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Dual Diagnosis Patients First Admitted to a Psychiatric Ward for Acute Psychiatric Patients: 2-Year Period 2003–2004 versus 2013–2014

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Additional information is available at the end of the chapter

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Abstract

Dual diagnosis (DD) is the coexistence of severe mental illness (SMI) and substance use disorder (SUD). The increase of DD observed in recent years has important implications for mental health services organization. The aim of this study is to assess the prevalence and features of DD over a decade, comparing the periods 2003–2004 and 2013–2014. We performed a retrospective study retrieving sociodemographic and clinical data from the medical records of patients at their first admission to the Psychiatric Ward of University Hospital “Maggiore della Carità” in Novara, Italy. Patients with SMI and comorbid SUD (SMI-SUD) and patients with SMI without comorbidity (SMI) were compared in the two periods, 2003–2004 versus 2013–2014. SMI-SUD patients in both 2-year periods were more likely to be male, younger, unemployed, living with parents (or alone, for the 2013–2014 period) rather than with a family of their own, and single (or divorced, in 2003–2004). The 2003–2004 patients were more frequently diagnosed with a personality disorder, whereas the 2013–2014 patients had mixed diagnoses. We have found differences in the possible predictors of substance abuse in the two periods as well: in both periods, male gender was associated with an increased risk of DD, whereas age >61 years was associated with decreased risk. Only in the first period (2003–2004) was having a university degree associated with a decreased risk of DD, whereas the diagnosis of a personality disorder was associated with an increased risk of DD; on the contrary, in the second period (2013–2014), living in a protective environment was associated with a decreased risk of DD. The identification of changes in the prevalence of first admission DD patients and their clinical and sociodemographic features may help to highlight an evolving pattern of substance use and to identify possible risk factors that may be the target of prevention and treatment approaches.

Keywords: dual diagnosis, first admission, inpatients, substance use disorder, addiction

1. Introduction

1.1. Addiction

The pathway that leads to addiction is characterized by specific steps: the initiation of substance use, the established use, and, finally, the development of addiction. Several factors are involved in this process, including genetic and environmental ones. The availability of the substance may play a role in each stage in the development of addiction, whereas the accessibility of a substance seems relatively more important in the initiation of substance use [1]. Evidence from family, adoption, and twin studies converges on the relevance of genetic factors in the development of addiction according to a complex model of inheritance and clinical and genetic heterogeneity [2–10]. The role of genetic, sociocultural, biological, and other factors, including drug availability, peer influence, social support, and type and psychoactive properties of the drug, varies across the lifespan and in different stages of the addiction process. Briefly, it seems that environmental factors (such as peer influences and family environment) have a stronger effect on exposure and initial pattern of use, whereas genetic factors play a major role in the transition from regular use to the development of addiction [11,12]. Moreover, it should not be overlooked that genetic factors underlying addiction may overlap to various degrees with those underlying other psychiatric disorders. For instance, studies focusing on the role of the COMT gene polymorphism in the genetic predisposition to mental disorders [including severe mental illness (SMI), such as schizophrenia, bipolar disorder, obsessive-compulsive disorder, anorexia nervosa, and attention-deficit hyperactivity disorder] have found that the same polymorphism may be involved in the pathogenesis of addiction and substance use disorder (SUD). Probably COMT increases susceptibility to mental disorders in general, whereas other genetic or environmental factors may influence the development of specific disorders, including SUD [13].

1.2. Dual diagnosis (DD)

The World Health Organization defines DD as the co-occurrence, in the same person, of a severe mental health condition (SMI) with a drug abuse or dependence disorder (SUD).

In 1993, First and Gladis [14] proposed to classify DD patients as follows: (1) main psychiatric disorder and secondary drug dependence, (2) main SUD and secondary psychiatric disorder, and (3) main psychiatric disorder and drug dependence. Discriminating among these three options may be particularly challenging in clinical settings, where it can be hard to understand whether it is the SMI that induced drug consumption or the drug consumption that induced or worsened the SMI.

Consistent with the first class proposed by First and Gladis (psychiatric disorder first and subsequent drug dependence), the study of the psychological attitudes in addiction disorders has led to the self-medication hypothesis (SMH) proposed by Khantzian [15]. The SMH primarily derives from clinical observations and posits substance dependence as a compensatory means to modulate emotions and aimed at self-soothing in response to distressing psychological states. According to this hypothesis, drugs would become addicting because of their power to alleviate, counteract, or modulate psychological suffering; there would also be a considerable degree of specificity in a person's choice of drugs because of unique psychological and physiological effects [15]. Hence, emotional states and distress, as well as expectancy of positive affective modifications, would be associated with substance use or relapse in people with SUD [16]. The SMH has received a variable empirical support, particularly as far as drug specificity is concerned [17]. The choice of type of drug according to the SMH is sometimes counterintuitive. For instance, while DD bipolar patients seem to use substances to maintain a euphoric state or soothe a depressive suffering, depressed patients, who might be expected to choose stimulants as well, often turn to depressants such as alcohol. Schizophrenic patients are often strongly nicotine addicted, and their heavy smoking may be an attempt to alleviate cognitive deficits and to reduce extrapyramidal side effects induced by antipsychotic medication, through the effect of nicotine on dopaminergic activity [18]. Briefly, the choice of a particular type of substance could depend on the symptoms that patients wish to relieve, as well as on substance availability, and on patients' basic personality traits [19]. Moreover, clinical experience in the last years has highlighted clear and ongoing changes in the choice of type of drug [from heroin and lysergic acid diethylamide (LSD) to the current so-called "smart drugs", vegetable or synthetic origin compounds with psychoactive effects that are not yet considered illegal]. For instance, changes in the prevalence of commonly used substances in people with DD have been discussed in two studies that estimated the prevalence of SUD in patients with SMI in Philadelphia [20,21]. These studies found a shift from cannabis being the most commonly used drug to cocaine and associated changes in demographic correlates. Although these data date back to more than 20 years ago, they highlight the changing pattern of SUD [22,23].

Consistent with these results, in Italy, in the last two decades, significant changes in the main drug used by patients attending addiction services have been noticed. Although the use of alcohol has remained relatively stable, there has been a significant decrease in the use of heroin and an opposite tendency regarding the use of cocaine; moreover, the use of "smart drugs" and polyabuse (i.e., the abuse of several substances simultaneously) has increased in an alarming way. The reasons underlying the use of new drugs may be different from those guiding the first heroin addicts. For instance, ecstasy has been generally chosen by adolescents and young adults for its entactogenic properties (the stimulation and enhancement of feelings of empathy, love, and presumed emotional closeness to others) [24,25].

As already suggested, personality may play a relevant role in the choice of the drug and expectations concerning the desired effect of the drug itself. The motivation leading to drug abuse may span from alleviating boredom and active search for pleasure, improvement of attention and performance, to reducing tension and decreasing mental illness symptoms.

Hence, personality traits should be assessed to improve the understanding of the complex relation between patients, drugs, and environment [26].

According to Cloninger's model [27,28], personality consists of temperament and character traits. Temperament is defined as a biological disposition reflected by relatively stable features related to mood, attitudes towards the environment, and reactivity to external and internal stimuli, including variability and intensity in emotional dispositions [29,30], whereas character is based on mechanisms that are developed through life experience. Although only a few studies have investigated personality dimensions in DD patients with the model developed by Cloninger, most of these found an association with high scores on the temperamental dimension of "novelty seeking" [31,32] as well as with high scores on "harm avoidance" [31]. According to Cloninger's descriptions of these temperament dimensions, we may expect patients with high scores on "novelty seeking" using drugs to search pleasure and to escape boredom and patients with high scores on "harm avoidance" using substances to achieve relief from tension and unpleasant or painful emotional states [33].

1.3. Epidemiology and clinical features of DD patients

Comorbidity between drug and/or alcohol dependence and a SMI is highly prevalent, and clinicians should be aware that patients asking for a psychiatric advice are likely to conceal their problems related to use and/or abuse of substances, unless specifically asked about them [34,35], possibly leading to an underestimation of DD. Recent studies report that the prevalence of DD in patients attending mental health service and substance misuse services ranges between 55% and 85% [36,37], and an association between SUD and mood and anxiety disorders has been supported by epidemiological and clinical studies [38–41]. In 2014, in the United States, among adults with a past year SUD, 39.1% had a comorbid psychiatric disorder, whereas, among adults without a past year SUD, only 16.2% had a SMI [42]. Moreover, epidemiological studies consistently describe a gender difference in DD patients as far as diagnosis is concerned; overall, DD is more common in males, and male patients usually suffer from psychotic and bipolar disorders, whereas depression and anxiety are more represented in women who, on the contrary, represent a smaller percentage of DD samples [43,44].

Many longitudinal or cross-sectional studies tried to identify recurrent and significant sociodemographic features and pattern/type of abuse typical of DD patients. The literature suggests that DD patients, compared to those with SMI but no comorbidity with SUD, are usually younger, males, with a lower level of education, often unemployed, still living with parents rather than with a family of their own, and with an overall lower social functioning [45–47]. DD is related to worst compliance to treatments, higher relapse rates and health services usage, more functional disability, and cognitive as well as psychological, physical, and social impairment [37,43,47,48]. Overall, DD patients show a poorer quality of life and reduced life expectancy [49] compared with patients with SMI or patients with SUD with no other comorbid psychiatric disorder.

The treatment of DD patients is particularly challenging because of the poor compliance and significant deterioration in social functioning that often occurs in these patients. They are more likely to suffer from comorbid medical conditions; as described above, they may experience

more difficulties in family relationships and troubles maintaining a stable job and financial situation; moreover, they may have legal problems related to the behavioral consequences of substance use and/or to the illegal attempts to obtain the substance. Compared to schizophrenia patients who do not use alcohol and drugs, patients with DD tend to have an earlier age of onset, more frequent and sometimes longer periods of hospitalization, more severe depressive and psychotic symptoms, more episodes of suicidal and violent behavior, more legal and financial problems, and higher mortality risk [50–56]. Likewise, bipolar patients with DD have 6.4-fold risk for violent crime compared with bipolar patients without comorbidity [57,58]. Overall, because they are less likely to adhere to their medication regimen, patients with DD also are at an increased risk of relapse and re-hospitalization [59,60]. However, even in those who do adhere to their medication, commonly abused substances can trigger or exacerbate psychiatric symptoms, eventually leading to relapse and need for inpatient treatment.

Although, in the last years, several studies have been performed about early detection and treatment of DD [59–64], there is a dearth of studies focused on the changes in the prevalence of DD in psychiatric inpatients [65]. A study about comorbidity with SUD in psychiatric inpatients performed in Spain [66] found 24.9% of inpatients having a SUD as well as another psychiatric disorder. Consistent with the literature about DD, a statistically significant predominance of men was found in the DD group together with younger age at the time of their first psychiatric admission; the most common diagnoses in this group were schizophrenia or related psychoses, although patients with SMI only had mostly affective disorders. As described above for preferred substance of abuse, the most used was alcohol followed by cannabis and cocaine.

Another interesting study assessing the trends in the incidence and demographic and clinical correlates of DD among patients whose first psychiatric hospitalization occurred between 1996 and 2010 was performed in Israel by Ponizovsky et al. in 2015 [67]. Based on the literature and their clinical experience, they hypothesized an increase of the proportion of DD among all first psychiatric hospitalizations during the study period due to the increasing prevalence of substance-related disorders in the general population, an increased vulnerability to DD on behalf of specific population groups (e.g., new immigrants) [68–70], and, lastly, higher DD rates in involuntarily hospitalized patients because they may be more likely to show episodes of suicidal and violent behavior [52] compared to voluntarily admitted patients. Over the study period, DD with drugs decreased from 1996 to 2010, whereas DD with alcohol and DD with both drugs and alcohol increased. The changing pattern of DD over time was supported as well as most findings concerning the sociodemographic features of DD patients reported in the literature. The positive predictors of DD with alcohol were male gender, previous suicide attempt, compulsory hospitalizations, and marital status. DD with alcohol was found mainly in immigrants, whereas DD with drugs was more common in the native population.

1.4. Challenges and perspectives in research

Treatment of DD patients requires a thorough understanding of both mental illness and addiction and the consequent integration of the traditional treatment approaches in both the mental health and addiction treatment fields [71].

In the research field, a complicating issue for DD studies is that they may focus on different populations: the general public, the population of subjects referring to psychiatric services, and the population of people currently treated by addiction services [72]. This diversity affecting the research field may be a concrete, challenging reality from a clinical standpoint. In Italy, this is particularly important because the standard practice for patients with comorbid psychiatric disorders and SUD is a parallel treatment. In our country, mental health and addiction facilities have different institutional cultures, etiological concepts, administrative arrangements, screening, and treatment approaches [73]. The problematic issues of such treatment approach include possible flaws in communication, collaboration, and linkage, which might significantly hinder or complicate comorbidity service delivery [74,75].

Even if it is clearly a changing and growing problem, the number of studies on DD prevalence in patients admitted to psychiatric wards in general hospitals in Italy is still scant. A recent study [76] has focused on differences in the length of stay in first-hospitalization schizophrenic patients with and without comorbid SUD and found that the first showed poorer symptom improvement and required longer stays than the latter. The flaws of communication and linkage between psychiatric and addiction services emerged from the study by Preti et al. [77], who reported that only approximately 30% of patients with SUD discharged from acute psychiatric inpatient facilities were referred to drug addiction services. Other issues that have been investigated in this field include SUD in emergency room settings [78], gender differences in DD patients [65], and attempts to understand whether SUD follows or pre-dates the psychiatric diagnosis [79,80].

Considering these premises, the aim of our study was to describe the sociodemographic and clinical features of DD patients at their first admission to the Psychiatric Ward of University Hospital “Maggiore della Carità” in Novara, Italy. With more detail, we collected data about all patients admitted for the first time during the 2-year periods 2003–2004 and 2013–2014 to (1) assess the extent of comorbidity with drug abuse in a sample of patients at their first admission to a psychiatric ward in a general hospital in Italy; (2) investigate whether there are differences between inpatients with and without comorbid SUD, focusing on sociodemographic, clinical, and other background variables in both periods; (3) investigate the possible differences between patients with comorbid SUD in the two 2-year periods; and (4) identify the possible predictors of comorbidity with SUD and their changes over a decade.

2. Methods

We performed a retrospective study reviewing the clinical charts of patients at their first admission to the Psychiatric Ward of University Hospital “Maggiore della Carità” in Novara,

Italy. We assessed two 2-year periods: 2003–2004 and 2013–2014. We excluded the records of patients with a diagnosis at discharge of SUD with no comorbid psychiatric disorder. Because our interest was to focus on DD, we collected data about patients with comorbid psychiatric and SUD diagnosis (later on described as SMI-SUD) and about psychiatric patients without comorbid SUD (SMI).

The following information was retrieved from the clinical charts: (1) sociodemographic data, including age, sex, education, occupational status, living accommodation, marital status, and legal problems and (2) clinical and psychopathological history, information concerning drug use, history of self-harm (including suicidal and parasuicidal behaviors), and history of aggressive behaviors and acting out.

Psychiatric diagnoses were made during the hospital stay by experienced psychiatrists with the aid of the Structured Clinical Interview I [81] and II [82] for Axis I and Axis II disorders, respectively. According to the International Classification of Diseases [83], diagnoses were the following: schizophrenia and other psychoses, affective disorders, anxiety disorders, and personality disorders; disturbance of conduct, mental retardation, eating disorders, acute stress reaction, and adaptation reaction were grouped as “other diagnoses”.

Information about the use of psychotropic drugs was collected by the treating psychiatrist during inpatient treatment, including age at first use and type of substance (alcohol, psychiatric drugs, cannabis, heroin, and cocaine; methamphetamine, ketamine, phencyclidine, LSD, butyl nitrite, amyl nitrite, and γ -hydroxybutyric acid were grouped together as “other drugs”). As for diagnosis, these data were then gathered for research purposes from clinical charts. The research project was approved by the Institutional Review Board of Università del Piemonte Orientale.

Statistical analyses were performed using STATA 11 (Stata Corp., College Station, TX, 2011). Initial descriptive statistics included the χ^2 test to evaluate the differences in proportions between groups (SMI-SUD vs SMI patients in the two periods). Then, a multivariate analysis was performed using a logistic regression to assess the potential predictors of substance abuse. The covariates included in the final model were selected using a stepwise forward selection process, with a univariate $p < 0.25$ as the main criterion [84]. Results are expressed as odds ratio (OR) with 95% confidence interval (CI). A two-tailed $p < 0.05$ was considered significant for all analyses.

3. Results

Patients first admitted to our psychiatric ward and matching the inclusion criteria described above were 227 in 2003–2004 and 257 in 2013–2014, respectively. The percentage of SMI-SUD patients was 25.1% in 2003–2004 and 32.7% in 2013–2014.

We divided patients in the following age categories: <18 , 19–40, 41–60, and ≥ 61 years. In 2003–2004, SMI and SMI-SUD patients were 1.8% and 3.5% for <18 years, 42.9% and 56.1% for 19–40 years, 31.2% and 36.8% for 41–60 years, and 24.1% and 3.5% for ≥ 61 years, respectively. In

2013–2014, SMI and SMI-SUD patients were 2.9% and 7.1% for <18 years, 31.8% and 54.8% for 19–40 years, 38.7% and 33.3% for 41–60 years, and 26.6% and 4.8% for ≥61 years, respectively. Differences between SMI-SUD and SMI patients in age distribution were statistically significant in both 2-year periods, and patients in the SMI-SUD group were more frequently in the age category 19–40 years; moreover, in 2013–2014, this difference was found also in the age category <18 years.

Table 1 reports data about sociodemographic features in the 2003–2004 and 2013–2014 groups, further subdivided according to the presence or absence of comorbid SUD. The main statistically significant differences between SMI and SMI-SUD patients included gender, occupational status, and educational level. SMI-SUD patients compared to SMI patients were more frequently males (70.2% vs 39.4% in 2003–2004 and 70.2% vs 36.6% in 2013–2014) and unemployed (33.3% vs 15.0% in 2003–2004 and 41.3% vs 22.5% in 2013–2014) in both 2-year periods. Furthermore, in 2013–2014, a higher percentage of students (10.0% vs 6.5%) and lower educational level (junior high school; 63.0% vs 37.3%) were found in SMI-SUD patients compared to SMI.

	2003–2004 (<i>n</i> = 227)		2013–2014 (<i>n</i> = 257)		<i>p</i> *
	SMI, % (<i>n</i>)	SMI-SUD, % (<i>n</i>)	SMI, % (<i>n</i>)	SMI-SUD, % (<i>n</i>)	
Gender					≤0.05
Male	39.4 (67)	70.2 (40)	36.6 (63)	70.2 (59)	
Female	60.6 (103)	29.8 (17)	63.4 (109)	29.8 (25)	
Nationality					0.209
Italian	94.1 (160)	98.3 (56)	86.7 (150)	82.1 (69)	
Foreign	5.9 (10)	1.8 (1)	13.3 (23)	17.9 (15)	
Educational level					0.179
Primary school	28.8 (49)	28.1 (16)	16.9 (28)	13.6 (11)	
Junior high school	38.2 (65)	50.9 (29)	37.3 (62)	63.0 (51)	
High school	24.7 (42)	19.3 (11)	37.9 (63)	18.5 (15)	
University degree	8.2 (14)	1.8 (1)	7.8 (13)	4.9 (4)	
Occupational status					≤0.05
Employed	38.1 (61)	48.1 (26)	31.4 (53)	33.7 (27)	
Unemployed	15.0 (24)	33.3 (18)	22.5 (38)	41.3 (33)	
Student	0.0 (0)	0.0 (0)	6.5 (11)	10.0 (8)	
Disabled/retired	25.6 (41)	7.4 (4)	29.6 (50)	10.0 (8)	
Other	21.3 (34)	11.1 (6)	10.1 (17)	5.0 (4)	

Table 1. Sociodemographic features of patients in 2003–2004 and 2013–2014. A comparison of the subgroups of patients, subdivided according to the presence or absence of comorbid SUD.

Table 2 describes the living accommodation and family features of patients in 2003–2004 and 2013–2014 and the comparison of the subgroups of patients, subdivided according to the presence or absence of comorbid SUD. The main statistically significant differences between SMI and SMI-SUD patients included living accommodation and marital status in both 2-year periods and having kids in 2013–2014. SMI-SUD patients compared to SMI patients lived more frequently with their family of origin (33.9% vs 19.2% in 2003–2004 and 33.8% vs 21.2% in 2013–2014) rather than with a family of their own, and they were more frequently single (48.2% vs 41.3% in 2003–2004 and 60.2% vs 33.5% in 2013–2014) or divorced in 2003–2004 (28.6% vs 12%). Moreover, in 2013–2014, SMI-SUD patients more frequently had no kids compared to SMI patients.

	2003–2004 (<i>n</i> = 227)		<i>p</i> *	2013–2014 (<i>n</i> = 257)		<i>p</i> *
	SMI, % (<i>n</i>)	SMI-SUD, % (<i>n</i>)		SMI, % (<i>n</i>)	SMI-SUD, % (<i>n</i>)	
Accommodation			≤0.05			≤0.05
Alone	25.8 (43)	23.2 (13)		18.6 (30)	27.3 (21)	
With parents	19.2 (32)	33.9 (19)		21.1 (34)	33.8 (26)	
Own family	49.1 (82)	28.6 (16)		49.1 (79)	29.9 (19)	
Therapeutic community	3.0 (5)	3.6 (2)		7.5 (12)	6.5 (5)	
Other	3.0 (5)	10.7 (6)		3.7 (6)	2.6 (2)	
Marital status			≤0.05			≤0.05
Married	38.3 (64)	21.4 (12)		44.1 (75)	22.9 (19)	
Single	41.3 (69)	48.2 (27)		33.5 (57)	60.2 (50)	
Widowed	8.4 (14)	1.8 (1)		6.5 (11)	3.6 (3)	
Divorced	12.0 (20)	28.6 (16)		15.9 (27)	13.2 (11)	
Siblings			0.412			0.112
No	22.9 (39)	31.6 (18)		20.0 (31)	29.9 (23)	
1	33.5 (57)	31.6 (18)		38.1 (59)	28.2 (22)	
≥2	43.5 (74)	36.8 (21)		41.9 (65)	56.4 (44)	
Children			0.277			≤0.05
No	47.1 (80)	50.9 (29)		35.6 (58)	63.3 (50)	
1–2	40.0 (68)	43.9 (25)		57.7 (4)	32.9 (26)	
≥3	12.9 (22)	5.3 (3)		6.8 (11)	3.8 (3)	

Table 2. Living accommodation and family features of patients in 2003–2004 and 2013–2014. A comparison of the subgroups of patients subdivided according to the presence or absence of comorbid SUD.

Family problems were reported as significantly more common by SMI-SUD patients in the years 2003–2004 than in SMI patients (21.1% vs 8.2 %, $p=0.009$), although no statistically significant difference was found between the two groups in the years 2013–2014 (47.9% vs 44.0%, $p=0.588$). Similarly, patients' parents were divorced in a significantly higher percentage of SMI-SUD patients than in SMI patients in the years 2003–2004 (7.0% vs 1.8%, $p=0.047$), although no significant difference was found in the two groups for this variable in the years 2013–2014 (84.2% vs 76.9%, $p=0.604$).

	2003–2004 ($n = 227$)			2013–2014 ($n = 257$)		
	SMI, % (n)	SMI-SUD, % (n)	p^*	SMI, % (n)	SMI-SUD, % (n)	p^*
Diagnosis			≤ 0.05			≤ 0.05
Affective disorders	24.1 (41)	10.5 (6)		17.9 (31)	4.8 (4)	
Schizophrenia/psychosis	25.3 (43)	7.0 (4)		22.5 (39)	26.2 (22)	
Personality disorders	23.5 (40)	52.6 (30)		19.1 (33)	23.8 (20)	
Anxiety disorders	7.6 (13)	0.0 (0)		30.1 (52)	22.6 (19)	
Other	19.4 (33)	29.8 (17)		10.4 (18)	22.6 (19)	
Self-injury behaviors	32.9 (56)	26.3 (15)	0.350	35.3 (60)	30.0 (24)	0.408
Acts of harm	4.7 (8)	12.3 (7)	≤ 0.05	11.8 (20)	26.3 (21)	≤ 0.05
Imprisonment	1.8 (3)	8.8 (5)	≤ 0.05	2.9 (5)	7.4 (6)	0.104

Table 3. Clinical features of patients in 2003–2004 and 2013–2014. Comparison of the subgroups of patients subdivided according to the presence or absence of comorbid SUD.

Table 3 reports the clinical and legal features of patients in 2003–2004 and 2013–2014, and the results of the comparison of the subgroups of patients, subdivided according to the presence or absence of comorbid SUD. The main statistically significant differences between SMI and SMI-SUD patients included diagnosis and acts of harm in both 2-year periods and imprisonment in 2003–2004. In 2003–2004, SMI-SUD patients compared to SMI patients were more frequently diagnosed with a personality disorder (52.6% vs 23.5%). In 2013–2014, the same difference was found, albeit less striking (23.8% vs 19.1%), together with a higher percentage of schizophrenia and psychosis in SMI-SUD patients compared to SMI patients (26.2% vs 22.5%). Acts of harm were more common in SMI-SUD patients than in SMI ones in both periods (12.3% vs 4.7% in 2003–2004 and 26.3% vs 11.8% in 2013–2014), whereas imprisonment was significantly more common in SMI-SUD patients only in 2003–2004 (8.8% vs 1.8%).

The following variables were included in the multivariate analysis: gender, nationality, educational level, occupation, marital status, living accommodation, family problems, acts of harm, imprisonment, age at admission, and diagnosis. The statistically significant results of the multivariate analysis performed to investigate the possible predictors of comorbidity with SUD are described in **Table 4**.

In both 2-year periods, female gender and age >61 years were associated with comorbidity with SUD with an OR <1 (adjusted OR 0.24, 95% CI 0.09–0.64, $p=0.004$ vs adjusted OR 0.15, 95% CI 0.06–0.39, $p<0.001$; adjusted OR 0.92, 95% CI 0.01–0.81, $p=0.031$ vs adjusted OR 0.03, 95% CI 0.01–0.31, $p=0.003$).

In 2003–2004, having a university degree was associated with a decreased risk of comorbid SUD (adjusted OR 0.04, 95% CI 0.01–0.64, $p=0.023$), whereas having a diagnosis of personality disorder was associated with an increased risk of SMI-SUD comorbidity (adjusted OR 3.51, 95% CI 1.05–11.77, $p=0.042$).

In 2013–2014, living in therapeutic rehabilitation center (compared to living alone) was associated with a decreased risk of SMI-SUD comorbidity (adjusted OR 0.02, 95% CI 0.01–0.41, $p=0.011$).

	2003–2004		2013–2014	
	OR (95% CI)	p	OR (95% CI)	p
Gender	0.24 (0.09–0.64)	≤ 0.05	0.15 (0.06–0.39)	≤ 0.05
Education level				
Primary school	Ref.	–	Ref.	–
Junior high school	0.46 (0.12–1.69)	0.239	0.63 (0.14–2.81)	0.546
High school	0.40 (0.10–1.64)	0.205	0.19 (0.04–1.03)	0.054
University degree	0.04 (0.01–0.64)	≤ 0.05	0.65 (0.08–5.02)	0.675
Accommodation status				
Alone	Ref.	–	Ref.	–
With parents	3.63 (0.92–14.27)	0.065	0.87 (0.23–3.26)	0.837
Own family	1.11 (0.17–7.14)	0.916	0.49 (0.12–1.98)	0.318
Therapeutic community	0.45 (0.04–5.84)	0.544	0.02 (0.01–0.41)	≤ 0.05
Other	5.40 (0.56–52.40)	0.146	0.63 (0.07–5.91)	0.691
Age at admission				
19–40 years old	Ref.	–	Ref.	–
<18 years old	1.39 (0.15–12.88)	0.771	0.60 (0.07–5.16)	0.644
41–60 years old	0.90 (0.30–2.74)	0.851	0.66 (0.23–1.87)	0.437
≥ 61 years old	0.92 (0.01–0.81)	≤ 0.05	0.03 (0.01–0.31)	≤ 0.05
Disease				
Affective disorders	Ref.	–	Ref.	–
Psychosis/schizophrenia	0.29 (0.06–1.38)	0.120	0.77 (0.16–3.68)	0.739
Personality disorders	3.51 (1.05–11.77)	≤ 0.05	2.21 (0.44–11.01)	0.334
Anxiety disorders	–	–	0.96 (0.22–4.18)	0.961

	2003–2004	2013–2014		
	OR (95% CI)	p	OR (95% CI)	p
Other	3.94 (0.99–15.69)	0.052	3.11 (0.56–17.11)	0.192

Table 4. Multivariate analysis for the assessment of potential predictors of comorbid SUD in psychiatric patients in 2003–2004 and 2013–2014.

As far as substance used is concerned, the assessment of the SMI-SUD sample in 2003–2004 and 2013–2014 highlighted a decrease of alcohol (78.9% of SMI-SUD patients in 2003–2004 vs 64.6% of SMI-SUD patients in 2013–2014) and heroin consumption (19.2% of SMI-SUD patients in 2003–2004 vs 14.6% of SMI-SUD patients in 2013–2014). Polyabuse did not seem to change after 10 years (42.1% vs 42.6%). On the contrary, we found an increase of the use of medication, cannabinoids, cocaine, and other drugs (0.05% vs 17.0%, 33.3% vs 57.3%, 28.0% vs 36.5%, and 0.05% vs 17.0%, respectively).

4. Discussion

The percentage of first admissions for SMI-SUD increased from the first to the second 2-year period considered (2003–2004 vs 2013–2014), being 25.1% and 32.7%, respectively. According to the existing literature, DD is a growing phenomenon. Studies performed in similar settings report a percentage of DD patients ranging from 24% to 51% [85,86]. In Italy, data from mental health departments and from addiction services describe a prevalence of psychiatric disorders with comorbid SUD ranging from 4% to 42%, respectively [87–91].

4.1. Sociodemographic and family features

Statistically significant differences were found in both periods between SMI and SMI-SUD patients as far as gender, age at admission, occupational status, marital status, and living accommodation are concerned. With more detail, SMI-SUD patients in both 2-year periods were more likely to be male, younger, unemployed, living with parents (or alone, for the 2013–2014 period) rather than with a family of their own, and single (or divorced, in 2003–2004). All these results are in line with similar reports from most other studies in this field. Regarding marital status and living accommodation, DD patients seem to experience relational problems in their families and have difficulties either creating or maintaining lasting relationships. Besides, comorbidity of psychiatric disorders and SUD may impact on relationships in and of itself. In a previous study [65], we found that this impact was particularly meaningful in female patients. Some differences between SMI and SMI-SUD patients were not shared between the two 2-year periods. For instance, in the 2-year period 2013–2014, SMI-SUD patients were more likely than SMI ones to have a junior high school degree rather than a high school one or a university degree and to have no kids [92]. On the contrary, family problems and parents' divorce were reported as significantly more common by SMI-SUD patients in the years 2003–2004 than in SMI patients. We may suppose an evolving pattern of substance seeking through the years; it may be that the motivation leading to addiction is shifting in most

cases from relief of psychological and emotional distress to active search for pleasure and entactogenic effects. This hypothesis is consistent with the widespread changes in the choice of the main substance of abuse.

Overall, consistent with the literature [91,93], what emerges from these data is that SMI-SUD patients are more likely to have a poorer sociorelational functioning and achievement, albeit our results do not allow to discriminate which came first, whether comorbidity or a poorer performance, which are likely to be strictly intertwined.

4.2. Clinical features

In both 2-year periods examined, psychiatric diagnosis was significantly different between SMI-SUD and SMI patients. This difference is striking in 2003–2004 patients: SMI-SUD patients are more frequently affected by personality disorders and “other” diagnoses (including disturbance of conduct, mental retardation, eating disorders, acute stress reaction, and adaptation reaction), whereas, in 2013–2014, there is still a difference as far as personality disorders is concerned, albeit less striking, together with differences in “other” diagnoses and schizophrenia, which is more frequent in SMI-SUD than in SMI patients. These results are partially consistent with the existing literature [37,94–97] especially because of the underrepresentation of mood disorders in the SMI-SUD group of patients. On the contrary, this change in diagnosis is interesting, as it may suggest a different pattern of substance use after 10 years. It seems that schizophrenic and psychotic patients are more likely, in recent years, to use substances, but it is not clear whether this change suggests a trend towards more self-medication seeking on behalf of these patients or rather a greater potential of substances to induce long-lasting psychotic symptoms. It should be considered that the type of substances used have changed a lot over a decade; cannabinoid, ecstasy, and new drugs are studied for their potential of inducing psychosis, and in clinical settings, it is quite common to observe long-lasting, medication-resistant psychotic symptoms in young patients who have taken one of the several new synthetic drugs. Besides, these are difficult or impossible to identify and detect with standard laboratory methods.

As far as acts of harm are concerned, these were significantly more common in SMI-SUD patients than in SMI ones, in both 2-year periods, and overall, the percentage of acts of harm was higher in 2013–2014. Several studies have focused on the relation between substance abuse and aggressive behaviors; the use of substances may result in poor insight, neurocognitive impairments, hallucinations, impulsivity, as well as other emotional or physiological problems that may underlie aggressiveness. Moreover, some studies report that SMI-SUD patients are more likely to have a criminal history and legal problems than SMI ones [36]. Violent behaviors and substance abuse may be entangled because of the close relationship between drug distribution and the criminal system; moreover, the constant need of money to get the drug may lead patients to aggressive acts to obtain it [98]. Despite the almost 2-fold increase in the percentage of acts of harm from 2003–2004 to 2013–2014, only in 2003–2004 was the frequency of imprisonment significantly different in SMI-SUD and SMI patients, being higher in the first.

As far as substance used is concerned, our findings are consistent with the literature and with clinical observations, especially regarding the increased use of cannabinoids, cocaine, and “other” drugs on the one hand and the decreased consumption of heroin on the other. Surprisingly, we found polyabuse to be relatively stable even after 10 years.

4.3. Multivariate analysis

In both 2-year periods, female gender and being ≥ 61 years old appear to be associated with a decreased risk of SMI-SUD comorbidity. Both results are consistent with the existing literature and could be expected according to clinical experience [66,85–87,91].

In the 2-year period 2003–2004, having a university degree was associated with a decreased risk of comorbid SMI-SUD, whereas having a diagnosis of personality disorder was associated with an increased risk of comorbid SMI-SUD, but 10 years later we found educational level and diagnosis having no impact on comorbidity. As already described above, this may suggest possible changes in the pattern of SUD as far as problematic family issues are concerned; notwithstanding the fact that, in 2013–2014, educational level and diagnosis no longer represented risk factors, it would have been interesting to assess whether individuals with different cultural levels as assessed by schooling or with different diagnosis share the same pathways towards SUD and similar choices regarding type of substance and use. As far as educational level is concerned, in a recent study, we found that, although having a university degree was associated with a decreased risk of DD for males, it was associated with an increased risk of DD in females [65]. We hypothesized a different pattern of social functioning and performance in male and female SMI-SUD patients [44] and that males and females may access substances via different pathways and choose different types of substances as well [99–102], with a variable impact on their lives.

As far as diagnosis is concerned, the same study mentioned above, which assessed the period 2003–2012, found affective and “other” disorders associated with an increased risk of comorbid SUD, compared to personality disorders, which according to Baigent [94] would be more likely than Axis I disorders to be associated with chronic SUD. On the contrary, reports from the literature show mixed results about this issue, and recent studies suggest that the frequency of comorbid SUD is similar in schizophrenic psychoses and in personality disorders [37] and that primary mood and/or anxiety disorders are at high risk for comorbid SUD as well [96,97].

Last, in the 2-year period 2013–2014, we found that living in therapeutic rehabilitation centers was associated with a decreased risk (compared to living alone) of comorbidity with SUD. This result is encouraging and may support the effectiveness of such therapeutic settings in protecting patients from exposition and/or relapse into SUD.

5. Limitations

Some limitations should be underscored. The retrospective design and data gathering through clinical charts entail some limitations. Some information could not be retrieved, for example,

detailed descriptions of type of self-harm or aggressive behavior. Psychiatric diagnoses were grouped into broad categories (affective disorders, schizophrenia and other psychosis, personality disorders, anxiety disorders, and others), and we did not discriminate between bipolar and unipolar affective disorders. We did not include data about laboratory tests objectively detecting drugs; nonetheless, it has been suggested that a urine drug screening can only identify a small additional rate (5%) of substance users [52]. Although it would have been interesting to assess details about reason for “acute” inpatient psychiatric admission, in this study, we focused specifically on a “snapshot” of comorbidity in a psychiatric ward over a 10-year period. Last, we cannot exclude that our results might have been influenced by broader systemic differences in the treatment of the DD population across time. Anyway, in our country, in the study period, there have neither been relevant changes in treatment options available for DD patients, nor in the legal policies about drugs.

6. Conclusions

This study adds to the scant literature about this issue in our country, and the large sample size is a strength of this research. Both SMI and SUD are predictors of underachievement and failure in educational and occupational settings, difficulty facing family responsibilities, violent and abusing behaviors, poverty, legal problems, and scarce compliance to treatment [103]. Acute settings may be particularly appropriate for the development of targeted interventions [104], and the treatment of patients with comorbid psychiatric disorders and SUD should begin early during hospitalization [105].

Changes in the pathways leading to drug abuse and in the patterns of addiction should not be overlooked.

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