

The Revolving Door Phenomenon: Psychiatric Hospitalization and Risk of Readmission Among Drug-Addicted Patients

P. Di Giovanni¹, G. Di Martino^{2*}, I.A.L. Zecca³, I. Porfilio⁴, F. Romano⁵, T. Staniscia⁶

¹Department of Pharmacy, "G. d'Annunzio" University of Chieti-Pescara, Chieti; ²School of Public Health and Preventive Medicine, "G. d'Annunzio" University of Chieti-Pescara, Chieti; ³School of Public Health and Preventive Medicine, "G. d'Annunzio" University of Chieti-Pescara, Chieti; ⁴School of Public Health and Preventive Medicine, "G. d'Annunzio" University of Chieti-Pescara, Chieti; ⁵Department of Public Health and Infectious Diseases, "La Sapienza" University of Rome; ⁶Department of Medicine and Aging, "G. d'Annunzio" University of Chieti-Pescara, Chieti, Italy

Abstract

Background. Substance use may influence the onset and course of psychiatric diseases. The "Revolving door" (RD) phenomenon, which indicates repeated hospitalizations of the same patients, has become a public health.

Objectives. The aim of this study was detecting the risk factors associated to hospital readmission to psychiatric wards of drug-addicted patients.

Methods. The study considered all the admissions performed between 2006 and 2015 in Abruzzo, Italy. Only the hospital discharge registry having code 304 (drug dependence) as diagnosis was taken into account. In addition, only the patients with a psychiatric DRG were included.

Results. 325 patients performed 558 psychiatric admissions during the study period (1089 person-years). The analyses of the discharge registry showed "Psychoses" as the main DRG (73.2%). An amount of 119 patients experienced a second psychiatric admission. Psychiatric readmissions were independently predicted by Schizophrenia (HR=2.061) and Anxiety disorders (HR=0.326).

Conclusions. Psychiatric hospitalization and readmission are frequent among drug-addicted patients. The subsequent RD phenomenon has become a public health issue, both for health and economic sides. *Clin Ter 2020; 171 (5):e421-424. doi: 10.7417/CT.2020.2252*

Key words: addiction, psychiatry, admissions, hdr, revolving door

Introduction

Substance use may influence the onset and course of psychiatric diseases¹. High prevalence of substance abuse is characteristic of patients with first-episode psychosis, with rates varying from 20% to 50%²⁻⁵. In addition, drug use is associated to a prior onset, to increased symptoms^{4,6}, higher rates of relapses and more frequent hospitalizations^{4,7}. Focusing on Italy, the "Revolving door" (RD) phenomenon, which indicates repeated hospitalizations of the same patients, has become a public health issue after the closure of psychiatric hospitals⁷. Hence, to prevent recurrent psychotic episodes the identification of modifiable prognostic factors

is extremely important: being unmarried, unemployed, receiving a disability pension, being homeless or living in a residential facility⁸ are social factors that can lead to frequent re-hospitalizations in association to clinical variables. The aim of this study was detecting all the risk factors associated to hospital readmission to psychiatric wards of drug-addicted patients.

Methods

data Source

The study considered all the hospital admissions performed between January 1st, 2006 and December 31st, 2015 in Abruzzo, a region in the center of Italy. Data were collected from all hospital discharge records (HDR), using the hospital information system. This system includes information about the demographic characteristics of patients, a Diagnosis Related Group code (DRG, grouped in 25 Major Diagnostic Category - MDC) used to classify the admission and a maximum of 6 diagnoses (one principal diagnosis and up to 5 secondary diagnosis) and 6 procedures (one principal procedure and up to 5 secondary procedures) followed during the hospitalization, coded using the International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM)⁹.

For the study, only the hospital discharge registry having code 304 (drug dependence) as the principal diagnosis or as one of the five secondary diagnosis was taken into account. In addition, only the patients with a psychiatric DRG were included: 425 (Acute Adjustment Reactions and Psychosocial Dysfunction), 426 (Depressive Neuroses), 427 (Neuroses except Depressive), 428 (Disorders of Personality and Impulse Control) 429 (Organic Disturbances and Mental Retardation), 430 (Psychoses), 431 (Childhood Mental Disorders) 432 (Other Mental Disorder Diagnoses).

Moreover, the following socio-demographic variables were collected: age, citizenship, marital status, scholarship, hospitalization duration, mode of admission, and mode of discharge.

Correspondence: Giuseppe Di Martino, School of Public Health and Preventive Medicine, "G. d'Annunzio" University of Chieti-Pescara, Chieti, Italy, via dei Vestini, 31, 66100 Chieti (CH) Italy +3908713554118. E-mail: peppinodimartino@hotmail.com

Data relative to patients' mental disorders were collected and grouped in six major categories, according to ICD-9-CM: Bipolar disorder (296.4X-296.8X), Depression (296.2X-296.3X), Delirium (297.XX), Personality disorders (301.XX), Anxiety (300.XX) and Schizophrenia (295.XX).

Endpoints and Follow-ups

Only patients who performed the first psychiatric admission until 31st December 2013 were included. All included participants were followed-up until December 31st 2015, linking a unique personal identification number with the Italian HDR. The primary endpoint was hospital readmission for any psychiatric cause during the ten-year period. The secondary endpoint was analyzing the predictors of psychiatric readmission among drug-addicted patients. Patients who did not perform hospital readmissions were followed until December 31st 2015 as well.

Statistical Analysis

Quantitative variables were summarized as mean and standard deviation (SD) or as median and interquartile range (IQR) according to their distribution. Qualitative variables were summarized as frequency and percentage. Recorded outcomes were first related to different covariates in an unadjusted model. Thereafter, cumulative probabilities of all-cause psychiatric readmissions were calculated using the Kaplan–Meier method. The Schoenfeld Residuals Test was performed to check the proportional hazards assumption. Cox proportional hazards analysis was used to calculate the adjusted hazard ratios (HR) of hospital readmissions. Gender did not matched the proportional hazards assumption and was not added in the multivariate analysis. All tests were two-sided and a p-value less than 0.05 was considered statistically significant. Statistical analysis was performed using IBM SPSS for Statistics v20.0 software (SPSS Inc. Chicago, Illinois, USA).

Results

Clinical Characteristics of Patients and Hospitalization Rates

An amount of 325 drug dependent patients performed 558 psychiatric admissions during the study period (1089 person-years). The age (mean±SD) of the study population was 35.6±9.1 years and 80.9% were men. The median follow-up was 120.0 weeks (26.5-325.9). Opioids were the most abused drug with a prevalence of 36.9%, and Personality Disorders were the most frequent mental diseases (89 cases, 27.4%). The analyses of the discharge registry showed "Psychoses" as the main DRG (73.2%).

Survival Analysis

An amount of 119 patients (109.3 per 1000 person-years) experienced a second psychiatric admission. Kaplan-Meier analyses (Fig. 1) showed that 86 re-admissions (72.3%) occurred during the first year and 104 during the first two

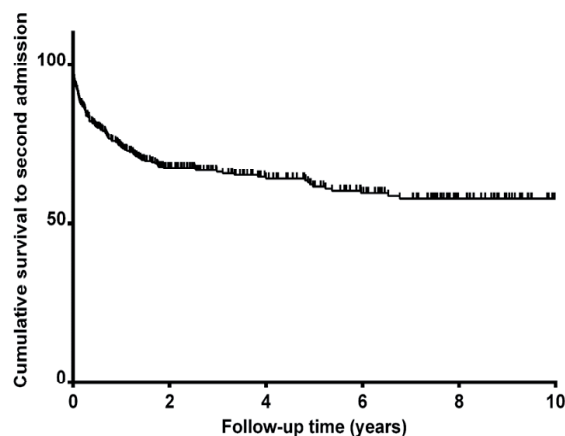


Fig. 1. Cumulative survival to second hospital admission

years (87.4%). The 42.9% of patients who had a second admission (51 patients) also performed a third admission over the study period (Fig. 2): overall, 42 re-admissions (80.8%) occurred during the first year and 45 during the first two years (88.2%).

Risk of Readmission

Psychiatric readmission was not predicted by age and type of drug addiction. Only cocaine showed a tendency to significance, demonstrating a lower risk of readmission among cocaine addicts (adjusted HR=0.442, $p=0.080$). Psychiatric readmissions were independently predicted by Schizophrenia (adjusted HR=2.061, $p=0.042$) and Anxiety disorders (adjusted HR=0.326, $p=0.050$). In addition, Personality Disorders showed a tendency to significance (adjusted HR=1.473, $p=0.071$) (Table 3).

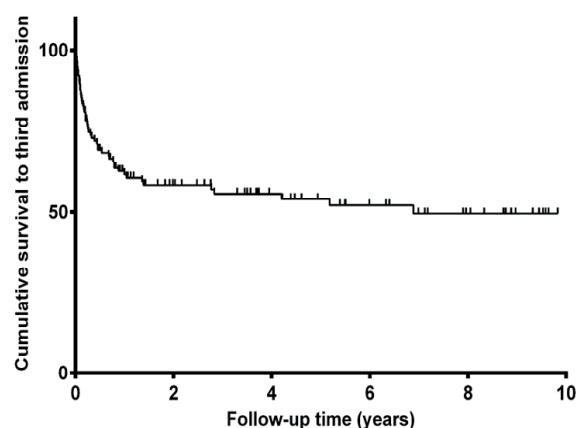


Fig. 2. Cumulative survival to third hospital admission

Table 1. Patients Characteristics

Variable	N (%)
Age	
<25	48 (14.8)
25-45	216 (66.5)
>45	60 (18.5)
Gender	
Male	263 (80.9)
Female	62 (19.1)
Marital Status	
Unmarried	155 (47.7)
Married	51 (15.7)
Other	119 (36.6)
Addiction	
Opioid	120 (36.9)
Cannabis	30 (9.2)
Cocaine	27 (8.3)
Combined	20 (6.2)
Alcoholism	22 (6.8)
Mental Disorders	
Bipolar	32 (9.8)
Depression	54 (16.6)
Delirium	12 (3.7)
Schizophrenia	16 (4.9)
Anxiety	18 (5.5)
Personality	89 (27.4)

Table 2. Cause of First Admission Distribution

DRG		n (%)
430	Psychoses	238 (73.2)
428	Disorders of Personality and Impulse Control	43 (13.2)
425	Acute Adjustment Reactions and Psychosocial Dysfunction	19 (5.8)
426	Depressive Neuroses	8 (2.5)
429	Organic Disturbances and Mental Retardation	7 (2.2)
431	Childhood Mental Disorders	6 (1.8)
427	Neuroses Except Depressive	3 (0.9)
432	Other Mental Disorder Diagnoses	1 (0.3)

Discussion

The aim of this study was evaluating the psychiatric readmission of drug-addicted patients and detecting related predictors. The study screened all the psychiatric admissions of drug addicts occurred in Abruzzo, a region in Central Italy, between 2006 and 2015. All drug-addicted patients, who performed at least one psychiatric admission during the study period, were included. The study cohort highlighted that most patients were male (80.9%), confirming male gender as influencing factor of psychiatric admission^{10,11}. In

Table 3. Univariate and Multivariate Cox Models Assessed to Analyze Predictors of Hospital Readmission

Variables	Crude HR (95% IC)	p-value	Adjusted HR (95%IC)	p-value
Addictions				
Opioid	1.198 (0.832-1.734)	0.331	1.224 (0.812-1.845)	0.335
Cannabinoid	0.819 (0.429-1.566)	0.547	0.886 (0.442-1.777)	0.733
Cocaine	0.454 (0.185-1.111)	0.084	0.442 (0.177-1.101)	0.080
Combined	1.181 (0.576-2.420)	0.650	1.228 (0.575-2.621)	0.596
Alcohol	1.259 (0.638-2.484)	0.507	1.308 (0.653-2.620)	0.448
Mental disorders				
Bipolar disorder	1.103 (0.607-2.003)	0.749	1.390 (0.735-2.629)	0.312
Depression	0.886 (0.542-1.448)	0.629	1.008 (0.596-1.704)	0.977
Delirium	1.489 (0.654-3.386)	0.343	1.581 (0.683-3.660)	0.284
Personality Disorder	1.309 (0.890-1.925)	0.171	1.473 (0.967-2.243)	0.071
Anxiety Disorder	0.330 (0.105-1.040)	0.058	0.326 (0.102-1.040)	0.050
Schizophrenia	2.013 (1.053-3.851)	0.034	2.061 (1.025-4.141)	0.042
Age				
<25	1		1	
25-45	1.303 (0.753-2.256)	0.334	1.358 (0.775-2.381)	0.285
>45	1.047 (0.532-2.060)	0.895	0.974 (0.486-1.949)	0.940

addition, being unmarried resulted to be the most frequent marital status among psychiatric admission, as confirmed by Schmutte et al.⁸. Psychosis resulted as the most frequent cause of admission in the cohort study. The biological mechanisms behind drug-induced psychosis are unclear, but the findings of this paper confirmed the results of some previous important reviews^{12,13}. Survival analyses showed as the greatest part of readmissions occurred during the first year, confirming the importance of the already known RD phenomenon⁷. RD phenomenon is strongly linked to the health care system organization, because it induces a sort of dependence on itself in this type of patients: drug addicts frequently use mental health services as an alternative to the real world. The inappropriate use of the hospital could induce dependence on mental health institutions⁷.

Cox regression analyses focused on both addictions and mental illness: in this paper, Schizophrenia and Personality disorders were predictors of hospital readmissions. In particular, schizophrenia is a well-known risk factor for hospital readmissions in drug-addicted patients, as described by^{14,15}. Moreover, patients with anxiety disorders had a lower risk of readmission than patients suffering from other mental disorders, as already showed by Burke et al.¹⁴. The age did not result as a risk factor for hospital readmission, though most of the included patients were aged between 25 and 45 years. Findings of this study can lead to personalized approach to psychiatric disorders among drug addicted patients¹⁶.

Limitations

The results of this study should be considered in the light of the following limitations: firstly, the identification of diagnosis is based on ICD-9-CM codes that did not take into account the severity of patients' conditions. Secondly, the use of administrative data may be limited by the reliability of certain types of information such as drugs therapy and clinical information. Thirdly, the drug dependence code (304) could be not reported, due to the lack of the information or to miscoding. In addition, this is a censored cohort, so patients enrolled during last years of the study had shorter follow-up.

Compliance with ethical standard

Disclosure of potential conflicts of interest

Authors declare no conflict of interests.

Research involving human participants and/or animals

This article does not contain any studies with human participants performed by any of the authors.

Informed consent

The study was conducted in conformity with the regulations on data management of the Regional Health Authority of Abruzzo and with the Italian Law on privacy (Art. 20-21 DL 196/2003) published on the Official Journal n. 190 of August 14, 2004. Data were encrypted prior to the analysis at the regional statistical office, where each patient was assigned a unique identifier. This identifier eliminated the possibility to trace the patient's identity. Administrative data do not need a specific written informed consent.

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