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ORIGINAL RESEARCH

Self-harm, somatic disorders and mortality in the 3 years following a hospitalisation in psychiatry in adolescents and young adults

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ABSTRACT

Background There is limited recent information regarding the risk of self-harm, somatic disorders and premature mortality following discharge from psychiatric hospital in young people.

Objective To measure these risks in young people discharged from a psychiatric hospital as compared with both non-affected controls and non-hospitalised affected controls.

Methods Data were extracted from the French national health records. Cases were compared with two control groups. Cases: all individuals aged 12–24 years, hospitalised in psychiatry in France in 2013–2014. Non-affected controls: matched for age and sex with cases, not hospitalised in psychiatry and no identification of a mental disorder in 2008–2014. Affected controls: unmatched youths identified with a mental disorder between 2008 and 2014, never hospitalised in psychiatry. Follow-up of 3 years. Logistic regression analyses were conducted with these confounding variables: age, sex, past hospitalisation for self-harm, past somatic disorder diagnosis.

Findings The studied population comprised 73 300 hospitalised patients (53.6% males), 219 900 non-affected controls and 9 683 affected controls. All rates and adjusted risks were increased in hospitalised patients versus both non-affected and affected controls regarding a subsequent hospitalisation for self-harm (HR=105.5, 95% CIs (89.5 to 124.4) and HR=1.5, 95% CI (1.4 to 1.6)), a somatic disorder diagnosis (HR=4.1, 95% CI (3.9–4.1) and HR=1.4, 95% CI (1.3–1.5)), all-cause mortality (HR=13.3, 95% CI (10.6–16.7) and HR=2.2, 95% CI (1.5–3.0)) and suicide (HR=9.2, 95% CI (4.3–19.8) and HR=1.7, 95% CI (1.0–2.9)).

Conclusions The first 3 years following psychiatric hospital admission of young people is a period of high risk for self-harm, somatic disorders and premature mortality.

Clinical implications Attention to these negative outcomes urgently needs to be incorporated in aftercare policies.

Key messages

► Previous studies have shown increased risks of self-harm, somatic disorders and premature mortality following discharge from psychiatric hospital. However, our knowledge is limited in young people. In this nationwide observational study, we found that 1 in 10 individuals aged 12- to 24-year-old will be hospitalized for a self-harming behaviour in the three years following discharge, 1 in 4 will present a somatic disorder, and 1 in 100 will die, mostly from suicide but also from natural causes. These findings highlight the urgent need for changes in the organization of the follow-up of young patients after a psychiatric hospitalization.

BACKGROUND

It is estimated that almost 1 billion people worldwide suffer from a mental disorder.[1] Mental disorders are also among the leading causes of disability globally,[2] with a huge cost at both individual and societal levels. While the burden conferred by mental disorders spans all age groups, it is maximal in 10–29 year olds.[2] The main mental disorders usually begin between childhood and young adulthood.[3] Moreover, studies have shown that a younger age at onset of mental disorders is associated with worse outcomes, including increased clinical severity and poorer social functioning in the long term.[3 4] Focusing on young people with a mental disorder is therefore of major importance.

Suicidal behaviour is strongly associated with mental disorders.[5–10] Around 5%–10% of patients with a major mental disorder will die from suicide[11–13] and 90% of people who died from suicide in high-income countries had suffered from a mental disorder.[14] In adolescents and young adults, suicide is the second leading cause of death worldwide[15] and intentional self-harm is very common.[16] Adolescents presenting or admitted to hospital for self-harm are in turn at increased risk of premature death from suicide but also from other causes including natural causes and accidents.[17 18] Mental disorders are indeed frequently comorbid with physical disorders, even at a young age,[19] and are associated with an increased risk of death from so-called 'natural causes'.[20] Therefore, self-harm, somatic disorders and premature mortality from various causes all contribute to the high burden of mental disorders.

Those hospitalised for a mental disorder present a particularly high risk of suicide.[6] The suicide risk

is notably augmented during the first week following admission and the first week following discharge.[21] In a meta-analysis of 100 studies/cohorts, Chung *et al*[22] estimated the risk of suicide following hospital discharge at 484/100 000 persons-year, the highest risk occurring during the first 3 months (0.3% of patients) and in those who had been hospitalised for suicidal ideas or after a suicidal act. Among mental disorders, the highest risk has been observed in those suffering from depressive or bipolar disorders, and schizophrenia.[23] Interestingly, a recent meta-analysis also confirmed an increased risk of natural death following discharge from a psychiatric facility.[20] Finally, the risk of re-admission for self-harm after an initial hospitalisation for mental disorder has been estimated at 6.5% within 1 year in a large cohort study in the UK.[24]

Our knowledge of the risk of self-harm, somatic disorders, premature death and suicide following discharge from psychiatric hospital in adolescents and young adults remains, however, limited. In the review mentioned above,[22] 13 studies (representing 20 cohorts) in adolescents (and none specifically in young adults) were identified for a total of less than 11 000 individuals and the largest sample reached around 3 000 patients recruited from a single hospital. Yet, sample size is critical when studying the risk of premature mortality and suicide as they are rare events in young people. Moreover, 8 of the 13 studies mentioned above were published more than 20 years ago. Increasing knowledge over the last years about the risk associated with discharge from psychiatric hospitals may have led to changes in clinical practices. However, these effects may have been counterbalanced by a reduction in psychiatric hospital beds in recent years in France and a limited investment in outpatient care for young people. New studies are, therefore, necessary to yield a more accurate picture of the situation. Finally, it is important to have a comparison group of patients with a mental disorder who have not been admitted for psychiatric hospital inpatient care. While hospitalised patients usually have more severe disorders than non-hospitalised patients, one question is whether care provided during psychiatric hospital admission and post-discharge follow-up procedures would result in a reduction of the studied risks at least to the level of non-hospitalised patients. While scientific knowledge has increased, the authors have the impression that this did not lead to sufficient organisational changes in France to mitigate the earlier pattern of findings.

OBJECTIVE

The aims of the study were: (1) To measure the rates of self-harm, somatic disorders, premature mortality and suicide in the 3 years following hospitalisation for mental disorder in 2013–2014 in a very large sample of adolescents and young adults aged 12–24 years. (2) To compare the risk of these four outcomes in this sample to a large sample of non-hospitalised young individuals matched for age and sex, and to a second sample of young people with a mental disorder but not hospitalised during this period. We hypothesised that the risk of these four outcomes would be increased in people hospitalised in psychiatry as compared with both non-hospitalised and non-affected controls, and with non-hospitalised affected controls.

METHODS

Study design

This was a nationwide retrospective observational cohort study based on data extracted from the French national health data system.

Database

We used exhaustive data from the French national health data system provided by the Système National des Données de Santé[25] (see online supplemental material).

All data were available from 1 January 2008 to 31 December 2017, at the exception of the causes of death available until 31 December 2015 only at the time of analyses.

Participants

Three groups of individuals were identified.

The hospitalised patient group (named hospitalised patients) comprised all individuals aged 12–25 years old hospitalised in psychiatry for a mental disorder in France between 1 January 2013 and 31 December 2014. They were identified from psychiatric hospital discharge abstracts with a main International Classification of Diseases-10th revision diagnostic code starting with F. The first hospitalisation for mental disorder during the period 2013–2014 was considered as the index hospitalisation. Patients who died during the index hospitalisation were excluded.

The main control group (non-affected controls) was then selected through a two-stage process. First, a 5% sample of the French 12–25 years old population recorded in the French national health data system was drawn. Inclusion criteria for this group included: no hospitalisation in psychiatry in 2008–2014; no principal or associated diagnosis of a mental disorder in medicine or surgery or psychiatry, or having received disability allowances for a psychiatric disorder, between 2008 and 2014; no psychotropic medication prescription between 2008 and 2014. Controls were then individually matched to hospitalised patients (1:3) according to age and sex. We considered that the control group was included in the study on 1 January 2013. As there were not enough controls aged 25 years old in the health system record, only patients aged 12–24 were retained in final analyses.

A second control group (affected controls) included patients aged 12–24 with a mental disorder but who had not been hospitalised in psychiatry. Inclusion criteria were: no hospitalisation in psychiatry in 2008–2014; a principal or associated diagnosis of a mental disorder (code Fxx) in medicine or surgery, and/or receipt of disability allowances for a psychiatric disorder, between 2008 and 2014; and/or a psychotropic medication prescription between 2008 and 2014.

For all individuals, we identified two periods: the background period spanned from 1 January 2008 to the index hospitalisation for mental disorder for hospitalised patients, or to 1 January 2013 for controls (therefore, a duration of 5–7 years); and the follow-up period starting from the index hospitalisation for hospitalised patients or from 1 January 2013 for controls with a fixed duration of 3 years for all participants (maximal date: 31 December 2017). For causes of death only, the follow-up period was limited to 31 December 2015 due to data availability, so a follow-up of 1–3 years.

Extracted data

Variables extracted from the database were: age (according to four classes: 12–15, 16–18, 19–21, 22–24 years), sex, all hospitalisations between 1 January 2008 and 31 December 2017 with their main and associated diagnostic codes (see online supplemental material).

Causes of death were classified as suicide, natural, accidental and other/unknown.

Outcomes

The four primary outcomes were rates during the follow-up period of (1) hospitalisation for self-harm, (2) hospitalisation with a somatic disorder diagnosis, (3) mortality from any cause and (4) mortality from suicide. Secondary outcomes were (1) risk factors for these four outcomes and (2) the rates of these outcomes per mental disorder diagnostic category.

Statistical analysis

Individual characteristics, somatic and psychiatric comorbidities and medication use are presented as proportions. Age groups were determined as quartiles of the age distribution in the hospitalised patients. Group comparisons were first performed using Pearson χ^2 tests or Fisher exact tests, as appropriate. Group comparisons were first conducted between hospitalised patient group and the first control group; then between the hospitalised patient group and the second control group in a similar manner.

Survival analyses were performed using a Cox proportional hazards regression model. We followed individuals until death or the end of the follow-up period, whichever came first (for all variables), in addition to hospitalisation for self-harm and hospitalisation with a somatic disorder diagnosis. Adjustment for confounding variables was then conducted. Confounding variables were age, sex, a past hospitalisation for self-harm and a past somatic disorder diagnosis. The results were reported as adjusted Hazard Ratios (HRs) and 95% Confidence Intervals (CIs).

Statistical significance was set at a p value of 0.05 for all analyses. SAS V.9.4 software was used for the data analyses.

FINDINGS

Individuals' characteristics

The hospitalised patient group comprised 73 300 individuals, the non-affected control group 219 900 individuals matched for age and sex (53.6% males), and the affected control group 9 683 individuals (51.6% males). Details about individuals' characteristics at time of inclusion are provided in table 1.

Regarding the hospitalised patient group, main mental disorders coded as the main diagnosis at time of the index hospitalisation were anxiety disorders, mood disorders (mainly depressive disorders) and schizophrenia, the three diagnoses representing 56.9% of cases. Moreover, 3.9% had an associated code of self-harm for the index hospitalisation.

During the 3-year follow-up, 57.6% among hospitalised patients were re-hospitalised with a mental disorder diagnosis versus 0.3% (p<0.0001) among the non-affected control group and 38.2% (p<0.0001) among the affected control group (table 2). For the hospitalised patients, the median number of re-hospitalisations for a mental disorder during the 3-year follow-up was 5; the median duration between the index hospitalisation and the first subsequent hospitalisation for mental disorders was 97 days.

Hospitalisation for self-harm during follow-up

During follow-up, the rates of hospitalisation for self-harm were higher in the hospitalised patient group (9.9%) than the non-affected (0.1%; p<0.0001) and affected (6.8%; p<0.0001)

Table 1 Individual's characteristics at the time of inclusion in 2013–2014 in adolescents and young adults hospitalised for a mental disorder, compared with the non-affected control group without a mental disorder and matched for age and sex, and with the affected control group with a mental disorder but not hospitalised in psychiatry

	Hospitalised patients (n=73 300)		Non-affected controls (n=219 900)			Affected controls (n=9 683)		
At index hospitalisation	n	%	n	%	P value	n	%	P value
Age group					1			<0.0001
12–15 years	16 113	22.0	48 339	22.0		1 987	20.5	
16–18 years	18 172	24.8	54 516	24.8		1 963	20.3	
19–21 years	18 818	25.7	56 454	25.7		3 419	35.3	
22–24 years	20 197	27.6	60 691	27.6		2 314	23.9	
Sex					1			0.0002
Male	39 271	53.6	117 813	53.6		4 996	51.6	
Female	34 029	46.4	102 087	46.4		4 687	48.4	
Background period (2008 to inclusion)								
Hospitalisation with a somatic disorder diag.	28 429	38.8	15 224	6.9	<0.0001	3 712	38.3	0.4
Hospitalisation with a mental disorder diag.	72 017	98.3	0	0	–	5 841	60.3	<0.0001
Hospitalisation for self-harm	9 164	12.5	134	0.06	<0.0001	982	10.1	<0.0001
Outpatient psychotropic medication prescription	48 943	66.8	0	0	–	6 312	65.2	0.002
Main mental disorder diagnosis at index hospitalisation								
Mental and behavioural disorders due to psychoactive substance use	4 454	6.1	–	–	–	–	–	–
Schizophrenia	13 284	18.1	–	–	–	–	–	–
Mood disorders	14 025	19.1	–	–	–	–	–	–
Neurotic, stress-related disorders	14 408	19.7	–	–	–	–	–	–
Behavioural syndromes associated with physiological disturbances and physical factors	3 250	4.4	–	–	–	–	–	–
Disorders of adult personality	7 559	10.3	–	–	–	–	–	–
Mental retardation	1 749	2.4	–	–	–	–	–	–
Disorders of psychological development	4 971	6.8	–	–	–	–	–	–
Behavioural and emotional disorders occurring in childhood and adolescence	8 089	11.0	–	–	–	–	–	–
Unspecified mental disorder	1 511	2.1	–	–	–	–	–	–
Self-harm at index hospitalisation	2 842	3.9	–	–	–	–	–	–

Table 2 Rates of hospitalisation for self-harm, hospitalisation with a mental or somatic disorder diagnosis and mortality during the 3-year follow-up in adolescents and young adults hospitalised for a mental disorder in 2013–2014, compared with the non-affected control group without a mental disorder and matched for age and sex, and with the affected control group with a mental disorder but not hospitalised

	Hospitalised patients (n=73 300)		Non-affected controls (n=219 900)			Affected controls (n=9 683)		
During follow-up	n	%	n	%	P value	n	%	P value
Hospitalisation for self-harm	7 266	9.9	148	0.1	<0.0001	654	6.8	<0.0001
Number of self-harm hospitalisation					<0.0001			<0.0001
1	4 539	62.5	141	95.3		438	67.0	
2	1 358	18.7	7	4.7		135	20.6	
3	544	7.5	0	0		40	6.1	
4+	825	11.4	0	0		41	6.3	
Self-harm means								
Poisoning	6 015	82.8	126	85.1	0.45	527	80.6	0.2
Hanging	301	4.1	2	1.4	0.09	33	5.1	0.3
Drowning	26	0.4	0	0	–	2	0.3	1
Firearm	12	0.2	0	0	–	1	0.2	1
Fire	25	0.3	0	0	–	3	0.5	0.5
Sharp/blunt objects	1 380	19.0	14	9.5	0.003	110	16.8	0.2
Jumping	205	2.8	4	2.7	1	11	1.7	0.1
Vehicle	39	0.5	0	0	–	5	0.8	0.4
Other or unspecified	618	8.5	5	3.4	0.02	58	8.9	0.8
Hospitalisation with a somatic disorder diagnosis	21 082	28.8	13 562	6.2	<0.0001	2 105	21.7	<0.0001
Hospitalisation with a mental disorder diagnosis	42 196	57.6	633	0.3	<0.0001	3 694	38.2	<0.0001
Mortality (until 2017)	573	0.8	99	0.05	<0.0001	35	0.4	<0.0001
Cause of death (until 2015)	411		91			35		
Natural	76	18.5	32	35.2	0.0005	12	34.3	0.6
Suicide	176	42.8	7	7.7	<0.0001	14	40.0	0.06
Accidental	92	22.4	39	42.9	<0.0001	6	17.1	0.09
Other or unknown	67	16.3	13	14.3	0.8	3	8.6	0.06

control groups (table 2 and figure 1). In all three groups, hospitalisation for self-harm during follow-up occurred mainly once, and self-poisoning was the main method of self-harm. Median duration between the index hospitalisation and the first hospitalisation for self-harm during follow-up in the case group was 244 days (min=1–max=1 096).

Hospitalisation for mental disorder was associated with a significant unadjusted risk of subsequent hospitalisation for self-harm when compared with both the non-affected (HR=155.3, 95% CI (132.0 to 182.8)) and affected (HR=1.5, 95% CI (1.4 to 1.6)) control groups. Both risks remained significant when age, sex, a past hospitalisation with a somatic disorder diagnosis and a past hospitalisation for a self-harm were added to the model (table 3). Younger age (12–15 vs 16–18, 19–21 and 22–24 years), female sex and having been hospitalised with a somatic disorder or for self-harm during the background period were all significant risk factors for subsequent self-harm hospitalisation.

In the hospitalised patient group, the most frequent mental disorder categories at the time of the index hospitalisation among those with a subsequent self-harm hospitalisation were mood disorders, neurotic and stress-related disorders and personality disorders (online supplemental table 1).

Hospitalisation with a somatic disorder during follow-up

The main somatic disorder diagnostic categories in the hospitalised patient group were 'Injury, poisoning and certain other consequences of external causes' (excluding self-harm), 'Factors influencing health status and contact with health services' and 'Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified' followed by digestive, endocrine, respiratory, nervous and genitourinary system diseases for both the background and follow-up periods (online supplemental tables 2 and 3).

During follow-up, rates of hospitalisation with a somatic disorder were higher in the hospitalised patient group (28.8%) than the non-affected (6.2%; p<0.0001) or affected (21.7%; p<0.0001) control groups (table 2 and figure 1).

Hospitalisation for mental disorder was associated with a higher unadjusted risk of hospitalisation with a somatic disorder during follow-up when compared with the non-affected (HR=5.5, 95% CI (5.3 to 5.6)) and affected (HR=1.4, 95% CI (1.3 to 1.5)) control groups. Both risks remained significant after adjustment (table 3). Older age (22–24 vs 12–15 years), being a female and having been hospitalised with a somatic disorder or for self-harm in the past were all significant risk factors for subsequent somatic disorder hospitalisation.

Mental disorder categories at the time of the index hospitalisation most frequently found among people with a subsequent hospitalisation with a somatic disorder diagnosis were mood disorders, and neurotic and stress-related disorders (online supplemental table 1).

All-cause mortality during follow-up

Rates of all-causes premature death were higher in the case group (0.8%) than the non-affected (0.05%; p<0.0001) and affected (0.4%; p<0.0001) control groups (table 2 and figure 1). The distribution of the causes of death differed between the groups. The main cause of death was suicide in the hospitalised patient

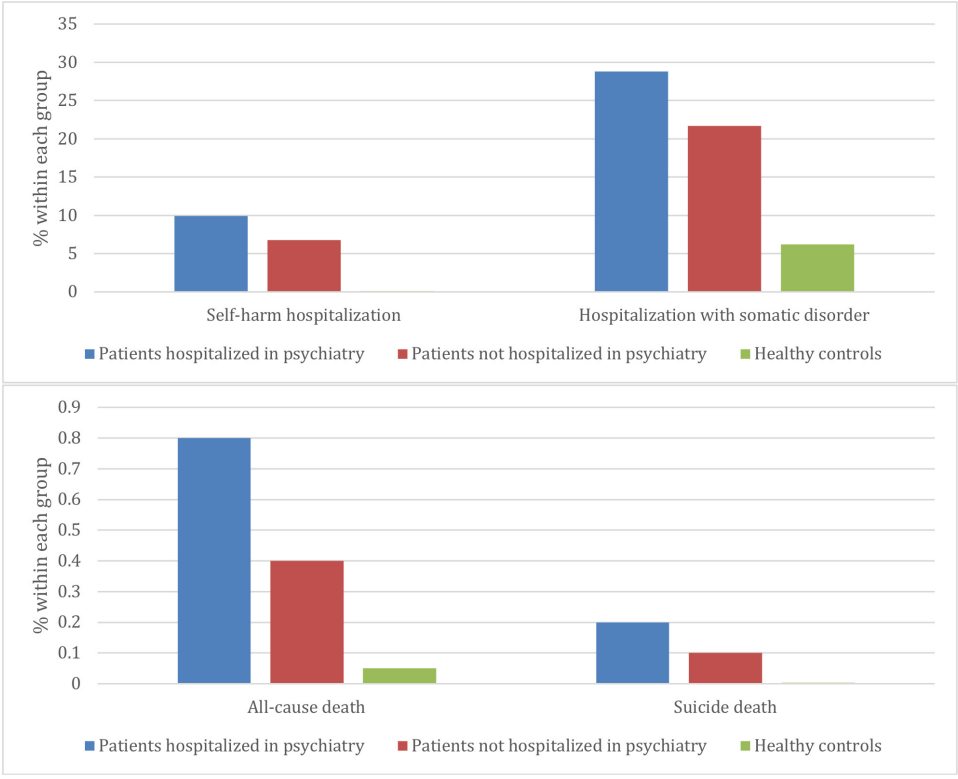

Figure 1 Rates (in % of the considered group) during the 3-year follow-up of hospitalisation for self-harm, hospitalisation with a somatic disorder diagnosis (top) and mortality (all-cause and suicide) (bottom) in the three groups.

group (42.8%) and affected control group (40.0%), but accidents (42.9%) and natural causes (35.2%) in the non-affected control group. Median duration between the index hospitalisation and death in the hospitalised patient group was 533 days (6–1094).

Hospitalisation for mental disorder was associated with a higher unadjusted risk of premature death when compared with the non-affected (HR=17.4, 95% CI (14.1 to 21.6)) and affected (HR=2.2, 95% CI (1.5 to 3.0)) control groups. Both risks remained significant after adjustment (table 3). Older age (16–18, 19–21 and 22–24 vs 12–15 years), being a male and having been hospitalised with a somatic disorder diagnosis or for self-harm were all significant risk factors for premature death.

Mental disorder diagnostic categories at time of index hospitalisation most represented among people who died during the follow-up were schizophrenia, mood disorders and substance abuse (online supplemental table 1).

Suicide mortality during follow-up

Higher rates of suicide were found in the hospitalised patient group (0.2%) than in the non-affected (0.003%; p<0.0001) control group but only marginally higher than in the affected control group (0.1%; p=0.06) (table 2 and figure 1). The main methods used for suicide in the hospitalised patient group were hanging and suffocation (51.1%) and jumping from heights (14.8%). Median duration between the index hospitalisation and suicide death in the hospitalised patient group was 369 days (6–1055).

Hospitalisation for mental disorder was associated with a higher unadjusted risk of suicide when compared with the non-affected (HR=9.0, 95% CI (4.2 to 19.1)) and affected (HR=1.7, 95% CI (1.0 to 2.9)) control groups. Both risks remained significant after adjustment (table 3). Older age (16–18, 19–21 and 22–24 vs 12–15 years, only vs affected controls), and having been hospitalised for self-harm were all significant risk factors for suicide.

Mental disorder diagnostic categories most often found among people who died from suicide in the case group were schizophrenia and mood disorders (online supplemental table 1).

DISCUSSION

This large cohort study of more than 70 000 youths aged 12–24 and hospitalised in psychiatry between 2013 and 2014 showed that during the 3 years following the index hospitalisation: 9.9% were hospitalised for self-harm, 28.8% were hospitalised with a somatic disorder and 0.8% died, with suicide being the cause in a large proportion of these (42.8%). These numbers were significantly higher than in young individuals with no known mental disorder but also than in never-hospitalised patients with a mental disorder, suggesting that a hospitalisation in psychiatry is a major marker for all four outcome variables.

Regarding self-harm, it has to be noted that only self-harming behaviours that led to a hospitalisation are identified in our study. Data about hospital presentation without a hospitalisation are not available. There is therefore a likely underestimation of the phenomenon that adds to the known under-coding of these acts in the hospital abstracts.[26] However, hospitalised self-harm most likely represents an imperfect proxy for more severe or more lethal acts. As noted in a recent review of literature, between-study variations in rates of post-discharge self-harms are important.[27] A previous study in the UK in a large population of 16–24 year olds reported a rate of self-harm hospitalisation of 5.8% within the first 12 months.[24] In the present study, half of the cases of self-harm occurred within the first 8 months, emphasising the importance of the early months post-discharge. As previously shown, three-quarters of suicidal events post-discharge tend to occur during the first year.[27] Identified risk

Table 3 Adjusted risk factors for hospitalisation for self-harm, hospitalisation with a somatic disorder diagnosis, death from any cause and from suicide during the 3-year follow-up in adolescents and young adults hospitalised for a mental disorder in 2013–2014, in comparison to the non-affected control group without a mental disorder and matched for age and sex, and to the affected control group with a mental disorder but not hospitalised

	Versus non-affected controls		Versus affected controls	
	HR	95% CI	HR	95% CI
Hospitalisation for self-harm during follow-up				
Index hospitalisation for mental disorder (ref=0)	105.5	89.5 to 124.4	1.5	1.4 to 1.6
Age (ref=12–15 years)				
16–18 years	0.9	0.8 to 0.9	0.9	0.8 to 1.0
19–21 years	0.9	0.8 to 1.0	0.9	0.8 to 0.9
22–24 years	0.9	0.8 to 1.0	0.9	0.8 to 1.0
Female (ref=male)	1.5	1.4 to 1.6	1.8	1.7 to 1.9
Past hospitalisation with a somatic disorder diagnosis (ref=0)	1.5	1.4 to 1.6	1.4	1.3 to 1.5
Past hospitalisation for self-harm (ref=0)	2.9	2.8 to 3.1	2.9	2.7 to 3.1
Hospitalisation with a somatic disorder diagnosis during follow-up				
Index hospitalisation for mental disorder (ref=0)	4.1	3.9 to 4.1	1.4	1.3 to 1.5
Age (ref=12–15 years)				
16–18 years	0.9	0.9 to 1.0	0.9	0.9 to 0.9
19–21 years	1.0	0.9 to 1.0	0.9	0.9 to 0.9
22–24 years	1.1	1.1 to 1.2	1.1	1.0 to 1.1
Female (ref=male)	1.3	1.3 to 1.4	1.5	1.4 to 1.5
Past hospitalisation with a somatic disorder diagnosis (ref=0)	2.1	2.0 to 2.2	1.8	1.8 to 1.9
Past hospitalisation for self-harm (ref=0)	1.3	1.3 to 1.4	1.4	1.3 to 1.4
Death (all causes) during follow-up				
Index hospitalisation for mental disorder (ref=0)	13.3	10.6 to 16.7	2.2	1.5 to 3.0
Age (ref=12–15 years)				
16–18 years	2.6	1.8 to 3.8	2.8	1.9 to 4.1
19–21 years	4.3	3.0 to 6.0	4.6	3.2 to 6.7
22–24 years	6.5	4.6 to 9.0	7.0	4.8 to 10.0
Female (ref=male)	0.5	0.4 to 0.6	0.6	0.5 to 0.7
Past hospitalisation with a somatic disorder diagnosis (ref=0)	1.7	1.4 to 2.0	1.6	1.4 to 1.9
Past hospitalisation for self-harm (ref=0)	1.7	1.3 to 2.1	1.7	1.3 to 2.1
Suicide during follow-up				
Index hospitalisation for mental disorder (ref=0)	9.2	4.3 to 19.8	1.7	1.0 to 2.9
Age (ref=12–15 years)				
16–18 years	0.7	0.3 to 1.5	2.2	1.0 to 4.5
19–21 years	1.1	0.6 to 2.0	5.4	2.8 to 10.5
22–24 years	0.9	0.5 to 1.7	6.6	3.4 to 12.7
Female (ref=male)	1.2	0.9 to 1.6	0.7	0.5 to 1.0
Past hospitalisation with a somatic disorder diagnosis (ref=0)	0.8	0.6 to 1.1	1.3	0.9 to 1.8
Past hospitalisation for self-harm (ref=0)	1.3	0.9 to 1.9	2.2	1.5 to 3.2

factors in the present study, namely younger age, being a female and past history of self-harm, have been found in other studies.[24] Finally, the mental disorders most frequently found among those who subsequently self-harmed were mood disorders, neurotic and stress-related disorders and personality disorders, being recorded for 63.5% of those hospitalised for self-harm.

Regarding suicide, data on causes of death were only available until 31 December 2015, therefore covering a follow-up period of one to 3 years, depending on the date of inclusion of individuals. Reported numbers are therefore underestimated, an underestimation that, again, adds to the known under-reporting of suicide in general. Yet, the rates were high, with 0.2% of the hospitalised patients dying by suicide during the follow-up period, half of the suicides occurring within the first year. In a recent meta-analysis of deaths in patients following discharge from psychiatric inpatient care,[20] these rates reached 0.35% overall within the first 2 years (six studies) and 0.1% in adolescents (eight studies), with the highest rates found during the first 5 years. Suicide was also the main cause of death, as in our study. Mental disorders most often reported among those dying by suicide were schizophrenia and mood disorders, which is in line with previous studies.[20]

It is increasingly recognised that people suffering from severe mental disorder are at increased risk of having somatic disorders and prematurely dying from natural causes.[20] Our study showed that this is also the case in young patients aged under 25 years. We found that among patients hospitalised in psychiatry, 38.8% had a previous hospitalisation with a somatic disorder diagnosis in the 5–7 years prior to the index hospitalisation and 28.8% during follow-up. Moreover, 18.5% of deaths were from 'natural causes'. Most frequent diagnoses were non-intentional injuries, followed by unclear diagnoses, then digestive, endocrine, respiratory, nervous and genitourinary system diseases. These rates in hospitalised patients were much higher than in healthy controls, and to a lower extent than in affected controls. It must also be emphasised that a past history of a somatic disorder in youths with a mental disorder was also a risk factor for self-harm and premature death, above the risk conferred by the hospitalised

mental disorder. It is beyond this article to discuss the mechanisms of the association between mental and somatic disorders. In a time when physical assessment and care of patients with mental disorders is increasingly emphasised, our study suggests that they should start early in this population.

Overall, these findings from a very large national cohort of young people hospitalised in psychiatry highlight the urgent need for both more research on the factors contributing to poor outcomes, and for changes in the organisation of the follow-up of young patients after a psychiatric hospitalisation. The reasons why the post-hospital discharge period remains one of high risk are multiple, including the fact that this may be a time of particular risk for patients with more severe psychiatric disorders.[28] However, as often reported in recent years, needs related to mental health in young people are unfortunately often poorly met.[29] Previous studies have, for instance, highlighted a reduced risk of suicide among young people who had outpatient healthcare prior to hospitalisation, longer inpatient stays or follow-up visits within 7 days from discharge.[30] Based on current findings, it seems relevant to provide more intense care during the 6–12 months following discharge from hospitalisation.

Some limitations of the present study have been described above, including underestimation of self-harm and suicides due to missing coding. Moreover, several causes of death were missing while mortality data are known to be accurate. Similarly, only somatic disorders associated with a hospitalisation were included, which could have also led to underestimation. Conversely, it could be hypothesised that individuals hospitalised in psychiatry have higher rates of somatic diseases because they have been more often clinically examined than non-hospitalised individuals. While possible, it should be noted that patients not hospitalised in psychiatry also have high rates of somatic disorders during follow-up. Moreover, many potential factors contributing to the risk of the four outcome variables were not available for investigation—such as medication intake, or care received during and after hospitalisation—limiting the interpretation of the findings. Finally, we only focused here on hospitalised patients; future studies should also assess the risk of negative outcomes in patients with mental disorders treated in primary care and in outpatient psychiatric settings.

CLINICAL IMPLICATIONS

During the 3 years following a hospitalisation in psychiatry, 1 in 10 young people aged 12–24 years old will be hospitalised for a self-harming behaviour, 1 in 4 will present a somatic disorder and 1 in 100 will die, mostly from suicide but also from natural causes. This national study—the largest to date in this population—underlines the importance of a reinforced multidisciplinary and holistic follow-up of young people in the months following discharge from a psychiatric hospitalisation.

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