Hospitalization in a Cohort Seeking Treatment for Illicit Drug Use in Finland

Ifeoma N. Onyeka, M.B.B.S., MSc.P.H. [a,*], Caryl M. Beynon, B.Sc., D.L.S.H.T.M., M.Sc., Ph.D. [b],
Kimmo Ronkainen, M.Sc. [a], Jari Tiihonen, M.D., Ph.D. [c,d,e], Jaana Föhr, M.D. [f], Outi Kuikanmäki, M.D. [f],
Mika Paasolainen, R.N. [f], Jussi Kauhanen, M.D., Ph.D., M.P.H. [a]

[a] Institute of Public Health and Clinical Nutrition, Faculty of Health Sciences, University of Eastern Finland, Kuopio, Finland
[b] Independent Research Consultant, Liverpool, United Kingdom
[c] Department of Forensic Psychiatry, University of Eastern Finland, Niuvanniemi Hospital, Kuopio, Finland
[d] National Institute for Health and Welfare, Helsinki, Finland
[e] Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden
[f] Helsinki Deaconess Institute, Helsinki, Finland

ARTICLE INFO

ABSTRACT

Illicit drug use is associated with various health problems that result in inpatient hospital admissions. The primary objective of this study was to examine all-cause and cause-specific hospitalizations by gender. The cohort comprised 4817 drug users (3365 males and 1452 females) who sought treatment in Helsinki between 1997 and 2008. Data on hospitalizations that occurred among these clients were extracted from the National Hospital Discharge Register. Crude hospitalization rates (CHRs) and standardized hospitalization ratios (SHRs) with 95% confidence intervals (CIs) were calculated, and Kaplan–Meier analysis with Log-Rank test was used to compare survival in terms of time to hospitalization between males and females. At the end of the follow-up period, 84.5% of females and 73.3% of male clients were hospitalized at least once. Female clients had higher CHR (607.6/1000 person–years, 95%CI: 594.1–621.4) than males (511.0/1000, 95% CI: 502.9–519.3), and had significantly poorer survival than males (Log-Rank test, $P < 0.001$). However, male clients stayed longer on admission than females (mean length of stay 70.2 days versus 60.7 days respectively, $P < 0.001$). Compared to the national rates, excess hospitalizations were noted in both males (SHR = 6.3, 95% CI: 6.2–6.4) and female clients (SHR = 4.3, 95% CI: 4.2–4.4). Based upon primary discharge diagnosis, the leading causes of hospitalizations included psychosis (n = 622), schizophrenia (n = 604), depression (n = 497), cardiovascular diseases (n = 223), hepatitis C (n = 116), HIV (n = 81), and other types of hepatitis (n = 45). Female clients were more likely than males to be admitted for hepatitis C infection ($P < 0.001$) and depression ($P < 0.001$). Male clients were more likely than females to be diagnosed with other types of hepatitis infections ($P = 0.032$) and psychosis ($P = 0.035$). Excess hospitalizations signify excessive utilization of health resources. Effective drug abuse treatment, gender-sensitive approaches, and regular health checks can help to reduce morbidity. Appropriate measures are needed to address psychiatric problems in this population.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

Illicit drug use is a major public health concern. It is estimated that in 2012 about 243 million people had used an illicit drug globally (United Nations Office on Drugs and Crime, 2014, pg. 1), and a recent report showed that over 80 million Europeans had used an illicit drug (European Monitoring Centre for Drugs and Drug Addiction, 2014, pg. 33). In Finland, alcohol use is far more common, but there has been an increase in illicit drug use in the last 15 years (Varjonen, Tanhua, & Forsell, 2013, pg. 26). Lifetime prevalence of drug use among the general Finnish population aged 15–69 years in 2010 included: 17.0% for cannabis, 2.1% for amphetamines, 1.7% for ecstasy, 1.5% for cocaine, and 1.0% for opiates (Varjonen et al., 2013, pg. 25). In response, Finnish municipalities provide treatment for drug users through specialized drug services, primary social and healthcare services, and also provide assistance to those with problems related to income, living, and employment (Varjonen et al., 2013, pg. 55).

Use of illicit drugs is associated with numerous health problems (WHO, 2014). These problems are frequently related to the type of drugs used. Psychotic and other mental problems are, for example, prevalent among cannabis users (Moore et al., 2007; van Os et al., 2002; Degenhardt et al., 2009). Blood-borne viral infectious diseases such as HIV and hepatitis C are prevalent among intravenous drug

* Corresponding author at: Institute of Public Health and Clinical Nutrition Faculty of Health Sciences University of Eastern Finland, Kuopio, P.O. Box 1627, FI-70211 Kuopio, Finland. Tel.: +358 403552905.

E-mail address: ifeoma.onyeka@uef.fi (I.N. Onyeka).

users (Kruse et al., 2009; Loebstein et al., 2011; Aceijas & Rhodes, 2007; Nelson et al., 2011), while consumption through inhalation increases the risk of pneumonia and other respiratory problems (Nguyen, Silva, Souza, & Müller, 2007). Drug mixing, frequent use, quantity used, and injecting route of administration increase the risk of a nonfatal overdose (Warner-Smith, Darke, & Day, 2002; Brugal et al., 2002; Kerr et al., 2007). Other morbidities associated with illicit drug use include hepatic diseases, and various forms of pulmonary, cardiovascular, neurological and muscular dysfunctions (Warner-Smith, Darke, Lynskey, & Hall, 2001).

In a 33-year follow-up study of drug users, Hser, Hoffman, Grella, and Anglin (2001) found high overall rates of hepatitis (41.7%), sexually transmitted diseases (27.5%) and other physical health morbidities, and the heroin-user group had higher mean values for various mental health problems. Ryan and White (1996) and Millson et al. (2004) found that drug users had poorer physical and psychological health than the general population. A prospective study of 604 HIV-infected drug users in the US (Floris-Moore et al., 2003) found that females had almost twice the hospitalization risk of males during the 1997–2000 period [relative risk (RR) = 1.72]. Similarly, an Australian study (Fatovich, Bartu, Davis, Atrie, & Daly, 2010) reported higher risk for all hospital separations among female drug users (RR = 2.35) compared to males. Morbidity and hospitalization among drug users could generate considerable costs to the society in terms of care provided by health services (Takahashi, Maciejewski, & Bradley, 2010; Stein & Sobota, 2001). Furthermore, hospitalization presents an opportunity for health professionals to identify drug use problems among patients and offer them intervention or treatment referral (NIAAA, 2004). Understanding the type of diseases for which drug users are hospitalized will support this case identification approach.

Therefore, it is important to examine the extent and nature of hospitalizations among drug-using populations. However, while hospitalizations among illicit drug users have been investigated in a variety of international settings, studies were limited by focusing exclusively on adolescents (Chisolm & Kelleher, 2006), HIV-infected users (Floris-Moore et al., 2003), opiates users (Popova, Rehm, & Fischer, 2006; Fatovich et al., 2010), cannabis users (Jouanjus, Leymarie, Tubery, & Lapeyre-Mestre, 2011; Hamilton, Lloyd, Hewitt, & Godfrey, 2014), those diagnosed with poisoning/overdose (Bjørn et al., 2009; Hulse et al., 2005; Warner–Smith et al., 2002; White, Hingson, Pan, & Yi, 2011; White, MacInnes, Hingson, & Pan, 2013) and soft tissue infections (Takahashi et al., 2010), absence of structured interview/client-level data at baseline (Popova, Rehm, Patra, Baliunas, & Taylor, 2007; Roxburgh & Degenhardt, 2008), and the lack of comparison to the general population (Weintraub et al., 2001). Further understanding of the range of health conditions requiring hospitalizations among drug users in general is needed; the availability of client-level baseline data and comparison to a reference population will help to interpret findings and to formulate an appropriate public health response.

At local level, studies on hospitalizations among drug users in Finland are scarce. To the best of our knowledge, we are not aware of any long-term large-scale epidemiological study that has explored hospitalizations among drug users in Finland. Although Partanen, Vikatmaa, Tukiainen, Lepäntalo, and Vuola (2009) investigated hospitalizations among 24 patients from the Greater Helsinki area of Finland who injected crushed tablets in the extremities, the small sample size limits the generalizability of their findings. The primary objective of this study was to examine all-cause and cause-specific hospitalizations among 4817 drug users in relation to gender. The secondary objective was to examine cause-specific hospitalizations by the primary drugs reported at baseline.

2. Methods

We retrospectively studied a cohort of 4817 clients who sought treatment for drug use at the Helsinki Deaconess Institute (HDI)

between 1997 and 2008. The service where the clients sought treatment provides treatment for illicit drug users, but there were a smaller number of clients (minors and polydrug users) who had alcohol and prescription medicines contributing most to the reasons for seeking treatment at that time. Their self-reported primary drugs of abuse included opiates mainly heroin and buprenorphine (30%, n = 1432), stimulants mainly amphetamines (28%, n = 1334), alcohol (21%, n = 1004), cannabis (19%, n = 894), prescription medicines mainly benzodiazepines used for non-medical purposes (2%, n = 96), and other drugs including hallucinogens, solvents/inhalants, gamma-hydroxybutyrate, and gamma-butyrolactone (1%, n = 57). We characterized the sample as illicit drug users because very few clients used only one drug and they mixed this with illicit drugs even if the primary drug was alcohol or medication. This study population made up the epidemiological part of the HUUTI consortium research project. The composition of the cohort, data collection methods, and baseline characteristics have been described elsewhere (Onyeka et al., 2012, 2013). Clients' data were linked to the Finnish National Hospital Discharge Register (FHDR), and they were followed up from the first day of the first visit to HDI until 31 December 2010. The FHDR has a total coverage of inpatient care provided at all hospitals and municipal health centers since 1969, and contains admission and discharge dates, discharge diagnoses, personal identity codes, hospital identifier codes, and other information (Haikonen, Lunetta, Lillsunde, & Sund, 2013). The nation-wide administrative health and social register system in Finland has good coverage and validity (Gissler & Haukka, 2004). Causes of inpatient hospitalizations were coded using the 10th version of the International Classification of Diseases (ICD-10). Clients' records contained the main/primary discharge diagnoses (i.e., the main reasons for hospitalizations) and 1–3 additional/secondary diagnoses. However, this research paper included cause-specific analyses for primary diagnosis only (and therefore excluded secondary diagnoses), and this was done to enable us to identify the most important reasons for hospital admissions. The ICD-10 codes for the predominant primary discharge diagnoses included: cardiovascular diseases: I00–I99; HIV: B20–B24; hepatitis C: B171, B182; other hepatitis: B150, B159, B162, B169, B178, B181, B189, B199; schizophrenia: F20–F29; depression: F30–F34, F38, F412, F4320, F4321, F4322; and psychosis: F00–F09, F20–F29.

2.1. Statistical analyses

The Statistical Package for Social Sciences (SPSS version 21, Chicago, IL) was used for data analyses. Descriptive statistics were presented as proportions, and means with standard deviation (SD). Statistical differences between gender groups were tested using the chi-square test for categorical variables and the Mann–Whitney test for continuous variables. Data analyses for all-cause hospitalizations included all admissions for each person, which also included multiple hospitalizations. However, we restricted analyses for cause-specific hospitalizations to primary diagnoses for the first admission because looking at re-admissions for the same cause in the same person will be too complex for this large study sample. Crude hospitalization rates (CHRs) were calculated by dividing the total observed number of hospital admissions by the total person–years (PY) of follow-up, expressed per 1000 PY. The expected numbers of hospital admissions were calculated by multiplying the person–years for each gender and age group by the corresponding average CHR in the Finnish population aged 11–65 years during 1997–2010. Standardized hospitalization ratios (SHRs) were calculated by dividing the observed number of hospitalizations by the expected number of hospitalizations. An SHR with a value above 1, with the lower limit of the corresponding 95% confidence interval (CI) that precludes one, indicates excess hospitalization. Hospitalization data for the reference population were obtained from the National Institute for Health and Welfare (THL), which also maintains the FHDR (THL, 2014). Survival analysis was done using the Kaplan–Meier method, and Log-Rank test was used to compare survival for all-cause