of an unspecified psychotropic drug. Males who committed suicide by taking a narcotic overdose were, in 4 cases, using an overdose of heroin, in 4 cases, of other opioids, in 3 cases, of methadone, and, in 1 case, of other synthetic narcotics. The non-narcotic overdoses of males were in 6 cases of benzodiazepines, in 3 cases they involved an unspecified psychotropic drug, in 2 cases, of other, unspecified drugs, medicaments and biological substances, in 1 case of unspecified antiepileptic and sedative-hypnotic drugs, in 1 case, of other antiepileptic and sedative-hypnotic drugs, and, 1 case, by other unspecified psycho-dysleptics (hallucinogens). Intentional overdoses were most frequently made up of prescription drugs, followed by illicit drugs in both genders; the difference by gender turned out not to reach significance (Table 2).

Among drug-related suicides attributed to an indirect cause of death, the most frequent cause was hanging; an overall percentage of 25% (n=10) of these cases was attributed to hanging; the other 75% (n=30) was due to other causes of indirect death: 9 were due to intoxication by gas (carbon monoxide), 5 to shooting with a firearm, 5 to jumping from a height, 4 to injury from a sharp object, 3 to a crash in a motor vehicle, 2 cases were caused by the victim lying down in front of an object in movement, 1 was caused by drowning and 1 by unspecified means. No statistical differences were found between the indirect causes of suicide in the male and female groups (Table 3). Among females, according to ICD-10, the mechanisms causing death by suicide due to intentional self-harm could be classified as follows: falling (in 2 cases jumping from a height), with one case recorded for each of the following: cutting/piercing (with a sharp object), bodily harm involving a means of transport (a crash in a motor vehicle), poisoning with gas (carbon monoxide), or caused by another specified method (lying down in front of an object in movement). Among females, no cases of suicide were recorded as being due to suffocation (hanging), or to the discharge of firearms.

### Table 2: Suicide by overdose between male and female illicit drug users according to use or non-use of narcotics, and type of substance (Slovenia, 2004-2007)

<table>
<thead>
<tr>
<th>Suicide, by overdose</th>
<th>Total N=45</th>
<th>Males N=26</th>
<th>Females N=19</th>
<th>Chi²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of psychoactive substance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narcotics</td>
<td>18 (40.0)</td>
<td>12 (46.2)</td>
<td>6 (31.6)</td>
<td>0.97</td>
<td>0.324</td>
</tr>
<tr>
<td>Non-narcotics</td>
<td>27 (60.0)</td>
<td>14 (53.8)</td>
<td>13 (68.4)</td>
<td>0.81</td>
<td>0.668</td>
</tr>
<tr>
<td>Type of substance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>35 (77.8)</td>
<td>19 (73.1)</td>
<td>16 (84.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illicit drugs</td>
<td>7 (15.6)</td>
<td>5 (19.2)</td>
<td>2 (10.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3 (6.7)</td>
<td>2 (7.7)</td>
<td>1 (5.3)</td>
<td>0.81</td>
<td>0.668</td>
</tr>
</tbody>
</table>

### Table 3: Suicides from indirect causes of death between male and female illicit drug users: those due to hanging or else to another indirect cause of death (Slovenia, 2004-2007)

<table>
<thead>
<tr>
<th>Indirect cause of death</th>
<th>Total N=40</th>
<th>Males N=34</th>
<th>Females N=6</th>
<th>Chi²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanging</td>
<td>10 (25.0)</td>
<td>10 (29.4)</td>
<td>0 (0.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other indirect method</td>
<td>30 (75.0)</td>
<td>24 (70.6)</td>
<td>6 (100.0)</td>
<td>2.35</td>
<td>0.125</td>
</tr>
</tbody>
</table>
4. Discussion

In spite of the fact that hanging is the most common method of suicide among the general population in Slovenia, accounting for more than half of these cases of suicide [16], in our study illicit drug users committed suicide by taking an overdose in more than half of the cases in that specific population, while, among the indirect causes of death due to suicide, the most frequent was suicide by hanging. Our data confirm literature data that taking an overdose and hanging are the two most common methods of suicide among illicit drug users; in particular, drug overdoses account for at least half of all deaths by suicide among illicit drug users [3,4,18].

Suicide victims in our study were typically young, in their middle thirties. This is not surprising, as heroin users run an extremely high risk of committing suicide [3, 4, 6, 8]. Only one fourth of all suicide victims demanded drug-related treatment in AOT, males much more frequently than females (32% vs. 12%). The natural story of heroin addiction is frequently accompanied by cycling phenomena, dropping out of treatment, or wandering from one treatment to another over time [9], but, in any case, a high proportion of heroin addicts are out of treatment at any given time [1].

71% of all the victims in our study were males; they showed a statistically significantly extra risk of committing suicide by indirect and more violent methods, whereas among females it was the risk of suicide from taking an overdose that dominated. Males in the EU general population usually commit suicide more frequently than females [17]. Similarly, among the general population in Slovenia males commit suicide more frequently than females; hanging is more typical for men – two-thirds of men commit suicide by hanging – whereas with females the proportion is below one half [16]. As in the general population, heroin users who committed suicide are predominantly males [2-4, 10, 19-21], but a majority of suicides are due to poisoning [3, 4, 18]. Considering all the overdoses taken by illicit drug users in Slovenia, males are predominant in the accidental and undetermined intent groups, while half of the victims in cases of suicide by overdose are females [14]. As males usually employ more violent methods, hanging is more frequent method of suicide in men than in women, whereas in females taking an overdose is usually more frequent, as they prefer a non-violent method [3,4,17]. In our study there was, in fact, not a single case of hanging or of being shot by a firearm among females.

Overdoses of non-narcotics were more frequent than those of narcotics (60% vs. 40%). Comparing the two genders, an overdose of narcotics was recorded in almost half the overdoses taken by males, whereas the proportion of overdoses of narcotics was only one third of all the overdoses taken by females. Prescription drugs (of which narcotics and benzodiazepines were the most frequent) were used in almost 80% of all overdoses, and showed an even higher proportion among females, whereas illicit drugs were used in only 16% of all overdoses, and the proportion was higher among males. Of all the overdoses taken, only 6 were of heroin (4 taken by males and 2 by females). In spite of the fact that drug overdose is a major cause of suicide in heroin users, an overdose of heroin itself is not a method of choice for committing suicide among heroin users; the most common method is, in fact, an overdose of pharmaceutical products, while an overdose of heroin is a rare event [3-5]. The high proportion of prescription drugs that are used in committing suicide by taking an overdose, and the low proportion – in general, and for females in particular – of registered AOT demand by suicide victims, point to the frequency of abuse and of recourse to the black market for narcotics and other medicines, partly linked with the nature of the disorder and with the stigma attached to addiction, especially heroin addiction [13].

As also occurs among the general population, if we exclude overdoses, among illicit drug users the most frequent indirect method of suicide proved to be hanging, followed by carbon monoxide poisoning.

Limitations and strengths

The main limitation of our study was the relatively small number of suicide victims, especially among females in AOT. A study involving a longer period of observation and a higher number of suicide victims would, in all probability, have given more significant results.

Data archives we have used (GMR, ETDU) could be subject to under-reporting for a variety of reasons (e.g. incomplete data, lack of resources, medical staff facing a work overload, administrative limitations), but this shortcoming was limited by their national coverage, continuity (in the case of GMR, lasting over decades, and in that of EDTU, lasting almost twenty years), tradition and a mandatory formal foundation (the law); as to SMR, the data supply lasted only for a relatively short period (2002-2007).
but it did provide the opportunity to collect additional information on drug-related deaths through the dense networking of additional data sources (police investigations, medico-legal investigations, additional investigations on suspicious deaths and on deaths from unknown causes, drug-related poisonings). SMR served as a valuable source of additional data on the causes of death.

Suicide mortality either within the GMR system or within the SMR, could be missed or might have been encoded as due to another cause of death (e.g. with attribution to accidental or undetermined intent), as a result of the stigma attached to illicit drug use and suicide. As a result, our data may have underestimated the true dimension of suicide by inadvertently shrinking the real dimension of the problem.

This cohort was recruited through an AOT and may not be representative of the illicit drug user population on a wider definition; despite this, the network of outpatient centers that provide AOT has the unique status of being the main treatment service for illicit drug use problems in Slovenia.

In reviewing drug overdoses, it should be noted that, as prescription drugs were involved in so many of these cases, with only a few exceptions (e.g. methadone), ICD-10 codes do not specify individual drugs, as the codes are structured in such a way that drugs and drug classes are grouped together; for this reason we recoded the type of substance involved (narcotics, sedatives, hypnotics). No information was available either on whether prescription drugs had been prescribed to future suicide victims directly, or had been acquired from an illegal market; the missing information was partially recovered by recoding the types of substance (e.g.: illicit drugs, medicines).

Despite all the limitations presented here, our results provide a summary of the national epidemiological evidence on suicide among illicit drug users by gender. The cohort study revealed the suicide issue among drug users – an issue that had previously been underestimated or left invisible by relying exclusively on the routine system of general mortality. Our study does, in fact, offer the opportunity to find out much more about suicides that are due to an indirect, drug-related cause, about suicides that are drug-induced and those due to overdoses taken by illicit drug users in AOT. In addition, the differences in causes of death by suicide between drug users who, as part of a cohort, are in contact with AOT centers, and those without any such contacts, were studied through the use of a special database (SMR) that offers further insights into suicide issues, especially among illicit drug users who are not receiving AOT.

5. Conclusions

Overdoses by prescription drugs are the most frequent method of suicide among illicit drug users. Caution in prescribing practice is a priority in treating the illicit drug user population, especially its female component; one precaution would be to lower the availability of any common means for committing suicide, all the more so considering the lower willingness of females to enter AOT services. Unfortunately, this approach only covers part of the problem, as diversion from drug-related services and the non-medical use of prescription medicines has grown more common. The destigmatization of drug addiction and the greater availability of drug-related treatment, especially designed for the needs of females, would also have a useful impact in reducing the risk of suicide in this population.

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Authors stated that this study was financed with internal funds. No sponsor played a role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

Contributors

The authors contributed equally to this manuscript.

Conflict of interest

Authors declared no conflict of interest. IM served as Board Member for Indivior, Molteni, CT Sanremo, D&A Pharma, and Lundbeck.

Ethics

Authors confirm that the submitted study was conducted according to the WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects.
The filing of addicted patients at addiction units is correlated with a reduction in mortality due to illicit opioids, but also to prescribed opioids and other substances of abuse

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Summary

Background: Opioid agonist treatment reduces mortality in heroin addicts. This study investigates differences in causes of death between people whose data were filed at addiction units and those whose data had never been filed at addiction units.

Methods: All drug users who applied for opioid agonist treatment in Slovenia in the period 2004-2006 were cross-linked through a general mortality register and a special mortality register. The vital status of cohort members was checked at the mortality register on the last day of follow-up (covering the period from 1st January 2004 to 31st December 2007).

Results: Out of 331 deceased people, the data of 232 proved to have been filed whereas the data of the other 99 had not been filed at any addiction treatment unit. The mean age of all the deceased was 32.2 years; 85% were males. Of all deaths, 63% were due to an overdose. The difference between the two groups was statistically significant. Three-quarters of the cases of poisoning were found in the group without data filed, while, among the group whose data had been filed, cases of poisoning were present in less than half of the victims. 88.7% of all overdoses were due to opioids (whether illicit narcotics or prescription opioids), with a higher proportion of overdoses due to prescription opioids and other prescription drugs occurring in the group without filed data. Conclusion: Among those whose data had not been filed at the addiction units, a greater percentage of deaths proved to be due to an overdose, mostly of heroin or prescription opioids, including methadone, than was true of the population of addicts whose data were on file. Younger subjects, in the second group, were subject to greater risks.

Key Words: addiction; drug related death; opioid overdoses; addiction treatment units; prescription opioids

1. Introduction

The mortality of a population and its particular groups is an important health indicator. Mortality rates among opioid addicts are higher than those in the general population [1, 4, 13], but in opioid addicts mortality varies between countries and populations [13]. Mortality among drug users is estimated to be 10 to 20 times that of the general population of the same age and gender [20]. Death rates for opioid addicts have been calculated to be 13 times higher than those of the general population [22]. Overdose is a major cause of death among illicit drug users and is also a major cause of death in long-term follow-up studies on opioid addicts [2, 3, 10, 21, 29].

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) [18] estimates that every year in Europe between 10,000 and 20,000 illicit drug users (mostly heroin users) die prematurely, the most frequent cause of death being an overdose, followed by an indirect cause of death related to drug use. Most drug-related deaths (DRDs) in Europe are due to opioids, usually heroin, and most opioid users are polydrug users [19]. It is true that the different causes of death vary across countries, populations and studies, but overdose remains the most common cause of death.
death among opioid addicts [13, 14] and injectors of drugs [26]. Between 7,000 and 8,000 fatal overdoses per year are reported in Europe [31], where heroin users predominate, and overdoses due to opioids (mainly heroin or its metabolites) account for between a third and a half of deaths among illicit drug users [18-20]. The presence of a single drug at a death due to overdose among illicit drug users is atypical [10]. The second most frequent cause of death in the population of illicit drug users can be identified as a natural cause of death (e.g. liver diseases, infections by HIV, hepatitis B and hepatitis C viruses, neoplasms, cardiovascular and pulmonary causes), while between one-fifth and two-fifths are due to suicide and trauma (e.g. deaths due to accidents such as traffic accidents, falls or drowning, or those due to violence in the form of assault and homicide) [18, 20].

Cohort study data in an opioid agonist treatment population in Slovenia showed just under one third (29.2%) of deaths due to overdose, and slightly more than one fifth (22.2%) attributable to natural causes of death [30].

Methadone maintenance treatment results in substantial reductions in opioid overdose deaths, as long as heroin addicts stay in treatment [6, 7], but it must be added that mortality among heroin addicts remains high [23, 27]. Mortality in the opioid agonist treatment population continues to run well above that of age and sex peers, as drug overdose and trauma remain the major causes of death, and mortality is also high during induction into methadone, but it is still higher in subjects out of treatment [15]. Data from the literature support the evidence that continuity (stabilization during pharmacotherapy, remission of symptoms, retention in treatment and compliance) of the opioid agonist treatment does reduce the risk of DRD [5, 8, 11, 12, 14, 18, 24]

According to Degenhardt et al., on the basis of meta-analyses, death rates seem to be 2.38 times higher for heroin users out of treatment than for those in opioid agonist treatment [13]. According to the estimates of some authors [15], opioid agonist treatment produces a 29% reduction in mortality compared with subjects out of treatment. Opioid agonist treatment has a greater than 85% chance of reducing overall mortality among opioid addicts if the average duration approaches or exceeds 12 months, but it must be pointed out there is an increased mortality risk at the start of agonist opioid treatment (AOT) and, similarly, immediately after stopping pharmacotherapy [9].

The provision of opioid agonist pharmacotherapy therefore results in significant reductions in mortality; in any case, these reductions in mortality could be a strong indicator of the effectiveness and quality of work provided by addiction treatment services.

The aim of the present study was to verify differences in the causes of death among illicit drug users who were registered with addiction services (Addiction Services Filed, AS-F) and those who were not (AS-NF). We assume that a good addiction service brings the advantage of a lower risk of mortality to their registered patients – not only patients on illicit opioids, but also those taking prescribed opioids and/or other substances of abuse.

2. Methods

2.1. Design of the study

Information on subjects included in the present study were obtained from three sources, all of them operative nationwide and all run by the Slovenian National Institute of Public Health. For the aims of the research project, only data collected by matching the three sources and including the data filed (AS-F) or not-filed (AS-NF) with addiction units to specify subjects’ condition were selected. That selected information was analysed by following a cross-sectional design, with the purpose of estimating the magnitude of differences – in terms of demographic characteristics, direct or indirect causes of DRDs, and substances found in the victims – between the data filed (AS-F) and those not filed (AS-NF) with addiction services.

2.2. Data collection

The data on mortality were obtained from the General Mortality Register (GMR), where all deaths occurring in Slovenia are stored, bearing in mind that the registration of all deaths in Slovenia is legally mandatory. Slovenia's population and vital statistics are accurate and complete. At the national GMR database only the underlying cause of death is selected out of the various causes of death recorded on the Medical Death Certificate, and that information is then stored. The underlying cause of death is encoded according to the criteria set out in the WHO International Classification of Diseases, 10th edition (ICD-10). For study purposes, the recommendations on drug-related causes of death issued by the EMCDDA were followed [16, 17]. Cases with any of the following sequence of underlying causes of death: mental and behavioural disorders due to use of an illicit psychoactive substance (opioids, cannabinoids, seda-
tives, cocaine, other stimulants, hallucinogens, volatile solvents or multiple drug use: F 11- F16, F 18, F 19, T40.0 to T40.9 and T43.6 codes) were selected and linked to external causes of injury and poisonings.

The second source of data was the Evidence of Treatment of illicit Drug Users (ETDU) database, where records on illicit drug users who request outpatient treatment are stored. The registration of these data in Slovenia is mandatory, and there are more than ten years of tradition supporting this practice. Professionals working at Centres for the Prevention and Treatment of Illicit Drug Addiction, during a face-to-face interview, collect the data on ETDU. The registration takes place, even in cases of continuous treatment, at the moment of first entry into treatment in a current year. Records include data on demographic status, illicit drug use and patients’ clinical data, items on risk behaviour, infectious diseases, sexual behaviour and legal experiences. For the purposes of the present study, records from a previous national cohort study were included, with records of 3,950 heroin addicts who had entered opioid agonist treatment for the first time in 2004, 2005 or 2006, or had been in treatment before 2004 and then re-entered, or were in continuous treatment, during the period from 1st January 2004 to 31st December 2006 [25].

The third source was the Special Mortality Register (SMR), where data on DRDs were collected at national level from 2002 till 2007 and then closed. The principal aim of SMR was to collect indirect causes of death and additional data, in cases where data were incomplete or missing at the GMR.

For the purposes of our study, three databases were merged into one on the basis of a unique identification number that was included in the data on the deceased registered at GMR and SMR, together with a composite semi-identification number for each treated illicit drug user, plus their date of birth, sex, and municipality of permanent residence. A new identification number was made up out of the above data for each record on the three databases. On the basis of the new identification number, all double or triple recordings of single cases were eliminated. The vital status of cohort members checked at the GMR on the last day of follow-up (on dates ranging from 1st January 2004 to 31st December 2007) divided the deceased from the survivors, who were included in a single cohort. After linking the databases GMR, SMR with the data for the deceased, to make up a new cohort, a new database was formed to include those whose decease was due to DRDs between the ages of 15 and 58 in Slovenia in the period 2004 to 2007.

Among poisonings considered as the underlying cause of death, the type of substance involved was identified among the following groups of the ICD-10 codes: prescription drugs (T40.2-T40.4, T40.6, T42.3, T42.4, T42.6, T42.7, T43.6, T43.8, T43.9), illicit drugs (T40.0, T40.1, T40.5, T40.7, T40.8, T40.9), other and unspecified drugs, medicaments (T50.9), carbon monoxide (T58), and ethanol (T51.0). Among poisonings, another axis of psychoactive substances involved was: narcotics (T40.0-T40.4, T40.6), stimulants (T40.5, T43.6), sedatives-hypnotics (T42.3, T42.4, T42.6, T42.7), hallucinogens (T40.7, T40.8, T40.9) and psychotropic drugs, when left unspecified (T43.9). By considering both the type of substance and the type of psychoactive substance, the final categories of prescription opioids, illicit narcotics and other prescription drugs were identified.

Causes of death: the various types of most probable underlying cause of death were divided into two groups: direct deaths from poisonings (overdose), and indirect deaths (divided into medical illness, injuries, traffic accidents and assaults).

2.3. Data analysis

For the analyses, cases were selected in which the deaths of illicit users were due to fatal poisoning by accident, or suicidal intent, a consequence of homicide, or death with undetermined intent.

In this study, AS-F and AS-NF subjects were compared for demographic and DRD causes by means of the chi-squared test (with Bonferroni’s correction), for categorical variables, and Student’s t-test for continuous variables.

The association between belonging to an AS-F or an AS-NF group and causes of DRD was assessed through a logistic regression analysis applied to the sample that resulted from merging the three data sources.

3. Results

We identified 331 DRDs; more than two-thirds of all these deaths belonged to AS-NF subjects. In all, 220 subjects had died from the direct effects of the drug (210 cases due to overdose, 9 cases due to poisoning by carbon monoxide [6 cases were in the AS-F group and 3 in the AS-NF one], while a single case was due to poisoning by ethanol and it belonged to the AS-F group).

Table 1 shows the demographic characteristics
of deceased AS-F and AS-NF subjects. The mean age of our sample was 32.22±9.9. 85% out of all deaths were of male subjects, and the male to female ratio was 5.5 to 1. A majority of those in our sample were single. No statistically significant differences were observed between AS-F and AS-NF victims in their demographic characteristics.

Table 2 shows DRD in AS-F and AS-NF subjects in Slovenia in the period 2004-2007. Of all these DRDs, 63% were overdoses, while one third had an indirect cause of death; the difference between the two groups was statistically significant. In particular, in the AS-NF group, three-quarters of all cases were poisonings, whereas in the AS-F group fewer than half of the cases involved poisoning. Of all the overdose cases, 88.7% were due to opioids (comprising illicit narcotic and prescription opioids), showing a higher proportion of prescription opioids and other prescription drugs in the AS-NF group than in the AS-F one, while, within the AS-F group, overdose by illicit opioids turned out to be the most frequent cause of death.

Turning now to the indirect causes of all DRDs, medical illnesses were the most common cause, followed by injuries, traffic accidents and assaults. More medical illnesses and injuries were found in the AS-F than in the AS-NF group. There were no statistically significant differences between the two groups regarding the nature of the causes of death.

Table 1. Demographic characteristics of DRD in AS-F and AS-NF victims

<table>
<thead>
<tr>
<th></th>
<th>Total N=331</th>
<th>AS-F N=99</th>
<th>AS-NF N=232</th>
<th>T/Chi</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (M±sd)</td>
<td>32.02±9.9</td>
<td>33.05±9.4</td>
<td>31.67±10.0</td>
<td>0.68</td>
<td>0.124</td>
</tr>
<tr>
<td>Gender (N,%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>280 (84.6)</td>
<td>86 (86.9)</td>
<td>194 (83.6)</td>
<td>0.56</td>
<td>0.509</td>
</tr>
<tr>
<td>Female</td>
<td>51 (15.4)</td>
<td>13 (13.1)</td>
<td>38 (16.4)</td>
<td>0.56</td>
<td>0.509</td>
</tr>
<tr>
<td>Marital status (N,%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>210 (63.4)</td>
<td>75 (77.3)</td>
<td>135 (78.9)</td>
<td>0.56</td>
<td>0.509</td>
</tr>
<tr>
<td>Married</td>
<td>26 (7.9)</td>
<td>12 (12.4)</td>
<td>14 (8.2)</td>
<td>0.56</td>
<td>0.509</td>
</tr>
<tr>
<td>Widow</td>
<td>4 (1.2)</td>
<td>3 (3.1)</td>
<td>1 (0.6)</td>
<td>0.56</td>
<td>0.509</td>
</tr>
<tr>
<td>Divorced</td>
<td>28 (8.5)</td>
<td>7 (7.2)</td>
<td>21 (12.3)</td>
<td>5.26</td>
<td>0.153</td>
</tr>
<tr>
<td>Missing</td>
<td>63 (19.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. DRD in AS-F and AS-NF subjects by type and causes of death, substances used and suicide

<table>
<thead>
<tr>
<th></th>
<th>Total N=331</th>
<th>AS-F N=99</th>
<th>AS-NF N=232</th>
<th>T/Chi</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of death (N,%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct (poisoning)</td>
<td>220 (66.5)</td>
<td>48 (48.5)</td>
<td>172 (74.1)</td>
<td>20.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Indirect</td>
<td>111 (33.5)</td>
<td>51 (51.5)</td>
<td>60 (25.9)</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Causes of death (N,%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct (poisoning)</td>
<td>220 (66.5)</td>
<td>48 (48.5)a</td>
<td>172 (74.1)b</td>
<td>20.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Medical illness</td>
<td>42 (12.7)</td>
<td>24 (24.2)a</td>
<td>18 (7.8)b</td>
<td>20.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Injury</td>
<td>38 (11.5)</td>
<td>17 (17.2)a</td>
<td>21 (9.1)b</td>
<td>20.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Traffic accident</td>
<td>21 (6.3)</td>
<td>7 (7.1)a</td>
<td>14 (6.4)a</td>
<td>20.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Assault</td>
<td>10 (3.0)</td>
<td>3 (3.0)a</td>
<td>7 (3.0)a</td>
<td>20.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Substances found (N,%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>118 (35.6)</td>
<td>57 (57.6)a</td>
<td>61 (26.3)b</td>
<td>34.36</td>
<td>0.000</td>
</tr>
<tr>
<td>Prescription opioid*</td>
<td>97 (29.3)</td>
<td>15 (15.2)a</td>
<td>82 (35.3)b</td>
<td>34.36</td>
<td>0.000</td>
</tr>
<tr>
<td>Illicit narcotics</td>
<td>92 (27.8)</td>
<td>25 (25.3)a</td>
<td>67 (28.9)a</td>
<td>34.36</td>
<td>0.000</td>
</tr>
<tr>
<td>Prescribed others</td>
<td>24 (7.3)</td>
<td>2 (2.0)a</td>
<td>22 (9.5)b</td>
<td>34.36</td>
<td>0.000</td>
</tr>
<tr>
<td>Suicide (N,%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>87 (26.3)</td>
<td>22 (22.2)</td>
<td>65 (28.0)</td>
<td>1.20</td>
<td>0.340</td>
</tr>
<tr>
<td>No</td>
<td>244 (73.7)</td>
<td>77 (77.8)</td>
<td>167 (72.0)</td>
<td>1.20</td>
<td>0.340</td>
</tr>
</tbody>
</table>

* Methadone, other opioids, unspecified narcotics, other synthetic narcotics.
Each letter denotes a subset of grouping categories whose column proportions do not differ significantly from each other at the .05 level.
Regarding suicides, assaults and traffic accidents.

Prescription opioids and other prescription drugs were found more frequently in deaths occurring in the AS-NF group. Of the prescription drugs, methadone was found in 27 out of 32 cases, other opioids in 31 out of 37 cases, unspecified narcotics in 6 out of 10 cases and other synthetic narcotics in 2 out of 2 cases, while, of the other prescription drugs, benzodiazepines were discovered in 14 out of 14 cases, undetermined anti-epileptics, sedatives and hypnotics in 4 out of 4 cases, and other anti-epileptics, sedatives and hypnotics in 2 out of 2 cases).

No differences were found regarding illicit narcotics (opium and heroin). In AS-F deaths, substances of abuse were found in a lower percentage of cases than in AS-NF ones.

Table 3 shows predictors of DRD in AS-NF subjects. The highest risk of DRD in AS-NF people comes from poisoning due to prescription opioids, illicit narcotics and other psychotropic prescription drugs. Age was a protective factor. Older victims tended not to belong to the AS-NF

### Table 3. Predictors of DRD in AS-NF

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>Exp(B)</th>
<th>95% C.I.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Age</td>
<td>-0.02</td>
<td>0.97</td>
<td>0.94-0.99</td>
</tr>
<tr>
<td>1</td>
<td>Found substances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prescription opioids</td>
<td>1.65</td>
<td>5.20</td>
<td>2.68-10.12</td>
</tr>
<tr>
<td></td>
<td>Illicit narcotics</td>
<td>0.90</td>
<td>2.46</td>
<td>1.37-4.44</td>
</tr>
<tr>
<td></td>
<td>Others, prescribed</td>
<td>2.59</td>
<td>13.55</td>
<td>2.92-61.08</td>
</tr>
</tbody>
</table>

Statistics: Chi-squared 40.05 df=4 p<0.001
Not in equation: Female gender, Indirect causes, Suicide absence, Medical Illness, Injury, Traffic accidents, Assault

In a retrospective analysis of the three databases, including data on deceased illicit drug users and comparing AS-F and AS-NF subjects, we found that the latter died at a younger mean age than the former.

Among manners of death, overdose was the most common, and was more frequent among AS-NF subjects than AS-F ones, with more drugs (especially prescription opioids, illicit narcotics and benzodiazepines) found in body fluids in the first group. In drug users who were still in treatment, more cases of natural causes of death (medical illnesses) and injuries leading to suicides were discovered as the underlying cause of death.

In Europe, overdoses have been found in up to 60% of DRDs [18]. In interpreting data on DRDs in Slovenia, it should be borne in mind that the deceased are usually heroin users, and in our case two-thirds of DRDs were due to an overdose of heroin, in a way parallel with the finding that the most frequent type of DRD in Europe takes the form of an overdose – a result that accounts for up to 60% of all DRDs among injectors in countries with a low prevalence of HIV/AIDS [18], as is the case of Slovenia [25].

According to EMCDDA [18, 19], 10% of European heroin addicts, before entering their first pharmacological treatment, had already used opioids (e.g. fentanyl, methadone and buprenorphine); prescription opioids were also found in toxicological reports – a finding which suggests that prescription opioids are available on the illicit market (diversion, misuse of pharmaceutical opioids). From the literature it seems that medical practitioners are an important source of misused pharmaceuticals, but they are usually not the main source of prescription opioids [28], which suggests diversion from the licit market, and illicit production or importation from outside the EU [20].

Similarly, in our case, of all types of overdose, the most frequent was a heroin overdose (33.6%), followed by prescription opioids such as other narcotics (codeine, morphine) (16.8%) and methadone (14.5%). 89% of all overdoses were due to opioids, and, of those cases, a high proportion was due to prescription opioids in the AS-NF group; this finding suggests even more strongly that misuse and phenomena of self-medication with prescription opioids is more common than the cases that have been detected (e.g. overdoses, diversion of opioids). In the AS-F group there were no cases of overdose by benzodiazepines, or by other, still undetermined anti-epileptics, sedatives or hypnotics, whereas, in the AS-NF group, the percentage of cases involving prescription opioids was higher, which suggests that the misuse of prescription opioids such as methadone could, by law, only be provided in addiction treatment centres and no AS-NF cases were reported in the records.

4. Discussion

In interpreting data on DRDs in
In a majority of DRD cases in Europe, the victims are men in their thirties [18, 19]. The typical overdose case is male, with death occurring in the early 30s and the victim not enrolled in drug treatment [10]. In Europe, 90% of overdose victims are over 25 years old, and 80% of overdose deaths are reported as happening to men [18].

Our findings have been generally consistent with the available data for Europe and with previous studies. Similarly, in our study the overdose victim profile was male, dying in his/her early thirties, and with death attributed to an overdose of opioids.

In the EU, the most common therapy for heroin addiction is AOT with methadone, which is prescribed to three-quarters of heroin addicts, followed by buprenorphine and, in less than 5% of these cases, the prescription of other substances, such as slow-release morphine or diacetylmorphine (heroin) [19]. It should be kept in mind that, during the follow-up period that completed our study, methadone had already been used in Slovenia for more than 10 years and, until 2005, therapy with methadone had been the only available AOT, while buprenorphine and slow-release morphine only reached the market towards the end of the follow-up period.

Addiction treatment services seem to be effective. A much higher proportion of the opioid agonist treatment naive population die from an overdose – most frequently of heroin or of prescription opioids, including methadone – than is true of the treated population. Young subjects were those at greatest risk.

The main limitation of our study was the relatively small number of victims. A study involving a higher number of people in the study cohorts, and, therefore, of victims and/or survivors, would have lasted over a longer period, and, in all probability, would have given more significant results.

The records we have used (GMR, ETDU) could be under-reported for a variety of reasons (e.g. incomplete data, lack of resources, medical staff facing a work overload, administrative limitations), but this shortcoming was limited by their national coverage, continuity (with GMR lasting over decades and ETDU for over ten years), tradition and a mandatory formal foundation (the law); as to SMR, the data supply lasted only for a relatively short period (2002-2007) but it did give the opportunity to collect additional information.

In the study there were, unfortunately, no data about whether victims were in treatment or not at the moment of their death, and there was no information either on the duration of their treatment, as the only data came from the registered contact with the victim and treatment system, so we had no opportunity to record dropouts, nor were we able to calculate the exact period of treatment for each patient included in the study. In addition, our figures may underestimate the true dimension of DRD because of the factor of stigma, so diminishing the real size of the problem. Despite all the limitations presented here, our results are an estimate of the epidemiological evidence on DRD, and on the difference between the illicit drug users who did contact and those who failed to contact a centre offering healthy substance use treatment. In any case, the results of this study should be assessed with caution.

In spite of all the use made of the mortality ratio in comparing the situation of patients who are in treatment with those who are out of treatment, it does seem to offer advantages as a tool for the measurement of outcomes, not only at personal level (the need to lower numbers of those dying) but also for treatment (a better ratio for survival means a better organization of the treatment system). The misuse of prescription opioids as a result of diversion from addiction treatment centres could be a consequence of inappropriate regulations or the inappropriate implementation of the regulation and inappropriate monitoring of retail pharmacies, while the use of prescription opioids from the black market might be attributable to attempts to implement self-treatment.

Equality of access in all regions of the country and a higher quality of opioid treatment could decrease the phenomenon of misuse, which, in some cases, may be fatal. In parallel with this, better access and quality could reduce drug overdoses, with a concomitant increase in the percentage of treated heroin addicts.

5. Conclusions

Misuse of prescription opioids seems to be more widespread than is often recognized and could be fatal, especially in victims who have had no contact with the opioid agonist pharmacological system. In general, those who were not in contact with opioid agonist treatment showed a high percentage of deaths due to an overdose – a finding that supports the view that this treatment has a protective effect. Where subjects had been in contact with addiction services, that fact in itself seemed to correlate with a lower risk of overdose, not only regarding the use of illicit narcotics, but also the use of prescription opioids and other prescription drugs.
References


26. Mathers B. M., Degenhardt L., Bucello C., Lemon J.,


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Role of the funding source

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Contributors

All authors were involved in the study design, had full access to the survey data and analyses, and interpreted the data, critically reviewed the manuscript and had full control, including final responsibility for the decision to submit the paper for publication.

Conflict of interest

Authors declared no conflict of interest. IM served as Board Member for Indivior, Molteni, Mundipharma, Gilead, Lundbeck, CT Sanremo.

Ethics

Authors confirm that the submitted study was conducted according to the WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects. This study does not require ethics committee approval because datasets used for statistical analyses were fully anonymised; however Ethics approval was obtained from the ethics committees of the Ministry of Health of the Republic of Slovenia.

Note

It is the policy of this Journal to provide a free revision of English for Authors who are not native English speakers. Each Author can accept or refuse this offer. In this case, the Corresponding Author accepted our service.
TO THE EDITOR: The previous, well-defined first cohort study on heroin addicts seeking treatment was upgraded [2]; 3,949 heroin addicts seeking Opioid Agonist Treatment (OAT) in Slovenia in the period from 1st January 2004 to 31st December 2006 were followed up for vital status till 31st December 2011 [3]. The data on mortality were obtained from the General Mortality Register (GMR). The causes of death were encoded according to the WHO International Classification of Diseases and Related Health Conditions, tenth revision (ICD-10) [6]. The codes used to identify suicide mortality included ICD-10 X60.0- X84.9. The vital status (survived/deceased) of all cohort members was ascertained through linkage between the cohort and the GMR. Linkage with the GMR was updated once a year in the 2004-2011 period. Datasets used for statistical analyses were made fully anonymous.

166 (140 males, 26 females) cases of deaths were identified, including 31 suicides (27 males, 4 females). In Slovenia the recording of suicide is restricted to cases where there is clear evidence of the suicide victim’s intention to kill him/herself [4]; thus those 31 suicide cases were all well defined (cause of death was suicide, with no doubt about intent).

The survival analysis was performed using Cox’s multivariate regression. The first model was prepared by using those 31 well-defined suicides as events: it revealed that the risk of suicide was significantly higher in older heroin addicts entering the cohort (for treatment), while male gender was not significantly related to suicide risk (Table 1.). Suicide is the most frequently misclassified cause of death worldwide, because it is often misclassified – as accidental death, where the victim’s intent had not been recognise as intentional or where the event is recorded as a death where the intent is stated to be unknown [5]. That means that, among deceased heroin addicts seeking treatment in OAT in cases where the recorded cause of death is other than intentional, suicide victims could or should be included, too. For this reason we constructed a variety of survival models by adding in different groups of deceased individuals where the cause of death was not recorded as intent to commit suicide, while the predictor variables, age at cohort treatment entry and male gender, stayed the same (Model 1: suicide mortality included ICD-10 code X60.0-X84.9 = Table 1; Model 2: suicide mortality included ICD-10 code X60.0-X84.9 and code Y10.0-Y34.9 of undetermined intent = Table 2. Model 3: suicide mortality included ICD-10 code X60.0-X84.9 and code X40.0-X49.9 of accidental deaths = Table 3; Model 4: sui-

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at the cohort treatment entry</td>
<td>1.05</td>
<td>2.56</td>
<td>0.011</td>
</tr>
<tr>
<td>Male gender</td>
<td>1.94</td>
<td>1.24</td>
<td>0.216</td>
</tr>
</tbody>
</table>

Table 1. Hazard risk of suicide in 3,947 cohort members (31 events: suicides; 2 missing cases)
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Table 2. Hazard risk of suicide in 3,947 cohort members (63 events: 31 suicides + 32 deaths of undetermined intent; 2 missing cases)

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at the cohort treatment entry</td>
<td>1.04</td>
<td>2.81</td>
<td>0.004</td>
</tr>
<tr>
<td>Male gender</td>
<td>2.36</td>
<td>2.14</td>
<td>0.032</td>
</tr>
</tbody>
</table>

Likelihood ratio test=14 on 2 df, p=0.000917

Table 3. Hazard risk of suicide in 3,947 cohort members (76 events: 31 suicides + 45 accidental deaths; 2 missing cases)

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at the cohort treatment entry</td>
<td>1.06</td>
<td>4.42</td>
<td>0.000</td>
</tr>
<tr>
<td>Male gender</td>
<td>1.26</td>
<td>0.79</td>
<td>0.430</td>
</tr>
</tbody>
</table>

Likelihood ratio test=18.4 on 2 df, < 0.001

Table 4. Hazard risk of suicide in 3,947 cohort members (108 events: 31 suicides + 77 other deaths; excluded deaths due to diseases and homicides; 2 missing cases)

<table>
<thead>
<tr>
<th>Variables</th>
<th>exp</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at the cohort treatment entry</td>
<td>1.05</td>
<td>2.56</td>
<td>0.000</td>
</tr>
<tr>
<td>Male gender</td>
<td>1.55</td>
<td>1.24</td>
<td>0.095</td>
</tr>
</tbody>
</table>

Likelihood ratio test=22.4 on 2 df, < 0.001

cide mortality included ICD-10 code X60.0-X84.9 and all other deaths, but excluded deaths due to homicides and due to diseases = Table 4.).

Older age at cohort treatment entry proved to be a robust predictor that significantly correlates with the risk of suicide, and remains statistically significant no matter which model is used. Male gender became significant only when used in a second model (suicide + death without determined intent), but not in any other case.

In spite of the fact that most of the deaths due to suicide in IDUs occur earlier in life, with two-thirds of all suicides in IDU occurring among those aged between 15 and 34 years, those aged over 35 continue to commit suicide [1]. Similarly, suicide victims in our study died young, at a mean age of 32.3±7.3 years, while the factor of older age at cohort treatment entry in heroin addicts seeking OAT acts as a risk factor for suicide. Specific suicide prevention intervention tailored to the needs of heroin addicts should be enforced.

References


Acknowledgements

Authors would like to thank Jožica Šelb Šemerl for her suggestions, and staff of the National Institute of Public Health for their help in data linkage.

Role of the funding source

Authors stated that this study was financed with internal funds. No sponsor played a role in study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.

Contributors

The authors contributed equally to this manuscript.

Conflict of interest

Authors declared no conflict of interest.

Ethics

Authors confirm that the submitted study was conducted according to the WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects. Ethics approval was obtained from the Republic of Slovenia National Medical Ethics Committee at the Ministry of Health.

Note

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Illicit drug-related suicide mortality and identification of initially unrecognized cases: experience of Slovenia

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TO THE EDITOR: For decades now Slovenia has been a striking example of a high suicide rate country. Even if research on suicide in the general population has a long tradition in this country, knowledge about the suicide related to the use of illicit drugs in the general population is still very restricted [12, 13]. This situation is partly the result of the methodology and its limitations in monitoring suicide mortality, especially mortality due to suicide among illicit drug users (IDUs), because the routine monitoring of mortality does not allow the identification of all cases of suicide, or, more specifically, of all illicit drug-related suicides (IDRS), especially those committed by IDUs where death is not a direct consequence of illicit drugs [4, 6, 8]. In addition, suicide and illicit drug use, are known worldwide to be issues that arouse strong stigma; as a result, the causes of these deaths are under-reported and frequently misclassified [1, 3, 6, 17].

The causes of death in Slovenia are determined by a medical doctor who has personally treated a deceased person, a coroner or pathologist, and suicide is recorded restrictively – only when there is clear evidence of the suicide victim's intent to kill him/herself; otherwise, a vaguer form of intent, whether of the mortality data appearing in GMR [4,6,8,17], suicide is in general one of the most under-reported and misclassified causes of death worldwide [17]. According to WHO, the causes of death actually due to suicide are frequently misclassified as deaths of undetermined intent, accidents, or even as homicides; in some cases the cause is stated to be unknown [17]. Under-reporting of suicide is strongly related to the stigma attached to it [17]. In addition, more violent methods (suicide by hanging or the use of firearms) are reported more accurately than non-violent methods (e.g. poisoning or drowning) [1]. There are also limitations in the use of GMR as the only source of illicit drug-related suicide mortality data, bearing in mind that besides overdoses (drug-induced or direct deaths), according to EMCDDA, indirect deaths, too – those that occurring without the illicit drug being found in fatal concentrations in the body – should be considered, even if it is true that suicides indirectly related to illicit drug use (e.g. hanging in IDU cases) are more difficult to assess [4, 6, 8].

The causes of death in Slovenia are determined by a medical doctor who has personally treated a deceased person, a coroner or pathologist, and suicide is recorded restrictively – only when there is clear evidence of the suicide victim's intent to kill him/herself; otherwise, a vaguer form of intent, whether
described as accidental or undetermined, is recorded [16]. The reliability of diagnosing the cause of death may be influenced by cultural variations, attitudes towards suicide taken by professionals, or the practical consequences or impact of a classification of death as intentional [3]; there is, in fact, a high proportion of overdoses where intent is left classified as undetermined [5,7,15].

Suicide is a cause of death in the ICD-10, but when the monitoring of IDRS is performed by using GMR as the exclusive source of data, IDRS could only be recognized in cases of intentional poisoning (ICD codes X61, X62) with one or more illicit drugs (T40.0-T40.9), or, considering cases where mental and behavioural disorders have been diagnosed as being due to illicit psychoactive substance use, whether of: opioids, cannabinoids, cocaine, other stimulants, or hallucinogens (F11, F12, F14, F16), cases of suicide committed by IDUs by means other than overdose by illicit drugs could remain hidden as events involving illicit drug use [6]. For example, in some cases of suicide due to causes other than the use of drugs, such as suicide by hanging, or jumping from a high place, only further police investigation or forensic examination could offer the additional information on illicit drug use with such suicide victims and such causes of deaths. Cases like these are recorded in GMR as suicide due to hanging or jumping from a high place, but no information is provided on illicit drug use, and those cases remain hidden as IDRS (partly due to the methodology that is adopted). EMCDDA, in its monitoring of drug-related mortality, arbitrarily defined ICD codes for drug-induced deaths, but these codes were wide enough to include medicines, so that knowledge of the cause of death alone is often not enough to determine whether the suicide victim was a regular IDU (e.g. had committed suicide by taking benzodiazepines).

In the period 2004 to 2007 mortality in Slovenia among IDUs, besides the routine use of GMR, was investigated in other ways [10-15]. GMR revealed 1,980 cases of suicide in the country, but they only included 17 cases that could be identified as IDRS when GMR was used as the only data source (Table 1). Considering that heroin users only rarely commit suicide by taking a heroin overdose and that hanging is the most frequent method of suicide in such cases [10-13], this is not surprising. Below we summarize our experience regarding the identification of IDRS by using more than a single data source, and describe our application of the linkage method. Where appropriate, data are expressed as a proportion of our sample, and 95% confidence intervals (CI) were calculated as an exact CI for sample proportions (using an exact binomial test).

Further data on suicide mortality in IDUs were obtained from cohort studies, of which the most frequently used have been cohort studies on IDUs in Opioid Agonist Treatment (OAT) [2, 9]. In Slovenia, the first cohort study was performed on 3,950 IDUs in OAT during the 2004-2006 period [11], and the vital status of cohort members was followed until 2011 [12], after being ascertained every year for previous years, so allowing the linkage of approximately 18,000 causes of death per year from GMR with a cohort for the period 2004-2007. In this way 24 IDRS were identified (Table 1); only 4 of these cases were overdose suicides. In this case the number of identified suicides in IDUs increased, through the documentation of drug-related suicides due to poisoning by other than specific illicit drugs and suicides other than those due to overdoses [2, 6, 9, 12]. The cohort was recruited through an OAT and may not be representative of the whole IDU population, but it remains true that outpatient OAT is the main treatment service for IDU problems in Slovenia.

In addition, a Special Mortality Register (SMR) was regularly compiled in Slovenia [10, 12, 14, 15], with the aim of supplying information about cases of deaths in which illicit drug use was one of the causes of death (whether the immediate cause, an intervening cause, or an underlying or associated cause – in other words, allowing a more flexible criterion than the external and underlying cause of death usually applied in GMR) appearing on the Medical Certificate of the cause of death, with additional information accessible through dense national networking, comprising police and medico-legal investigations, additional investigations on suspicious deaths and on deaths due to an unknown cause, and drug-related poisonings). Linkage of all three databases: GMR, cohort and SMR, allowed the identification of suicide victims with illicit drug use. In our experience we performed linkage between the national databases mentioned above for the period 2004-2007. Our best estimate of IDRS in Slovenia in the 2004-2007 period was 87 cases, which represents 4.4% of all suicides in this country during those years. By contrast, the use of GMR as the single source of data on IDRS led to only 19.5% (95% CI: 11.8-29.4%) of IDRS cases being identified (Table 1).

The inclusion of SMR offered the opportunity to identify additional IDRS cases which had been included in the GMR, but where the full details had
of mortality would itself result in some cases of drug-related suicide (deaths) remaining hidden [6]. The phenomenon of IDRS could still be under-reported after drawing on three different databases, but this shortcoming was limited by other strengths: national coverage, mandatory formal foundation for GMR and cohort (IDU in OAT) (continuity, tradition, law) international standards and comparability (use of ICD-10 codes, indicators) [6,17]. Actually there are no mandatory standards for SMR, and the available data are not comparable between countries [6]; our experience is one of making full use of the extra data resources that become available through police and medico-legal investigations.

### Table 1: Suicides and illicit drug-related suicides in Slovenia during 2004-2007 period according to the use of one single source of data or of linkage of one source with national databases

<table>
<thead>
<tr>
<th>Year</th>
<th>Suicides in country (GMR)¹ N</th>
<th>Illicit drug-related suicides (GMR only)² N</th>
<th>Illicit drug-related suicides – Data linkage: GMR + cohort³ N</th>
<th>Illicit drug-related suicides – Data linkage: GMR + cohort + SMR⁴ N (% of all suicides in country, 95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>514</td>
<td>2</td>
<td>5</td>
<td>20 (4.0; 95% CI: 2.4-6.6)</td>
</tr>
<tr>
<td>2005</td>
<td>503</td>
<td>5</td>
<td>7</td>
<td>23 (4.6; 95% CI: 2.9-6.8)</td>
</tr>
<tr>
<td>2006</td>
<td>529</td>
<td>3</td>
<td>7</td>
<td>22 (4.2; 95% CI: 2.6-6.2)</td>
</tr>
<tr>
<td>2007</td>
<td>434</td>
<td>7</td>
<td>5</td>
<td>22 (5.1; 95% CI: 3.2-7.6)</td>
</tr>
<tr>
<td>2004-2007</td>
<td>1,980</td>
<td>17</td>
<td>24</td>
<td>87 (4.4; 95% CI: 3.5-5.4)</td>
</tr>
</tbody>
</table>

Legends:

1. GMR= General Mortality Register: includes all deaths in the country
2. Suicide cases recorded in GMR, with additional cause included (ICD-10 code): F11, F12, F14, F16, T40
3. Cohort of illicit drug users in Opioid Agonist Treatment (suicide victims aged 15-58 years)
4. SMR –Special Mortality Register: includes suicides with information on illicit drugs as being one of the causes of death (immediate cause, intervening cause, underlying or associated cause, in addition to the external and underlying cause of death usually included in GMR), with further information available through police and medico-legal investigations

In our study IDRS mortality included: drug-induced suicides (overdoses) and drug-related suicides other than poisoning in IDUs. SMR made it possible to identify those IDRS that remain absolutely hidden if GMR is treated as the only available source of data. In addition, by drawing on the resources of SMR, even cases of drug-related suicide committed by IDUs not seeking treatment were identified — cases which remain hidden even when GMR is linked with its cohorts. In our case SMR functioned as a complementary mortality register. It should, however, be borne in mind that the use of SMR as the only source of mortality would itself result in some cases of drug-related suicide (deaths) remaining hidden [6].

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European Union.


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Role of the funding source

Authors state that this study was financed with internal funds. No sponsor played a role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

Contributors

The authors contributed equally to this manuscript.

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A. OPIS KONTAKTA S CENTROM

5. Datum iskanja pomoči (vpišite dd.mm.yy)
6. Vrsta stika s centrom (obkrožite)
   1. nova stranka
   2. stara stranka
7. (a) Že bil kjerkoli obravnavan (obkrožite in vpišite kje)
   1. nikoli
   2. že - ponovno vstopa v program

(b) Če želite, pred koliko meseci zadnjič (vpišite štev. mes.)

8. (a) Trenutno v obravnavi drugje (obkrožite in vpišite kje)
   1. da
   2. ne
   3. neznan

(b) Vir napotitve (obkrožite)
   1. sam
   2. družina/prijatelji
   3. drug center
   4. splošni zdravnik
   5. bolnišnica/druge zdrav. ustan.
   6. socialna služba
   7. vodnik
   8. drugo
   9. neznan

B. SOCIALNO-DEMOGRAFSKE INFORMACIJE

9. Spol (obkrožite)
   1. moški
   2. ženska
10. (a) Starost (vpišite)

(b) Datum rojstva (vpišite dd.mm.yy)

11. (a) S kom trenutno živi - v zadnjih 30 dneh (obkrožite)
   1. sam
   2. s partnerjem in otrokom
   3. s starši
   4. s prijatelji
   5. s otrokom
   6. drugo (vpišite)

(b) Živi z odvisnikom (obkrožite)
   1. da
   2. ne
   3. neznan

(c) Če ima otroke, navedite število otrok (vpišite)

12. (a) Živi v kraju obravnavne (obkrožite)
   1. da
   2. ne
   3. neznan

(b) Stanovalni prebivališče v regiji (obkrožite)
   1. Pomurska
   2. Podravska
   3. Vrbovka
   4. Savinjska

C. ŠKODLJIVA UPORABA DROG

<table>
<thead>
<tr>
<th>Droge</th>
<th>Način vnosa</th>
<th>Pogostnost uporabe zadnji mesec</th>
<th>Starost ob prvi uporabi</th>
<th>Trajanje redne uporabe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(vpišite ime in navedite šifro - glej šifrant)</td>
<td>(vpišite šifro)</td>
<td>(vpišite šifro)</td>
<td>(vpišite šifraata)</td>
</tr>
<tr>
<td>GLAVNA DROGA</td>
<td>Alkohol</td>
<td>XXXXXXXXXXXXXXXXXXXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Opijčje</td>
<td>1. herozin</td>
<td>4. hipnotiki in sedativi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Kokain</td>
<td>3. codein</td>
<td>41 barbiturali</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Pselvija</td>
<td>11 barbiturali</td>
<td>42 benzodiapnine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Methamfetamin</td>
<td>30 drugi hipnotiki</td>
<td>43 drugi sedativi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Halucinogeni</td>
<td>19. likasi</td>
<td>51 LSD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Methamfetamin</td>
<td>52 drugi halucinogeni</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Amfetamin</td>
<td>6. Hlapljive snovi za vedljanje</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Kokain</td>
<td>7. cannabis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Druge snovi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. (a) Starost pri prvi uporabi katerekoli prepovedane droge
19. (b) Vpišite ime in šifro droge
D. TVEGANJE VEDENJE

26.(a) Sedaj si vbrizgava - zadnjih 30 dni (obkrožite)
1. da 2. ne 9. neznan

(b) Če si vbrizgava, ali je souporabljal(a) iglo/brizgo pri zadnjem vbrizgavanju
1. da 2. ne 9. neznan

(c) Če si vbrizgava, ali je souporabljal(a) ostali pribor pri zadnjem vbrizgavanju
1. da 2. ne 9. nezna

(d) Če si vbrizgava, ali je souporabljal(a) iglo/brizgo v zadnjem mesecu
1. da 2. ne 9. neznan

(e) Če si vbrizgava, ali je souporabljal(a) ostali pribor v zadnjem mesecu
1. da 2. ne 9. neznan

21.(a) Ali si je kdajkoli vbrizgaval(a) (obkrožite)
1. da 2. da, vendar ne v zad. 30 dneh 3. ne 9. neznan

(b) Če si je kdajkoli vbrizgaval(a), navedite starost ob prvem vbrizgavanju (vpišite) [let]

(c) Če si je kdajkoli vbrizgaval(a), ali je tudi kdajkoli souporabljal(a) iglo/brizgo (obkrožite)
1 da 2. da, vendar ne v zad. 30 dneh 3. ne 9. neznan

22. Že imel(a) spolne odnose (obkrožite)
1. da 2. ne 9. neznan

23. ima stalnega partnerja že več kot 12 mesecev (obkrožite)
1. da 2. ne 3. neustrezno 9. neznan

24. Število spolnih partnerjev v zadnjem letu (vpišite) [broj]

25. Uporabili(a) kondom pri zadnjem spolnem odnosu (obkrožite)
1. da 2. ne 3. neustrezno 9. neznan

26. Če imel(a) poleg stalnega partnerja še drugega(e) spolnega(e) partnerja(e), ali je uporabila kondom pri zadnjem spolnem odnosu z drugim partnerjem (obkrožite)
1. da 2. ne 3. neustrezno 9. neznan

27. V zadnjih 12 mesečih imel(a) spolnega partnerja, ki ne vbrizgava drog (obkrožite)
1. da 2. ne 3. neustrezno 9. neznan

28. Zaradi drog že bil kdajkoli obravnavan na policiji/sodišču/v zaporu (obkrožite)
1. da 2. ne 9. neznan

E. KAZALNIKI OKUŽB

29. Podatki o vrsti testiranj in rezultatih (označite z ✓)

<table>
<thead>
<tr>
<th>Testiran(a) - pozitiven(a)</th>
<th>Testiran(a) - negativen(a)</th>
<th>Testiran(a) - rezultat neznan</th>
<th>Nikoli testiran(a)</th>
<th>Rezultati testiranj so starejši od 12 mesecev</th>
</tr>
</thead>
<tbody>
<tr>
<td>anti HIV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>anti HBC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>anti HBE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HBs Ag</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>anti HCV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCR RNA HCV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

30. Cepljen(a) proti hepatitisu B (obkrožite in/ali vpišite) 1. da (vpišite število prejetih doz) 2. ne 9. neznan

F. OBRAVNAVA

31.(a) Dogovor o obravnavi - možen je praviloma 1 odgovor, možna sta tudi dva, če je psihoterapija ali psihosocialna terapija ali svetovanje dopolnilo detoksikaciji in vzdruževalnemu programu (obkrožite)

1. dekotriščanje brez zdravil ("drug free")
2. detoksikacija z zdravili
3. kratkotrajni vzdruževalni program (do 6 mesecev)
4. dolgotrajni vzdruževalni program (več kot 6 mesecev)
5. psihoterapija

6. psihosocialna terapija
7. svetovanje, podpora, nasvet
8. napotek v drug terapevtski center (vpišite kateri)
9. drugačna obravnava (vpišite)
10. še ni odločitev/neznan

32. S katerimi zdravili je bil zdravljen(a) (označite s kljukico)

<table>
<thead>
<tr>
<th>Že prej</th>
<th>V sedanjem obravnavi</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. Brez zdravil</td>
<td></td>
</tr>
<tr>
<td>1. Metadon</td>
<td></td>
</tr>
<tr>
<td>2. Buprenorfin</td>
<td></td>
</tr>
<tr>
<td>3. Naltrexon</td>
<td></td>
</tr>
<tr>
<td>4. Drugo (vpišite)</td>
<td></td>
</tr>
</tbody>
</table>

G. OPOMBE

H. IZPOLNILI

(zig ali tiskajte in podpis):
Notification of Death

Entry in the death register

01. Surname and name of the deceased,
for married woman also maiden name

02. Sex: male = 1, female = 2

03. Date of birth

04. Hour of birth (for newborns)

05. Place of birth

06. Permanent residence

07. Marital status: single = 1, married = 2,
widow(er) = 3, divorced = 4, unknown = 9

08. Citizenship of the deceased

09. Entry in the municipal register of citizenship

10. Education (the highest level of education completed)

11. Occupation (the nature of his/her work)

12. Occupation (the nature of his/her work) of the person who supported
the deceased

13. Socio-economic status of the occupation of the deceased
or of the person who supported him/her

14. Date of death

15. Time of death (0-24)

16. Place of death

17. Location of death,
if the person died in a health institution indicate the address
of the institution

18. Medical care, if he/she was cured at home,
indicate name and surname of the doctor

cured = 1, not cured = 2

19. Provider of information about the cause of death
the physician who was taking care of the deceased = 1,
the person who carried out the post mortem = 2;
the official coroner; the doctor = 3.

20. Cause of death

21. Surname and name

22. Date of mother’s birth

23. Mother’s education (the highest level of education completed)

24. Mother’s (the nature of her work) occupation

25. Occupation (the nature of his/her work) of the person who supports
the mother

26. Socio-economic status of the occupation of the mother
or of the person who supports her

27. Number of children

28. Child was:
born in a lawful marriage = 1
born outside of a lawful marriage = 2
abandoned = 3

29. Nature of violent death:
fatal accident = 1,
suicide = 2,
murder, infanticide = 3

30. Time of death

31. External causes of violent death

32. Place of the fatal accident

33. Where accident happened
(at home, at work, etc.)

Address and signature of the person who reported death
Official stamp
Registrar