

Biopsychosocial Complexity of Revolving Door Admissions in an Acute Psychiatric Unit: A Retrospective Cohort Study

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Abstract

Background: Frequent psychiatric rehospitalizations, commonly referred to as revolving door (RD) pose major challenges to community mental healthcare system and may reflect patients' bio-psycho-social (BPS) complexity.

Aims: The aim of the current study was to investigate the association between BPS complexity and RD in an acute psychiatric hospital ward, located in a Northern Italy province serving around 500,000 inhabitants.

Methods: A retrospective cohort study design was implemented to review all adult admissions between December 2021 and March 2023. Sociodemographic, clinical, and service-related data were extracted from the electronic clinical records. BPS complexity was assessed using the INTERMED tool. RD was defined as ≥ 3 hospitalizations within 12 months. Survival analyses estimated hazard ratios (HRs) with corresponding 95% confidence intervals (95% CIs) for time-to-RD, under the assumption of proportional hazards.

Results: A total of 322 patients were analyzed, and 31 (9.63%) met RD criteria. Compared to non-RD, RD patients displayed higher INTERMED scores, especially in psychological (HR: 1.28, 95% CI [1.06, 1.54]) and social (HR: 1.15 [1.05, 1.26]) domains. Living in a residential facility compared to a private house (HR: 7.14 [3.31, 15.38]), previous compulsory admissions (HR: 4.27 [1.73, 10.54]), long-acting injectable antipsychotic use at the first admission (HR: 3.46 [1.63, 7.35]), and receiving an individualized treatment plan at the community mental health center compared to not receiving it at the time of the first admission (HR: 5.30 [1.25, 22.42]) were all associated with an increased risk of RD during the follow-up.

Conclusions: Higher complexity in psycho-social domains and history of coercive treatments increased the risk of RD. Addressing psychological distress, social disconnection, and agency in community care may support clinicians in recognizing and anticipating risk factors for RD.

Keywords

biopsychosocial complexity, psychiatric hospitalization, revolving door admission, survival analysis, mental disorders

Introduction

A proportion of mental health patients experience recurrent psychiatric hospitalizations, a pattern commonly referred to as revolving door (RD) phenomenon (Fonseca Barbosa & Gama Marques, 2023).

Definitions of RD vary across studies according to the number and frequency of readmissions. Some authors have defined RD as at least two hospitalizations in a year, others as three hospitalizations in 3 years, or three or more within a single year (Di Lorenzo et al., 2016; Gobbi et al., 2021; Weiden & Glazer, 1997).

RD patients typically present with chronic psychiatric conditions, often accompanied by social disadvantage (Frick et al., 2013; Gobbi et al., 2021). Previous studies

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identified factors associated with RD, such as young age, low educational attainment, unemployment, unstable housing, comorbid substance use, previous involvement with the criminal justice system, and poor adherence to treatment (Bravo et al., 2022; Fonseca Barbosa & Gama Marques, 2023). However, these characteristics alone have not shown univocal effects across studies, suggesting that the determinants of recurrent hospitalization are likely embedded in broader biopsychosocial (BPS) complexity, rather than single risk factors. BPS complexity has been recognized as a significant indicator of poor clinical outcomes, such as longer hospitalization and higher health-care costs (De Jonge et al., 2003): despite this, systematic and standardized assessment of BPS complexity rarely assist clinicians in real-world clinical practice.

Although RD patients represent fewer than 10% of psychiatric service users, repeated hospitalizations contribute substantially to the use of mental health resources (Di Lorenzo et al., 2016; Fonseca Barbosa & Gama Marques, 2023; Ki et al., 2023), potentially leading to increased health care costs and/or inappropriate allotment of resources. Consequently, RD remains a challenge for contemporary community-based and deinstitutionalized mental healthcare systems (Menzies et al., 2024).

Despite growing research interest in factors associated with recurrent psychiatric hospitalizations, systematic evaluations of the BPS factors associated with RD are still limited. Assessing BPS complexity should require an approach capable of integrating biological, psychological, social, and health-system information into a coherent framework. Some multidimensional assessment tools have been used in psychiatry, primary care, and other medical specialties to capture patient complexity or psychosocial needs, although these instruments showed considerable variability in their conceptual focus and measurement approaches (Nicolaus et al., 2022). Among these, the INTERMED instrument was specifically developed to provide a structured and clinically meaningful method for evaluating BPS complexity across multiple domains (Stiefel et al., 1999), offering an opportunity to elucidate how multidimensional vulnerabilities contribute to clinical relapse and rehospitalization.

The present study aimed to examine the association between BPS complexity and RD admissions in an acute psychiatric ward, to test the hypothesis that a higher BPS complexity is associated to repetitive admissions. BPS features and needs of individuals may be among the relevant indicators of the risk for recurrent hospitalizations and may inform strategies to improve effectiveness of community mental healthcare.

Materials and Methods

Study Design and Participants

This is a single-center observational study, with retrospective data collection, based on a cohort of adult patients

(i.e., ≥ 18 years old) admitted to the psychiatric ward of the S. Sebastiano Hospital in Correggio (Italy), pertaining to the public health sector and serving the Reggio Emilia province (around 500,000 inhabitants), during the time frame between 8th December 2021 and 31st March 2023.

Study Procedures and Measures

For this study, the clinical charts of all admissions during the study period were screened. The unique exclusion criterion was being < 18 years of age.

For each patient, the following information were collected: age, sex, living context, work situation, educational level, nationality, ongoing individual treatment plan at the community mental health service (yes/no), regimen of first admission (voluntary or compulsory), admission and discharge diagnoses, current use of alcohol or drugs, duration of hospitalization in days, project at discharge, the number of different psychotropic medications prescribed at discharge, long-acting injecting antipsychotic (LAI) at admission (yes/no). Diagnoses at admission were collected as they were recorded, usually in a descriptive format, while diagnoses at discharge were specified according to Diagnostic and Statistical Manual of Mental Disorders 5th Edition, Text Revision (DSM 5-TR) categories (American Psychiatric Association, 2022) but formally coded according to ICD-10-CM (World Health Organization, 2015), being ICD the official classification system adopted in Regione Emilia-Romagna of Italy. Furthermore, all admitted patients were assessed at admission and discharge by means of the Health of the Nation Outcome Scales (HoNOS). The HoNOS scale is a clinician-rated outcome measure developed and widely used to assess the health and social functioning of adults with severe mental illness. It consists of 12 items covering behavior, impairment, symptoms, and social functioning, each rated on a 0 to 4 scale, with a higher score indicating higher clinical severity (Wing et al., 1996). This tool is routinely employed in the ward and was therefore not specifically one of the experimental measures of the study.

To identify RD patients, for each admitted patient, the number of any subsequent readmissions was recorded. In accordance with the approach adopted by other authors (Di Lorenzo et al., 2016; Fisher & Stevens, 1999; Morlino et al., 2011), the RD group was defined as comprising patients who had been hospitalized on three or more occasions within a 12-month period. This threshold was preferred to more liberal definitions (e.g., ≥ 2 admissions) to ensure the identification of a population of high-utilizers and to facilitate the comparison of our results with existing epidemiological data from similar psychiatric care systems. For each RD patient, time-to RD was calculated as the days from the first admission to the third within the next 12 months; for non-RD patients, the follow-up time was calculated as the number of days from study entrance (i.e., the first admission) and the next 12 months (representing administrative censoring).

In the framework of the present research, the INTERMED tool (Stiefel et al., 1999) was applied to clinical data to calculate the INTERMED score. The INTERMED scale consists of 20 items with a 0 to 3 Likert type scoring format. The total INTERMED score is the sum score across all answered items, ranging from 0 to 60. The INTERMED evaluated BPS complexity through an integrated assessment of the four following domains: biological (BIO), psychological (PSY), social (SOC), and health systems (HS), each assessed in a temporal perspective: past, present, future (prognostic assessment). For each of the 20 items resulting from the crossing between domain and time (2 items each for the 8 domains referring to past and present, 1 item for the 4 domains referring to future), a list of anchor points guides toward the scoring. Clinical information may be collected by interviewing the patients and/or by revising clinical charts: the latter was the method here employed, as performed in previous research (Marchi et al., 2025). Higher scores reflect a great degree of BPS complexity and a cut-off of 21 on the total score was considered to categorize complex and non-complex, according to previous research validating the tool (Van Reedt Dortland et al., 2017). The three investigators (A.M., G.B., I.C.) who scored the INTERMED had access to patients' clinical files including a comprehensively documented medical and psychiatric assessment, providing all relevant information to the calculation of anchor points as requested by the INTERMED methodology of administration. Each rater was assigned a distinct, partially overlapping subset of the patient cohort. To ensure inter-rater consistency and calibrate the scoring process, approximately 40% of the sample was independently evaluated by two researchers. Any discrepancies in the ratings within this subset were discussed until a consensus was reached. The remaining records were evaluated by a single rater. Given the retrospective design of the chart review, raters had access to the full longitudinal clinical records and were therefore not blinded to the patients' subsequent readmissions or RD status.

Statistical Analysis

Descriptive statistical analysis of the variables in our sample was performed using mean and standard deviation (SD) for continuous variables, frequency and percentages for dichotomous and categorical variables. Comparison between groups (RD patient versus non-RD) was performed by t-test for continuous variables and by Chi² test for dichotomous and categorical variables.

Survival Analysis Was Performed Using RD as the Outcome

All survival times, exact and censored, were used to plot the overall survival function, according to the Kaplan–Meier estimator, and the log-rank test was used for making comparisons between groups. Univariate and multivariate

Table 1. Number of Admissions Among RD Patients.

Number of RD admissions	n (%)
3	14 (45.2)
4	7 (22.6)
5	4 (12.9)
6	2 (6.5)
7	2 (6.5)
9	1 (3.2)
12	1 (3.2)

Note. n = number; RD = revolving door.

Cox's regression analysis were performed, under the assumption of Proportional Hazards (PH) tested by examining Schoenfeld's residuals ($p > .05$ for all the models), to determine survival trends adjusted for relevant predictors, and to estimate the hazard ratios (HRs) with corresponding 95% confidence intervals (95% CIs; Sedgwick & Joeke, 2015; Zhang et al., 2018). The level of statistical significance considered for the rejection of the null hypothesis (alpha) was 5% (therefore $p < .05$). Statistical analyses were performed with Stata 15 (StataCorp LLC, College Station, Texas, USA).

Statement of Ethics

The study has received approval from the Local Ethical Committee of reference. The study was carried out according to the Declaration of Helsinki, to the Good Clinical Practice principles for medical research (World Medical Association, 2013) and the current regulations relating to the protection and processing of personal and sensitive data.

Results

Description of the Sample

During the study period, a total of 461 admissions were recorded for 322 patients, of whom 31 (9.63%) meeting RD criteria. Despite representing a relatively small proportion of patients, RD cases accounted for 137 admissions (29.7%). The distribution of the number of admissions among RD patients is reported in Table 1.

Notably, *t*-test comparisons found RD patients exhibiting higher INTERMED total scores ($p = .010$), and on psychological ($p = .007$), and social ($p = .002$) domains. Additionally, RD patients had longer hospitalizations ($p < .001$) and received higher antipsychotic doses ($p < .001$). Socio-demographic and clinical characteristics of RD and non-RD patients are summarized in Tables 2 and 3, respectively.

Survival Analysis

The median follow-up time ranged from 6 to 365 days (mean 346, $SD = 65.4$ days). The identified 31 patients classified as RD cases were compared to the remaining

Table 2. Socio-Demographic Characteristics of RD and Non-RD Patients.

Variables	RD (n=31, 9.63%)	Non-RD (n=291, 90.37%)	p-Value ^a	Missing, n (%)
Age, mean (SD)	37.42 (12.28)	41.67 (14.63)	.119	0
Gender, n (%)			.289	0
Male	17 (54.8)	176 (60.5)		
Female	14 (45.2)	115 (39.5)		
Nationality, n (%)			.580	3 (1.0)
Italian	26 (83.9)	224 (77.8)		
Non-Italian	5 (16.1)	64 (22.2)		
Education, n (%)			.118	186 (57.8)
No school	1 (5.6)	0		
Elementary	1 (5.6)	4 (3.4)		
Middle school	7 (38.9)	31 (26.3)		
High school	7 (38.9)	59 (50.0)		
University	2 (11.1)	23 (19.5)		
Other	0	1 (0.8)		
Employment, n (%)			.054	33 (10.2)
Unemployed	14 (46.7)	126 (48.6)		
Employed	4 (13.3)	74 (28.6)		
Student	2 (6.7)	10 (3.9)		
Retired (pension)	0	10 (3.9)		
Disability pension	10 (33.3)	39 (15.1)		
Marital status, n (%)			.078	18 (5.6)
Single	24 (80.0)	159 (58.0)		
With partner	1 (3.3)	59 (21.5)		
Divorced	3 (10.0)	40 (14.6)		
Widower	0	6 (2.2)		
Other	1 (6.7)	10 (3.6)		
Housing, n (%)			<.001	6 (1.9)
Homeless	2 (6.5)	23 (8.1)		
Private house	19 (61.3)	247 (86.7)		
Residential facility	10 (32.3)	15 (5.3)		
Type of community care, n (%)			.038	1 (0.3)
CMHC	24 (77.4)	169 (58.3)		
None	2 (6.5)	79 (27.2)		
Other	5 (16.1)	42 (14.5)		

Note. Significant *p*-values are reported in bold text. CA=compulsory admission; CMHC=community mental health center; N/n=number; RD=revolving door; SD=standard deviation.

^a*p*-Values are based on *t*-test for continuous variables and chi2 test for categorical variables.

Table 3. Clinical Characteristics of RD and Non-RD Patients.

Clinical Variables	RD (n=31, 9.63%)	Non-RD (n=291, 90.37%)	p-Value ^a	Missing, n (%)
Diagnosis at admission (descriptive), n (%)			.855	3 (1.0)
Psychotic episode	12 (40.0)	142 (49.1)		
Agitation	7 (23.3)	52 (18.0)		
Suicide attempt	2 (6.7)	23 (8.0)		
NSSI	3 (10.0)	14 (4.8)		
Mania	3 (10.0)	21 (7.3)		
Anxiety-depression	0	10 (3.5)		
Social emergency	1 (3.3)	5 (1.7)		
Alcohol/substance intoxication	1 (3.3)	12 (4.2)		
Other	1 (3.3)	10 (3.5)		

(continued)

Table 3. (continued)

Clinical Variables	RD (n = 31, 9.63%)	Non-RD (n = 291, 90.37%)	p-Value ^a	Missing, n (%)
Diagnosis at discharge (ICD-10-CM), n (%)			.225	3 (1.0)
SZ, schizotypal, delusional and other non-mood psychotic disorders (F20-F29)	17 (54.8)	154 (52.9)		
Bipolar affective disorders (F31)	3 (9.7)	30 (10.4)		
Depressive disorders (F32-F33)	0	26 (8.9)		
Disorders of adult personality and behavior (F60-F61)	7 (22.6)	39 (13.4)		
Mental disorders due to known physiological conditions (F00-F09)	0	5 (1.7)		
Mental and behavioral disorders due to psychoactive substance use (F10-F19)	0	15 (5.2)		
Intellectual disabilities (F70-F79)	3 (9.7)	5 (1.7)		
Obsessive-compulsive disorder and related disorders (F42)	0	3 (1.0)		
Feeding and eating disorders (F50)	0	2 (0.7)		
Other	1 (3.2)	9 (3.1)		
LAI before admission, n (%)			.002	3 (0.9)
Yes	10 (32.3)	32 (11.1)		
No	21 (67.7)	256 (88.9)		
Substance of abuse, n (%)			.756	2 (0.6)
None	20 (64.5)	166 (57.4)		
Cannabis	1 (3.2)	40 (13.8)		
Cocaine	1 (3.2)	3 (1.0)		
Opioids	0	1 (0.3)		
Amphetamines	0	1 (0.3)		
Multiple	5 (16.1)	38 (13.1)		
Alcohol	3 (9.7)	31 (10.7)		
Other	1 (3.2)	9 (3.1)		
Discharged to, n (%)			.149	1 (0.3)
Home	11 (35.5)	104 (35.9)		
Other psychiatric facility	17 (54.8)	159 (54.8)		
Sheltered housing	3 (9.7)	5 (1.7)		
Other hospital ward	0	9 (3.1)		
Patient absconded	0	2 (0.7)		
Discharge against medical advice	0	10 (3.4)		
Other	0	1 (0.3)		
Previous CA, n (%)			.002	0
Yes	22 (71.0)	111 (38.1)		
No	6 (19.4)	140 (48.1)		
Unknown	3 (9.7)	40 (13.7)		
INTERMED total, mean (SD)	29.48 (7.33)	25.37 (8.46)	.010	0
INTERMED BIO, mean (SD)	1.81 (2.30)	2.35 (3.26)	.364	0
INTERMED PSI, mean (SD)	13.61 (1.94)	12.30 (2.62)	.007	0
INTERMED SOC, mean (SD)	9.71 (3.98)	7.28 (4.09)	.002	0
INTERMED HS, mean (SD)	4.29 (3.00)	3.40 (2.51)	.065	0
HoNOS admission, mean (SD)	16.16 (5.04)	15.75 (5.66)	.700	5 (1.6)
HoNOS discharge, mean (SD)	12.36 (5.03)	10.37 (5.08)	.050	20 (6.2)
Number of psychiatric medications at discharge, mean (SD)	1.58 (0.72)	1.43 (0.78)	.289	4 (1.2)
Chlorpromazine mgEq antipsychotic, mean (SD)	732.07 (473.19)	458.09 (345.18)	<.001	10 (3.1)
Days of hospitalization, mean (SD)	25.06 (45.17)	10.68 (13.33)	<.001	1 (0.3)
Number of medical comorbidities, mean (SD)	0.69 (0.89)	0.85 (1.14)	.471	25 (7.8)

Note. Significant *p*-values are reported in bold text. CA = compulsory admission; HoNOS = Health of the Nation Outcome Scales; ICD-10 = International Statistical Classification of Diseases and Related Health Problems, 10th edition; INTERMED BIO = INTERMED, biological domain; INTERMED HS = INTERMED, health system domain; INTERMED PSI = INTERMED, psychological domain; INTERMED SOC = INTERMED, social domain; LAI = long-acting injectable antipsychotic; mgEq = milligram equivalent; *N/n* = number; NSSI = non-suicidal self-injury; RD = revolving door; SD = standard deviation; SZ = schizophrenia.

^a*p*-Values are based on *t*-test for continuous variables and chi2 test for categorical variables.

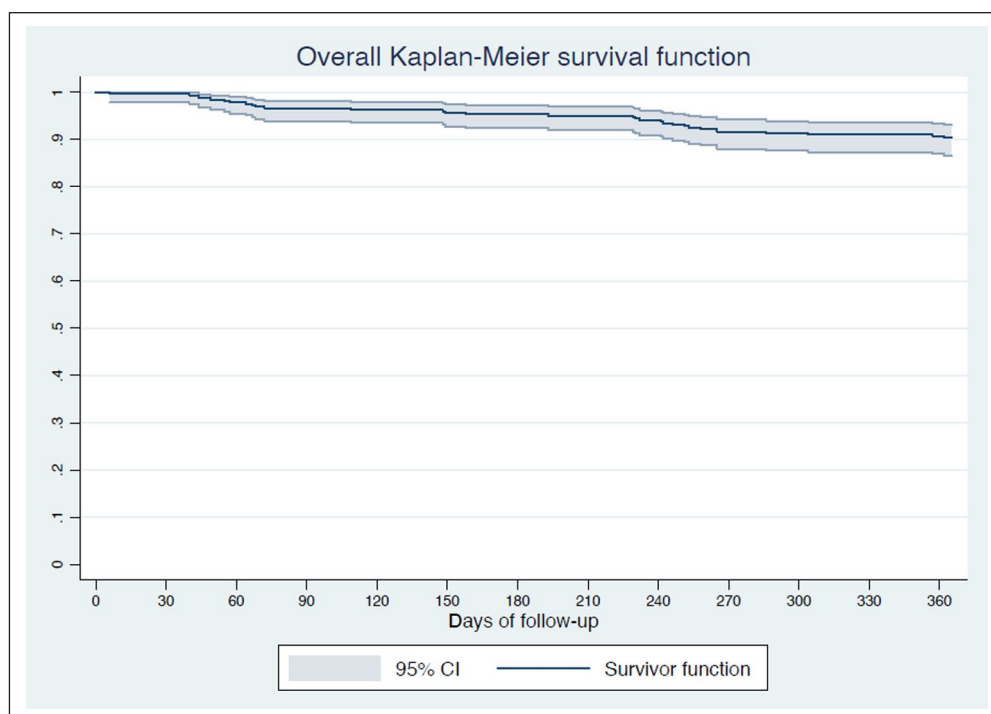


Figure 1. Kaplan-Meier plot of the overall survival function.
 Note. 95% CI=95% confidence interval.

291 patients censored at the end of follow-up. All exact and censored times were used to estimate the overall survival function, displayed in Figure 1. The cumulative survival probability at the end of the follow-up was 90%.

Univariable Cox regression of RD on INTERMED scores found a statistically significant effect of total score (HR: 1.06, 95% CI [1.01, 1.10]), psychological (HR: 1.28 [1.06, 1.54]) and social (HR: 1.15 [1.05, 1.26]) domains on increasing the risk of RD during the follow-up. However, the effect of INTERMED biological (HR: 0.95 [0.84, 1.07]) and health service (HR: 1.13 [0.99, 1.28]) domains did not reach statistical significance. These findings are displayed in Figure 2.

Given the retrospective design of this cohort study, the sample size was strictly determined by the number of consecutive eligible admissions during the observation period. However, to investigate the adequacy of the sample size, a sensitivity power analysis was performed using the Hsieh and Lavori formula for Cox regression (Hsieh & Lavori, 2000). Specifically, considering the standard deviation of INTERMED total score across the sample of 8.44, with 31 observed RD events, a two-tailed alpha of .05, and 80% power, the model was powered to detect a minimum HR of 1.06 for every 1-point increase on the predictor scale. Notably, this minimum detectable effect size aligns with the actual HR observed in our univariable analysis, confirming that our study was adequately powered to detect the associations present in our data.

Next, the effect of indicators of psychopathological and social complexity, available in our database, was

examined. In particular, living in a residential facility rather than in a private house (log-rank test, $p < .001$), having an individualized treatment plan at community mental health center (CMHC) compared with not (log-rank test, $p = .013$), receiving LAI therapy prior the first admission (log-rank test, $p = .001$), and history of previous compulsory admission (CA, log-rank test, $p = .001$) were all significantly associated with an increased risk of RD. Interestingly, no association was observed between comorbid substance use and the risk of RD (log-rank test, $p = .433$) and between age and the risk of RD ($p = .372$). Kaplan-Meier survival curves for each group of comparisons are displayed in Supplemental Figures 1 to 5.

Univariable Cox regression results for these associations are reported in Table 4.

Discussion

This study investigated the association between BPS complexity and the risk of RD admissions to an acute psychiatric unit in a public general hospital in Italy. Higher levels of BPS complexity, and specifically on psychological and social domains, as measured with the INTERMED tool, resulted significantly associated with an increased risk of RD during follow-up. These findings support the view that frequently admitted patients have both clinical and social complex needs (Fonseca Barbosa & Gama Marques, 2023; Menzies et al., 2024). The association between psychological and social domains of the INTERMED and RD is

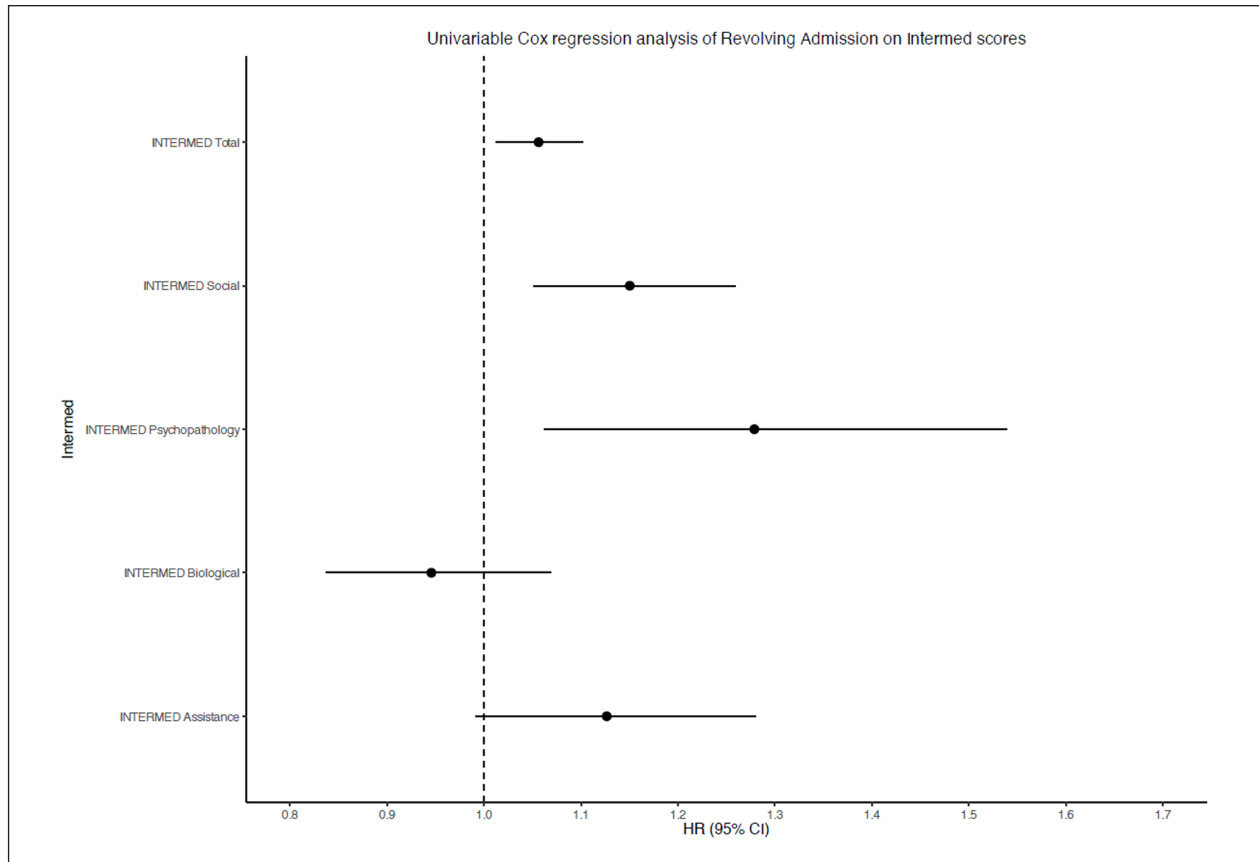


Figure 2. Forest plot of univariable Cox regression analyses of INTERMED scores on RD.

Note. HR represent the relative risk of RD associated with a one-unit increase in each INTERMED score. HR=hazard ratio; 95% CI=95% confidence interval.

Table 4. Results of Univariable Cox Regression Analyses of Social and Clinical Indicators on RD Risk.

Predictor	HR [95% CI]	p-Value
Housing:		
Private house	Ref.	Ref.
Homeless	1.14 [0.265, 4.90]	.860
Residential facility	7.14 [3.31, 15.38]	<.001
Type of community care:		
CMHC	Ref.	Ref.
None	0.189 [0.044, 0.799]	.023
Other	0.846 [0.323, 2.22]	.735
LAI prior first admission:		
No	Ref.	Ref.
Yes	3.46 [1.63, 7.35]	.001
Previous CA:		
No	Ref.	Ref.
Yes	4.27 [1.73, 10.54]	.002
Comorbid SUD:		
No	Ref.	Ref.
Yes	0.746 [0.357, 1.56]	.434
Age	0.987 [0.960, 1.02]	.372

Note. HRs>1 indicate increased risk of RD; HRs<1 indicate decreased risk of RD. Statistically significant p-values are reported in bold text.

CA=compulsory admission; CMHC=community mental health center; HR=hazard ratio; LAI=long-acting injectable antipsychotic; Ref.=reference group; SUD=substance use disorder.

consistent with the clinical profile of individuals typically admitted to acute psychiatric wards within public hospitals, where admissions are usually precipitated by acute psycho-social crises rather than biological comorbidity. Patients with predominant biological needs are generally admitted to other medical wards and may receive psychiatric support through consultation-liaison psychiatry services (De Giorgio et al., 2015; Marchi et al., 2021). Therefore, it was not unexpected that BPS dimensions linked to psychological distress, limited coping resources, and fragile social support networks were more strongly associated with recurrent admissions.

These findings underscore the need to strengthen early psychosocial interventions aimed at continuity of care from the first days of hospitalization to the acute psychiatric ward. Establishing coordinated discharge planning, improving communication between hospital teams and CMHCs, and addressing social determinants of recovery may help reduce the likelihood of rapid readmissions (Ådnes et al., 2020). In our sample, RD patients also had a longer duration of hospitalization, possibly reflecting the challenges in arranging suitable discharge settings. Embedding psychosocial rehabilitation and case management approaches within inpatient care could facilitate safer and more sustainable discharges, although this is not always feasible, particularly for individuals who experience low level of cooperation and service mistrust (Bone et al., 2019; Marchi et al., 2025). In line with this interpretation, a history of CA emerged as a strong risk factor for RD. This finding likely reflects the difficulties in establishing therapeutic alliances and ensuring continuity of care after coercive interventions, as well as the potential erosion of trust between patients and services (Jones et al., 2021; Li et al., 2023; Marchi et al., 2024). Intervention targeting collaborative-care, transparent communications, and patient agency may help reduce the recurrence of coercive treatments and subsequent hospitalizations (Bone et al., 2019).

Regarding pharmacological variables, treatment with LAI antipsychotics prior to the first hospitalization was associated with a higher risk of RD. This association might be indicative of complexity due to more severe or poorly adherent clinical presentations (Marchi et al., 2022). Similarly, having an individualized treatment plan at CMHC was associated with increased RD risk. This possibly reflects illness chronicity and clinical severity, as those receiving personalized care are typically individuals with more persistent or disabling conditions. Unfortunately, our data did not capture the content of these individualized treatment plans, so it was not possible to further examine this association. Consequently, the current category encompassed a wide range of interventions, from routine psychiatric follow-up and pharmacotherapy to more complex care programs such as personal health budgets (Pelizza et al., 2021). An alternative, although speculative, interpretation is that frequent contact with services may sometimes lead

to earlier detection of clinical deterioration, resulting in timely but more frequent admissions. In this perspective, recurrent admissions could also represent appropriate crisis management with the aim to prevent more serious outcomes such as self-harm or social breakdown. Future research should distinguish between preventive and reactive readmissions to better understand these dynamics.

Consistent with previous literature, RD patients received higher antipsychotic doses than non-RD patients, further supporting the interpretation that these individuals experience more severe or refractory symptoms (Marchi et al., 2022). However, this finding also invites reflection on whether pharmacological intensification alone is sufficient to prevent readmission in high-complexity patients. Integrated approaches of psychosocial and rehabilitative interventions with the pharmacological treatment might be more effective in promoting long-term stability (Ådnes et al., 2020; Bravo et al., 2022).

Within the social domain, living in a residential facility emerged as a significant predictor of RD. This condition often indicates long-term dependency on structured environments and limited autonomy, which may increase reliance on inpatient care in response to stress or symptom exacerbation. Enhancing individualized psychosocial support, daily-life skills training, and community inclusion appeared relevant targets to reduce the risk of recurrent admissions (Bravo et al., 2022). Conversely, homelessness did not predict RD in our sample. This finding could suggest that housing needs have been adequately addressed during the first hospitalization, or that individuals experiencing homelessness may follow alternative care trajectories, including outreach or non-hospital services (Buhrich & Teesson, 1996; Vorting et al., 2021).

Interestingly, HoNOS scores at admission and discharge did not differ significantly between RD and non-RD patients, suggesting a greater specificity of INTERMED in capturing BPS complexity related to the phenomenon of readmission.

The lack of an association between substance use and RD risk contrasts with some prior evidence (Dionisie et al., 2025; Fonseca Barbosa & Gama Marques, 2023). However, it aligns with previous research in the Italian context that found no statistically significant effect of substance use on the risk of RD (Di Lorenzo et al., 2016; Morlino et al., 2011). Similar findings have been reported internationally (Dias Neto & Da Silva, 2008; Koparal et al., 2021), where substance use was identified as a predictor of shorter admissions or self-discharge rather than frequent psychiatric rehospitalization (Di Lorenzo et al., 2016; Koparal et al., 2021). Indeed, admissions for alcohol or substance-related problems often require brief stays primarily focused on clearing intoxication states or managing acute withdrawal symptoms (Haywood et al., 1995). Patients in these circumstances are frequently discharged as soon as the acute episode resolves. Furthermore, our

findings might reflect effective referral of individuals with substance use disorders to specialized addiction services, reducing the likelihood of psychiatric readmissions once substance use is recognized and managed through dedicated care pathways.

Future research should aim to replicate these findings in larger, multi-center prospective studies, ideally incorporating longitudinal, rather than retrospective, follow-up. Such designs could clarify the temporal relationship between BPS complexity and emergency psychiatry services use, and test organizational interventions to improve service effectiveness. Additionally, mixed-methods approaches, ideally co-designed with groups of expert-by-experience, could investigate how specific psychosocial interventions, the quality of therapeutic alliances, and trust in services influence the trajectories of individuals with recurrent admissions.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the single-center design and the specific context of the Italian universalistic public health system may limit the generalizability of the results. Nevertheless, since the Italian system is organized at the regional level, it is reasonable to assume that the findings may be applicable at least within the regional context and potentially extendable to similar national settings. Second, the retrospective design is sensitive to recall bias and incomplete data, which cannot be retrieved once documentation is finalized. Reliance on clinical charts for data collection, rather than direct interviews with patients and caregivers may have reduced the completeness and accuracy of some information. Additionally, the use of clinical charts as the primary data source may have introduced bias due to variability in reporting accuracy. For instance, specialized diagnostic tests (e.g., neuroimaging, lumbar puncture) may have been performed in a limited number of patients to exclude organic causes, based on clinical indication rather than a standardized research protocol. The lack of uniform biological and instrumental data across the entire sample is a limitation. As such, despite the efforts made to harmonize data extraction, causal effects cannot be drawn, and residual confounding cannot be ruled out. Third, we did not perform formal statistical testing for inter-rater reliability on INTERMED scoring, and raters were not blinded to the RD status of the patients during the retrospective chart review. While this may have introduced a potential risk of information bias, the INTERMED tool relies strongly on objective socio-demographic and clinical parameters, which likely mitigate subjective interpretation. Fourth, left censoring occurred because individuals entered the study at their first recorded hospitalization within the observation period, which may have introduced potential confounding related to contextual changes over

time (e.g., modifications in service organization, personnel turnover, or clinical practices) that could have influenced survival estimates. However, no major changes directly related to the management of RD—such as targeted staff training initiatives or clinical trials—were documented during the study period. Fifth, the lack of administration of INTERMED at discharge limited the possibility to test the impact of the interventions delivered during the hospitalization have brought benefits on the overall BPS complexity of the patients. Sixth, the number of RD cases was relatively small, limiting statistical power and the possibility of conducting fully adjusted multivariable analyses. As such, replication in larger samples and prospective study designs would increase robustness of the current findings. Sixth, no information potentially relevant to the definition and impact of BPS complexity, such as duration of untreated psychosis, use/abuse of caffeine or smoking, and family history, were retrieved and included in the analysis. Nevertheless, at least some of this information is already included in the calculation of the INTERMED score (e.g., smoking habits, or delay in formal diagnosis). Finally, the study included all patients admitted to the ward, regardless of their place of residence. While this approach increased the sample size and ecological validity, it may have led to attrition bias in cases of patients discharged to other provinces or regions whose subsequent readmissions were not captured in the local database.

Conclusions

This study found that psychological and social complexity, even though not biological factors, were significantly associated with the risk of RD admissions in an acute psychiatric ward. Future research should develop and test interventions that promote independent living and collaborative care within community services to reduce RD patterns. Incorporating structured BPS assessments (such as the INTERMED) into routine practice may help identify multidimensional needs, guiding early preventive strategies focused on psychological stabilization, social reintegration, and coordinated community follow-up.

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Ethical Considerations

The study has received approval from the Local Ethical Committee (CE-AVEN) on March 22nd, 2022, protocol number 2022/0039687. The study was carried out according to the Declaration of Helsinki, to the Good Clinical Practice principles for medical research and the current regulations relating to the protection and processing of personal and sensitive data.

Consent to Participate

The study analyzed retrospectively clinical data related to hospital admissions that had taken place much before that the date of data collection. In accordance to the indications received from the Local Ethical Committee, no written informed consent was therefore collected.

Author Contributions

Gianluca Fiore, Mattia Marchi, and Silvia Ferrari were responsible for projecting the aims and developing the research methodology, with the support and supervision of Gian M. Galeazzi and Luca Pingani. Gianluca Fiore, Gloria Bizzarri, Ilaria Corbellini, Alessia Mancini, and Isabella Riguzzi were responsible for data collection, with the support and supervision of Roberto Salati. Mattia Marchi was in charge of data analysis and interpretation. Silvia I. Rusu, Giulia Ferrazzi, and Giulia Pollice contributed largely to the writing process, under the supervision of Silvia Ferrari, who also finalized the submission.

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Data Availability Statement

The data analyzed during the current study is available from the corresponding author upon request.*

Supplemental Material

Supplemental material for this article is available online.

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