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ORIGINAL RESEARCH ARTICLE

The characteristics of patients admitted to a forensic psychiatric intensive care unit (FPICU) in Belgium

Oriane de Martynoff[1], Caroline Benouamer[1,2], Ann Darsonville[1], Frédéric Bacart[1], Benjamin Delaunoit[1], Gwenaëlle Tantot[1], Gaëlle Dupont[1], Thierry H. Pham[2,3,4], Xavier Saloppé[2,5,6]

[1]Centre Régional Psychiatrique 'Les Marronniers', Tournai, Belgium; [2]Centre de Recherche en Défense Sociale, CRDS, Tournai, Belgium; [3]Université UMONS, Belgique; [4]Institut Philippe-Pinel, Montréal, Canada; [5]Université de Lille, CNRS, UMR 9193 – SCALab – Sciences Cognitives et Sciences Affectives, Lille, France; [6]Service de psychiatrie, Hôpital de Saint-Amand-les- Eaux, France
Correspondence to: Xavier Saloppé; 96 rue Despars, 7500 Tournai, Belgium;
xavier.saloppe@crds.be; https://orcid.org/0000-0003-0021-145X

Background: Psychiatric intensive care units (PICUs) are increasingly recognised as essential components of forensic care for managing patients who are difficult to treat in conventional units. Despite this, there is limited research on the psychiatric and violence risk profiles of these patients, particularly in forensic settings.
Aim: To identify the characteristics of patients admitted to a forensic PICU (FPICU) in Belgium.
Method: A comparative analysis conducted between 2016 and 2022 on a cohort of 344 patients; 176 FPICU admissions and 168 forensic cases not admitted to the FPICU (NFPICU). Demographic, clinical and criminological profiles were assessed using the PCL-R, VRAG and HCR-20 tools.
Results: As expected, FPICU patients demonstrated complex diagnostic profiles, including higher rates of substance use (52.8%), psychotic disorders (55.1%), and antisocial personality disorders with psychopathy (25.0%). Comorbid mental disorders were prevalent (69.9%), exacerbating their elevated risk of violence as assessed by the HCR-20 and VRAG. They were also more frequently involved in non-sexual violent (56.5%) and non-violent offences (68.7%). Coercive measures, including involuntary treatments (65.9%), seclusion (91.5%), and restraint (43.8%), were more commonly employed for FPICU patients.
Conclusion: Patients admitted to the FPICU present complex psychiatric and criminological profiles, with high levels of comorbidity and violence risk. Specialised care strategies should be implemented in secure environments that emphasise therapeutic relationships to reduce restrictions, manage disruptive

behaviours, and enhance treatment adherence. The implementation of the Forensic High and Intensive Care model, as developed in German-speaking countries, could support the reintegration of these patients into standard care units.

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Declaration of interest: None

Key words: psychiatric intensive care unit, coercive measures, forensic inpatient, high security, violence risk assessment, clinical profile

Introduction

Psychiatric intensive care units

Since their establishment in the early 1970s in the UK, psychiatric intensive care units (PICUs) have become an integral part of psychiatric services worldwide (Cullen et al. 2018). In France, they were introduced in 2005 as intermediate structures between general psychiatric services and units for difficult patients (UMD) (Le Bihan et al. 2009). Guidelines and standards for PICUs in general psychiatry have been published (Pereira & Clinton 2002; Felix 2023). These units are designed to manage, in the very short term and within a safe and controlled environment, psychiatric patients presenting particularly challenging symptoms in traditional care units, as well as a high risk of self-harm or aggression towards others (Brown & Langrish 2012).

To achieve this, PICUs require a reinforced multidisciplinary care team, predominantly male, with expertise in crisis management and a staff-to-patient ratio three times higher than that of standard units (Rachlin 1973; Dolan & Lawson 2001). These units typically have a limited number of beds (10 to 15) and lower occupancy rates, along with shorter lengths of stay (2.6–30 days) compared to larger units (Beer et al. 1997; Crowhurst & Bowers 2002; Felix 2023). Architecturally, PICUs are equipped with individual rooms, common areas, outdoor spaces and isolation rooms (Jones et al. 2023). The design of these spaces is carefully planned to ensure optimal supervision, facilitate de-escalation, and reduce the risk of violent behaviour (République Français 2002; Pereira & Clinton 2002).

While most of the literature on PICUs focuses on patients in general psychiatry, only three international studies, to our knowledge, have examined the profiles of forensic psychiatric patients (Rachlin 1973; Dolan & Lawson 2001; Jones et al. 2023; Kasmi 2010). Nevertheless, PICUs are increasingly used in secure psychiatric settings, given the specific psychiatric and criminological profiles of these patients (Adams & Clark 2008).

Demographic, clinical & criminological characteristics of patients in FPICUs

Overall, the patients were predominantly Caucasian, single and unemployed (Table 1), with an average age under 40 years, although this varied depending on the organisational structure of the forensic PICU (FPICU). The length of stay in the FPICU was more than twice the recommended maximum of 30 days (Beer et al. 1997; Crowhurst & Bowers 2002; Felix 2023) in two of the three studies.

In terms of criminal history, non-sexual violent offences were the most common. The primary diagnoses on admission included major mental disorders, particularly psychotic disorders and substance-related disorders. The main reasons for admission were a deterioration in mental state and/or behaviour, as well as threats or acts of assault against others.

During their stay in the FPICU, most patients were involved in at least one hetero-aggressive incident. These incidents required the use of isolation and restraint in over a third of cases. The readmission rate is less than 30% for all studies, and once discharged, patients were referred to other forensic units.

Despite the diversity of available variables, these data are highly valuable as they provide insights into the profiles of patients referred to FPICUs in Anglo-Saxon countries. They also confirm that FPICUs cater for psychiatric patients whose symptoms are particularly challenging to manage within standard forensic hospital care units. The organisation of the healthcare system must therefore ensure that these individuals are appropriately screened and directed to treatment units tailored to their specific needs (Kennedy et al. 2016). These needs extend beyond the medical domain to include personal safety and institutional considerations.

The triage of these patients is based on two primary categories: risk and treatment (Pham et al. 2019). For this reason, this study will examine violence risk factors, which correspond to procedural security. This dimension complements the relational and environmental security already partially addressed by the PICU care system (Kennedy 2002). Although FPICUs were established in

Table 1. Characteristics of forensic psychiatric patients in FPICUs.

	Dolan & Lawson (2001) N = 73	Kasmi (2010) N = 24	Jones et al. (2023) N = 96
Follow-up period	1994–1998	2006–2007	2019–2020
Socio-demographic characteristics			
Male gender: n (%)	59 (81.0)	24 (100.0)	96 (100.0)
Age (years): mean (SD)	33.2 (9.2)	31.8 (18–5)	37 (10.3)
Ethnicity n (%)			
Caucasian	37 (61.0)	24 (100.0)	55 (57.3)
Afro-Caribbean	16 (27.0)	0 (0.0)	12 (12.5)
Asian/Other	8 (13.0)	0 (0.0)	29 (30.2)
Relationship status n (%)			
Married/cohabiting	13 (18.0)	3 (12.0)	6 (6.3)
Employed n (%)	–	4 (17.0)	10 (10.4)
Institutes before admission n (%)			
Hospital	18 (25.0)	15 (63.0)	3 (3.1)
Prison	37 (51.0)	8 (33.0)	93 (96.6)
Length of stay (days): mean (range)	75.0 (2–622)	84.0 (3–201)	28.1 (2–54)
Criminal History n (%)			
Non-sexual violence	31 (42.0)	20 (83.0)	83 (86.5)
Homicide	8 (11.0)	3 (13.0)	–
Arson	9 (12.0)	4 (17.0)	13 (13.5)
Sexual violence	6 (8.0)	0 (0.0)	15 (15.6)
Property offence	8 (11.0)	0 (0.0)	68 (10.8)
Major mental disorders at admission n (%)			
Psychotic disorders	56 (77.0)	19 (79.0)	93 (96.9)
Mood disorders	10 (14.0)	4 (17.0)	7 (7.3)
Substance-related disorders	27 (71.0)	18 (75.0)	93 (96.9)
Personality disorders	–	–	23 (24.0)
Reasons for admission n (%)			
Deterioration of mental state and/or behaviour	Majority	20 (65.0)	–
Threatened/actual assault on others	34 (47.0)	27 (77.0)	
Self-harm	10 (14.0)	–	–
Threat of fire and/or arson	6 (8.0)	–	–
Socially unacceptable (sexual) behaviour	5 (7.0)	–	–
Incidents during stay n (%)			
Any incident	37 (51.0)		
Assault on patient	13 (35.0)	–	65 (67.7)
Verbal violence	8 (22.0)	17 (55.0)	–
Property damage	16 (43.0)	–	–
Assaults on staff	15 (41.0)	2 (6.0)	
Self-harm	7 (19.0)	–	7 (7.3)
Threat of fire and/or arson	5 (7.0)	–	3 (3.1)
Sexually inappropriate behaviour	–	–	10 (10.4)
Use of seclusion	–	12 (39.0)	62 (64.6)
Use of restraint	21 (57.0)	–	21 (21.9)
None	37 (51.0)	10 (32.0)	16 (16.7)
Readmission	5 (6.8)	7 (29.2)	20 (20.8)
Institutions at discharge n (%)			
Internal	51 (65.0)	21 (84.0)	37 (38.5)
Other hospital	5 (6.0)	2 (8.0)	10 (10.4)
Prison	–	–	49 (51.0)

France in the 1990s (Le Bihan et al. 2009), no European French-speaking studies have investigated the profiles of patients admitted to these units.

Aims

The three studies mentioned above provide detailed patient profiles but do not compare patients referred to FPICUs with those from other forensic units. Therefore, this study aims to describe the characteristics of a large sample of patients admitted to the FPICU in Belgium and, over a longer follow-up period than in previous studies, to compare their demographic, clinical, and criminological profiles with those of patients who have not stayed in the FPICU (NFPICU). We hypothesise that the FPICU patient profiles will be more severe in terms of psychiatric conditions and risk of violence, resulting in more frequent use of coercive measures.

Method

Participants

Under Belgian law, individuals who have committed offences against others and are deemed incapable of controlling their behaviour due to a mental disorder are subject to forensic psychiatric treatment mandated by the courts (Moniteur Belge 2014). This study was conducted at the forensic hospital of the Centre Régional Psychiatrique 'Les Marronniers' in Tournai, Belgium. This facility provides tailored care for 381 patients under forensic commitment, focusing on their social reintegration. Patients remain at the hospital for an average of 8 to 10 years, during which time they receive both psychiatric and somatic care (Jeandarme et al. 2019).

Between June 2016 and June 2022, forensic records for 344 male individuals were reviewed. Among them, 176 were admitted to the FPICU. Consistent with the definition of a PICU, this 15-bed unit is staffed at three times the level of conventional units, with a team comprising five nursing staff (nurses, educators and care assistants), a psychologist, a social worker, a physiotherapist, a general practitioner and a psychiatrist. The healthcare staff is predominantly male, with a ratio of seven men to one woman, and they are trained in crisis management. The unit features single rooms, a common area, an outdoor space, and seclusion rooms. The remaining 168 patients did not stay in the FPICU (NFPICU). The NFPICU patients were randomly selected from across the 12 care units.

Instruments

Violent risk appraisal guide (VRAG). VRAG scores span from −26 to +38, with an expected average of 0 (Quinsey et al. 1998). The initial VRAG validation sample was categorised into nine classes based on score ranges: (1) ≤ −22; (2) −21 to −15; (3) −14 to −8; (4) −7 to −1; (5) 0 to +6; (6) +7 to +13; (7) +14 to +20; (8) +21 to +27; and (9) ≥ +28.

In a study assessing the convergent and predictive validity of the PCL-R, VRAG, and HCR-20 within a diverse French-speaking population of high-security prison inmates and forensic inpatients, the three instruments exhibited high correlations (> 0.70) and shared a substantial common variance. Receiver operating characteristics (ROC) analysis suggested that VRAG (0.74, 0.82) and HCR-20 (0.72, 0.71) demonstrated moderate predictive validity for both general and violent recidivism (Pham et al. 2005).

An examination of the validity and reliability of VRAG in a Belgian forensic psychiatric population indicated strong interrater reliability (ICC = 0.91) and moderate internal consistency ($\alpha = 0.63$) (van Heesch et al. 2016). Additionally, a pilot study revealed considerable inter-rater agreement between item and total scores from two assessors (K = 0.70–0.89) (Rossegger et al. 2014).

In our study, the French version of VRAG was used (Pham et al. 2005). Despite the publication of the revised version VRAG-R (Rice et al. 2013), we used VRAG because it was the version available during data collection.

Historical, clinical, risk-20 version 3 (HCR-20). The HCR-20 is the globally dominant structured professional judgment tool for assessing violence risk (Webster et al. 1997; Douglas et al. 2013). Its name reflects its three component scales: historical (H) factors (10 items); clinical (C) factors (5 items); and risk-management (R) factors (5 items). Each factor is rated on a three-point scale from 0 to 2, yielding a total score range of 0 to 40, where higher scores indicate greater risk. By addressing both static factors (unlikely to change over time) and dynamic factors (amenable to change), the HCR-20 aims to enhance sensitivity to individual and situational variations in risk assessment.

A review of over 50 studies by Douglas & Reeves (2011) highlighted the tool's strong interrater reliability and its moderate to large association with violent behaviour (Douglas et al. 2014). In a French-speaking Belgian forensic hospital, the HCR-20 demonstrated robust psychometric properties, including an interrater correlation of 0.73, intraclass coefficients of 0.70 (single measures) and 0.82 (average measures), and a Cronbach's alpha of 0.74 for all 20 items (Claix & Pham 2004; Pham et al. 2005). These findings are consistent with similar studies (Douglas et al. 2014).

Using the French translation of the HCR-20 (Webster et al. 1997), research by Jeandarme et al. (2017a) reported an interrater reliability (IRR) of the total score at 0.74, with subscale IRRs of 0.84 for the H-scale, 0.64 for the C-scale, and 0.58 for the R-scale. Receiver operating characteristics (ROC) analysis within a French-speaking population of high-security prison inmates and forensic inpatients yielded moderate predictive validity for general and violent recidivism (ROC = 0.72, 0.71; Pham et al. 2005). For this study, we used the updated third version (HCR-20^{V3}; Douglas et al. 2013).

Psychopathy checklist, revised (PCL-R). The PCL-R is organised into two main factors and four facets (Hare 1991, 2003). Factor 1 captures affective, interpersonal, and narcissistic traits, further divided into Facet 1 'Interpersonal' and Facet 2 'Affective'. Factor 2 reflects a tendency for chronic antisocial behaviour and is subdivided into Facet 3 'Lifestyle' and Facet 4 'Antisocial'. The PCL-R includes 20 items, each rated on a three-point scale: 0 indicating that the item does not apply, 1 suggesting partial applicability, and 2 indicating full applicability.

The total score ranges from 0 to 40. The procedure recommended by Hare (1991, 2003) was strictly followed. Data for evaluation were collected from two primary sources: criminal, social, psychological and psychiatric records, and semi-structured interviews.

In Belgium, the PCL-R has undergone psychometric evaluation in various contexts. In a prison setting, the instrument demonstrated high inter-rater reliability (r = 0.96, ICC = 0.91; Pham 1998). Similarly, among a forensic psychiatric population, it showed strong inter-rater reliability (r = 0.92, K = 0.85; Pham et al. 1998). Additionally, it was the focus of a predictive validation study (Jeandarme et al. 2017b; Pham et al. 2005).

However, the study by Jeandarme et al. (2017b) reported overall poor rater agreement, with an ICC of 0.42. Only Facet 4 (Antisocial) demonstrated 'good' rater agreement, achieving an ICC of 0.60. In a mixed sample of high-security prison inmates and forensic inpatients, ROC analysis suggested that the PCL-R had moderate predictive validity for general and violent recidivism, with AUC (area under the curve) values of 0.63 and 0.68, respectively (Pham et al. 2005).

In our study, we used the French translation of the PCL-R (Côté & Hodgins 1996) with a cut-off score of 25, as recommended by Cooke & Michie (1999) and Pham (1998).

Procedure

The information used in this study was sourced from hospital records which included details such as age at admission, length of stay, nationality, marital status, and psychiatric diagnoses (DSM 5) (American Psychiatric Association 2013). Judicial information, including the index offence and prior offences, was obtained from the Central Criminal Records of the Ministry of Justice. Violent offences were specifically defined as acts of non-sexual violence against others, characterised by the intentional use of physical force or the threatened, attempted, or actual exertion of power against another person. Offences were further classified into three categories: sexual, non-sexual violent, and non-sexual non-violent. Individual evaluations of participants were conducted at least one month after admission to the facility. These assessments were performed by psychologists trained in the standardised application of the VRAG, HCR-20, and PCL-R, ensuring a comprehensive and consistent risk assessment process.

Regarding involuntary treatments, rapid tranquillising interventions administered intramuscularly without the patient's consent were considered. The medications most used in this context for managing acute agitation included Diazepam and Lorazepam (benzodiazepines) as well as Clotiapine, Haloperidol, Olanzapine, and Zuclopenthixol acetate (sedative neuroleptics). Finally, the use of seclusion and restraint measures was systematically documented throughout the follow-up period.

Ethical considerations

The Ethics Committee of the Centre Regional Psychiatrique 'Les Marronniers' provided approval for the execution of this study, referenced as DV/VJ/MDN/2022. The procedure adhered to the principles outlined in the Declaration of Helsinki and the General Data Protection Regulation (EU) 2016/679 (Council Regulation 2016). Every patient received comprehensive information about the study's objectives and voluntarily provided consent to participate.

Data analysis

Given that the data sources exhibited varying percentages of missing data, certain analyses were conducted on reduced sample sizes. Table 2 provides the percentage of missing items for each variable.

Non-parametric analyses were used because none of the dependent variables met the normality assumption, as confirmed by a Kolmogorov–Smirnov test. For continuous variables, comparisons between the FPICU and NFPICU subsamples were conducted using Mann–Whitney U tests, with effect sizes calculated as $r = z/\sqrt{N}$ (Field 2013). Effect sizes were interpreted based on Cohen's r criterion (Cohen 2003): 0.10 = small; 0.30 = medium; 0.50 = large.

The variables analysed included age at admission, length of stay, number of seclusions, restraints, involuntary medications, PCL-R scores (total, factors and facets), VRAG total score, and HCR-20 scores (total and factors).

For categorical variables, comparisons between subsamples were performed using chi-squared (χ^2) or Fisher's exact tests. Cramer's V was used to measure association strength, with the following interpretation (Rea & Parker 2014): negligible (0.00–0.10); weak (0.10–0.20); moderate (0.20–0.40); relatively strong (0.40–0.60); strong (0.60–0.80); very strong (0.80–1.00). The categorical variables included nationality, marital status, index offence and prior offences, seclusion, restraint, involuntary medication, psychiatric diagnosis, VRAG risk category, and psychopathy prevalence (PCL-R cut-off of 25).

All statistical analyses were performed using SPSS v29.0 (IBM Corp. 2022). To minimise the risk of Type I errors due to multiple comparisons, a Bonferroni correction was applied across the seven clusters of variables. This method adjusts the significance threshold to account for the increased likelihood of false positives when conducting multiple tests.

Results

Three-quarters of FPICU patients were admitted for more than 14 days, with an average stay of 188 days

Table 2. Percentage missing variables.

	N	% missing total	% missing FPICU	% missing NFPICU
Demographic				
Belgian nationality	344	0	0	0
Married/cohabitation	344	0	0	0
Age admission (years)	344	0	0	0
Length of stay (years)	344	0	0	0
Judicial				
Qualification index offence	344	0	0	0
Qualification prior conviction	324	5.8	1.1	10.7
Psychiatric diagnosis	344	0	0	0
Coercive measures	344	0	0	0
PCL-R				
Total score	169	51.0	61.4	39.9
Interpersonal/affective factor	165	52.0	63.1	40.5
Interpersonal facet	165	52.0	63.1	40.5
Affective facet	165	52.0	63.1	40.5
Social deviance factor	161	53.2	63.1	42.9
Lifestyle facet	165	52.0	63.1	40.5
Antisocial facet	162	52.9	63.6	41.7
VRAG	175	49.1	59.7	38.1
HCR-20	110	68.0	72.7	63.1

FPICU: forensic psychiatric intensive care unit; NFPICU: inpatients who did not stay in the FPICU; PCL-R: Psychopathic Checklist-Revised; VRAG: Violence Risk Assessment Guide; HCR-20: Historical Clinical Risk-20

Table 3. Characteristics related to the stay in the FPICU.

	n (%)	mean (SD)
Length of stay		
>14 days	140 (79.50)	
Number of days in this stay		187.56 (376.49)
≤14 days	36 (20.50)	
Number of days in this stay		2.19 (4.62)
Admission frequency		
Admitted at least 2 times	75 (42.20)	
Reasons for FPICU admission		
Threats of violence and/or physical assault towards staff	97 (57.10)	
Threats of violence and/or physical assault towards patients	68 (40.20)	
Substance-related behaviour	25 (14.70)	
Deterioration in mental state and/or behaviour	23 (13.60)	
Self-aggressive behaviour	5 (2.90)	
Arson	2 (1.20)	
Institutions after discharge		
Forensic psychiatric unit different from that prior to admission	88 (50.0)	
Same forensic psychiatric unit as before admission	88 (50.0)	

FPICU: forensic psychiatric intensive care unit

(Table 3). Among our sample, all patients were referred from other units within the forensic hospital, rather than directly from prison, despite the care system allowing for such transfers. Approximately 43% of patients had been admitted to the FPICU on more than two prior occasions.

The most common reasons for admission were: (1) threats of violence and/or physical assault towards staff and other patients; (2) substance-related behaviours; and (3) deterioration in mental state and/or behaviour. Importantly, half of the patients required a transfer to another unit following their stay in the FPICU.

The characteristics of individuals in the FPICU and NFPICU groups are summarised in Table 4. Across the entire sample, the majority held Belgian citizenship, and only a minority were married or living in a common-law partnership at the time of the index offence. FPICU individuals were generally younger and had shorter stays at the forensic hospital compared to their NFPICU counterparts. They also demonstrated a higher prevalence of non-sexual violent and non-sexual non-violent offences, whereas NFPICU individuals showed a higher prevalence of sexual offences. The same trends were observed

Table 4. Group comparisons of FPICU and NFPICU for demographic, criminological, clinical and violence risk characteristics.

	FPICU		NFPICU		p-value	Cramer's V/ Cohen's r
	n (%)	mean (SD)	n (%)	mean (SD)		
Demographic						
Belgian nationality	122 (69.32)		131 (77.98)		NS	
Married/cohabitation	8 (4.54)		7 (4.17)		NS	
Age admission (years)		33.47 (10.18)		37.41 (10.40)	<0.001*	0.20
Length of stay (years)		7.19 (6.17)		11.30 (9.15)	<0.001*	0.24
Judicial						
Qualification index offence						
Sexual offences	30 (17.05)		64 (38.10)		<0.001*	0.24
Violent non-sexual offence	99 (56.25)		69 (41.07)		0.003*	0.15
Non-violent non-sexual offence	121 (68.75)		86 (51.19)		<0.001*	0.18
Prior convictions	123 (70.69)		110 (72.85)		NS	
Qualification prior conviction					NS	
Sexual offences	29 (16.67)		30 (20.00)		NS	
Violent non-sexual offences	86 (49.43)		66 (44.00)		NS	
Non-violent non-sexual offences	113 (64.94)		93 (62.00)		NS	
Psychiatric diagnosis						
Any mental disorder	152 (86.36)		116 (69.05)		<0.001*	0.21
Psychotic disorder	97 (55.11)		72 (42.86)		0.015	0.12
Substance use disorder	93 (52.84)		43 (25.60)		<0.001*	0.28
Mood disorder	31 (17.61)		44 (26.19)		0.036	0.10
Anxiety disorder	10 (5.68)		24 (14.29)		0.006*	0.14
Comorbidity mental disorder	123 (69.89)		85 (50.60)		<0.001*	0.20
Any personality disorder (PD)	127 (72.16)		131 (77.98)		NS	
Antisocial PD	58 (32.95)		40 (23.81)		0.039	0.10
Schizoid PD	2 (1.14)		10 (5.95)		0.014	0.13
Obsessive-compulsive PD	4 (2.27)		11 (6.55)		0.046	0.10
Narcissistic PD	2 (1.14)		8 (4.76)		0.045	0.11
Comorbidity personality disorder	31 (17.61)		44 (26.19)		0.036	0.10
Comorbidity mental and personality disorder	144 (81.82)		123 (73.21)		0.037	0.10
Coercive measures						
Use of seclusion	161 (91.5)		128 (76.2)		<0.001*	0.21
		3.06 (1.94)		1.89 (1.74)	<0.001*	0.31
Use of restraint	77 (43.8)		33 (19.6)		<0.001*	0.26
		0.82 (1.25)		0.27 (.68)	<0.001*	0.27
Involuntary medication	116 (65.9)		39 (23.4)		<0.001*	0.43
		7.92 (26.72)		1.93 (8.74)	<0.001*	0.44
PCL-R						
Total score		20.45 (6.48)		17.07 (6.49)	<0.002*	0.24
Interpersonal/affective factor		8.45 (3.57)		6.54 (3.53)	<0.001*	0.26
Interpersonal facet		3.46 (2.18)		2.22 (2.08)	<0.001*	0.30
Affective facet		4.97 (1.88)		4.31 (2.19)	NS	
Social deviance factor		11.35 (3.82)		9.77 (4.20)	0.016*	0.19
Lifestyle facet		5.40 (2.18)		5.09 (2.14)	NS	
Antisocial facet		5.92 (2.31)		4.69 (2.78)	0.005*	0.22
Cut-off 25	17 (25.00)		13 (12.87)		0.035*	0.16
VRAG						
Total score		8.75 (9.40)		3.20 (11.21)	<0.001*	0.27
HCR-20						
Total score		27.59 (5.43)		24.94 (5.70)	0.009*	0.25
Historical factor		14.98 (3.09)		13.53 (3.67)	0.034	0.20
Clinical factor		6.65 (1.80)		5.39 (2.08)	0.002*	0.30
Risk factor		6.00 (1.66)		5.87 (1.53)	NS	

FPICU: forensic psychiatric intensive care unit; NFPICU: inpatients who did not stay in the FPICU; PCL-R: Psychopathic Checklist-Revised; VRAG: Violence Risk Assessment Guide; HCR-20: Historical Clinical Risk-20; Cramer's V / r: effect size. *significant at Bonferroni correction. NS: non-significant result.

for prior convictions, although the differences were not statistically significant.

Clinically, the prevalence of mental disorders and comorbidity was higher among FPICU individuals compared to NFPICU individuals. Specifically, more FPICU patients were diagnosed with substance use and psychotic disorders, whereas anxiety and mood disorders were more prevalent among NFPICU patients. Regarding personality disorders, antisocial personality disorder was more frequently diagnosed in FPICU individuals, while

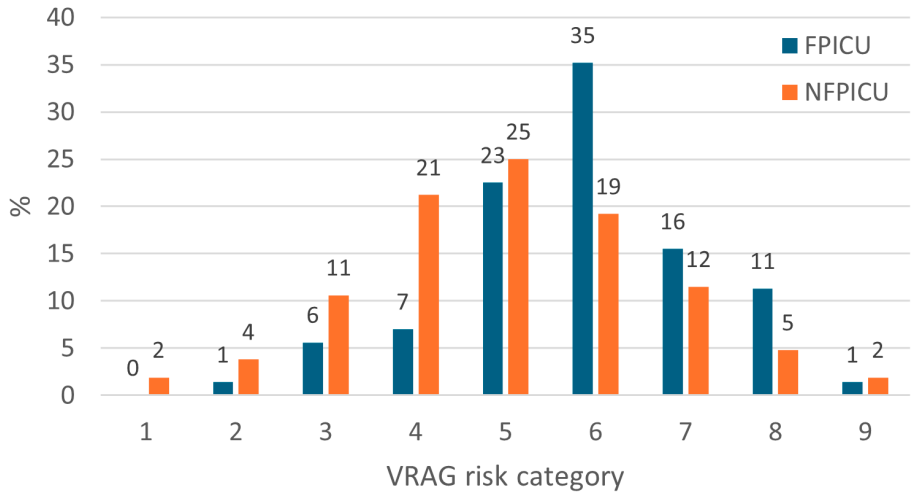

Fig. 1. Percentage distribution of patients across VRAG risk categories by sample. FPICU, forensic psychiatric intensive care unit; NFPICU, patients not admitted to the FPICU.

schizoid, obsessive-compulsive, and narcissistic personality disorders were more common among NFPICU individuals. Finally, the prevalence of comorbidity between mental and personality disorders was higher among FPICU patients compared to NFPICU patients.

In terms of coercive measures, FPICU individuals experienced seclusion and restraint more often than their NFPICU counterparts. Furthermore, healthcare professionals administered involuntary treatments significantly more frequently for FPICU patients.

Regarding the risk of violent recidivism, FPICU individuals exhibited a higher risk profile on the HCR-20 (except for the Risk Management factor), VRAG, and PCL-R (excluding the Lifestyle facet). A greater proportion of NFPICU individuals fell into the low and moderate VRAG risk categories (Fig. 1), whereas a higher proportion of FPICU individuals were classified into the higher risk categories, $\chi^2(1, n = 175) = 16.13$, $p = 0.041$, Cramer's $V = 0.30$. Lastly, using a cut-off score of 25, a significantly larger proportion of FPICU individuals were identified as psychopathic compared to the NFPICU group.

Discussion

FPICUs are increasingly established and recognised as an essential component of the forensic care landscape. Patients admitted to these psychiatric units are often considered difficult to treat and manage within conventional care settings. However, no studies currently exist on the specific psychiatric and risk profiles of these patients in Belgium. In this study, we first described the profile of patients admitted to the FPICU. We then compared, over a 6-year follow-up period, the demographic, clinical, and criminological profiles of a large sample of forensic psychiatric patients who stayed in the FPICU with those who did not (NFPICU).

Severe psychiatric profiles & high violence risk in the FPICU

Consistent with the existing FPICU literature (Dolan & Lawson 2001; Kasmi 2010; Jones et al. 2023), most FPICU patients in this study were under 40 years old and predominantly single. They committed fewer sexual offences, with a higher prevalence of violent non-sexual and non-violent non-sexual offences compared to NFPICU patients. As anticipated, FPICU patients exhibited a more severe psychiatric profile. This is consistent with the results of previous studies (Dolan & Lawson 2001; Kasmi 2010; Jones et al. 2023), which reported a higher prevalence of substance use disorders, psychotic disorders, and comorbid mental health issues in FPICU patients.

These results align with research suggesting that the risk of violence is elevated by the presence of psychotic (Fazel et al. 2014) or substance-related disorders (van der Kraan et al. 2014). The risk is further exacerbated when both conditions are present concurrently (Fazel et al. 2009; Van Dorn et al. 2012; Pickard & Fazel 2013; Witt et al. 2013). In forensic patients with schizophrenia spectrum disorders, co-occurring substance use can worsen the onset and severity of symptoms, impair cognitive functioning, and increase the likelihood of antisocial behaviour (Patterson et al. 2021).

In our study, these psychiatric and risk factors were reflected in the primary reasons for FPICU admissions: threats of violence, physical assaults on staff or patients, and substance-related behaviours. The high prevalence of antisocial personality disorder and particularly psychopathy among FPICU patients further emphasises the

severity of their profiles. Additionally, FPICU patients were more likely to have committed violent non-sexual offences and exhibited higher static and dynamic violence risk scores.

These findings highlight the importance of intensive treatment for substance use disorders within this subgroup of patients (Fazel et al. 2009). Implementing such interventions during their stay in forensic care, as recommended by the Risk-Need-Responsivity model (Bonta & Andrews 2016), could significantly reduce the risk of violence. Indeed, adjusting treatment intensity and duration based on individual patient profiles is crucial. In addition, it is interesting to specify profiles in terms of primary or secondary criminogenic factors. For patients whose primary criminogenic risk factor is substance abuse, their history of offending is directly tied to long-term patterns of substance use. Conversely, for those where substance abuse is a secondary risk factor, it represents just one of several criminogenic needs. The latter group often constitutes the majority (van der Kraan et al. 2014).

Addressing substance abuse should be prioritised and could be achieved through collaboration between forensic and addiction services or by enhancing forensic mental health training to include specialisation in substance abuse (Pickard & Fazel 2013). The creation of a cross-disciplinary team specialising in addiction management would be a significant improvement. Such a team could address substance use issues across all units, not just in FPICUs, thereby helping to mitigate the violence risk associated with substance use. This is especially important given that addiction treatments often require long durations, frequently exceeding 75 months (van der Kraan et al. 2014). Furthermore, reducing violent behaviour depends not only on addressing substance use but also on considering other factors. These include dispositional factors such as age, historical factors like parental abuse and neglect, and clinical factors such as threat perception (Van Dorn et al. 2012).

Extensive use of coercive measures in the FPICU

Crisis management in forensic psychiatry requires a stepped approach tailored to the patient's care and security needs. It also demands a multidisciplinary bio-psychosocial framework, encompassing biological, psychological, social, and environmental interventions to address the complex needs of patients (Atakan & Duddu 2008). This approach spans seven key domains: (1) physical health (Darsonville et al. 2022; Jeanmart et al. 2023); (2) mental health; (3) substance use disorders; (4) problem behaviours/criminogenic needs; (5) self-care and daily activities; (6) education, occupation and creativity; and (7) family relationships (Kennedy 2022).

In forensic settings, the primary goal of treatment is often to address factors contributing to violence. This includes managing treatment-resistant mental disorders, complex comorbidities, and challenging behaviours, which are prevalent among FPICU patients (Kennedy 2022). Ensuring a therapeutically safe environment is critical (Kennedy et al. 2020). Noncompliance with medication is a key factor distinguishing offending patients from nonoffending ones, especially among those with schizophrenia and comorbid substance use disorders (Bender et al. 2024). Conversely, medication adherence, particularly to antipsychotics such as clozapine, is linked to lower rates of violent and non-violent offences (Frogley et al. 2012; Witt et al. 2013; Rezansoff et al. 2017; Dell'Osso et al. 2024). In violence prevention, forensic psychiatrists often face situations in which they must refuse requests to reduce or discontinue medication (Kennedy 2022).

To manage crises, involuntary medication, or rapid tranquillisation, is sometimes necessary. This aligns with our findings that FPICU patients had higher rates of involuntary medication use compared to NFPICU patients, whose rates (23.4%) align with international prevalence for mental health facilities (25.7%) (Belayneh et al. 2024) but exceed those in Flemish Forensic Psychiatric Centers (FPC) (12.2%) (van Heesch et al. 2022).

Other coercive measures were often necessary. Consistent with previous studies on forensic FPICUs (Dolan & Lawson 2001; Kasmi 2010; Jones et al. 2023) this study records wide use of seclusion and restraint when preventive measures proved insufficient. The prevalence of physical restraint in the NFPICU (19.6%) was slightly higher than international data for adult mental health facilities (14.4%) (Belayneh et al. 2024) but significantly higher compared to Flemish FPC (0.8%) (van Heesch et al. 2022). This discrepancy can be attributed to the policy in Flemish FPC, where a non-mechanical restraint approach is adopted, and restrictive devices are generally not available in wards or seclusion rooms, probably explaining the minimal use of this intervention.

Finally, seclusion was the most frequently used coercive measure in forensic settings, with a prevalence of 76.2% in this study compared to 48.3% in Flemish FPC (van Heesch et al. 2022) and 15.8% in adult mental health facilities (Belayneh et al. 2024). The higher prevalence observed here may be due to our calculation method, which considered the presence of at least one seclusion episode during the six-year follow-up period, even if the mean number of episodes per patient remained low. However, this finding aligns with previous research showing that the combination of psychotic and personality disorders predicts both the likelihood and duration of seclusion episodes (van Heesch et al. 2022).

Most patients perceive seclusion and restraint negatively, although most also believe that their use is appropriate at times in a context of agitation and aggression (Haw et al. 2011). Most patients view seclusion and

restraint negatively, though many acknowledge their necessity in cases of severe agitation or aggression (Haw et al. 2011). These interventions are acceptable when used as a last resort, proportionate to the risk involved, applied for the shortest duration, and compliant with legal regulations to respect human rights (Kennedy et al. 2020). To assess their benefits, structured tools such as the DRILL (Dundrum restriction, intrusion and liberty ladders) may be employed (Kennedy et al. 2020).

Effective organisation requires staff to record seclusion or restraint observations every 15 minutes, seek a second opinion after four hours, and ensure that these measures do not exceed 24 hours (De Cuyper et al. 2023). Maintaining regular communication between patients and healthcare professionals helps transform these measures into therapeutic care rather than mere deprivation of liberty (Shetty et al. 2023).

In terms of organisation, staff should check that observations and evaluations of seclusion or restraint are recorded every 15 minutes, should request a second opinion at the latest after 4 hours of using restraint or seclusion and the maximum duration of these measures should never exceed 24 hours (De Cuyper et al. 2023). To ensure that these measures are part of care and not simply a deprivation of liberty, they must maintain regular communication between the patient and healthcare professionals, thus maintaining contact with the outside world. Involving patients as much as possible in meaningful activities during seclusion, according to their preferences (e.g. reading newspapers, poems, stories, or a chapter of a book) via the viewing panel could help ensure this such connectedness (Shetty et al. 2023).

Moreover, seclusion and restraint reduction programs emphasise leadership, training, post-event reviews, patient involvement, prevention strategies, and fostering a therapeutic environment (Goulet et al. 2017). Staff training and systematic assessment of aggressive behaviour are essential (Dahm et al. 2017). Empowering patients by incorporating their perspectives on coercive treatments into care plans can reduce distress associated with such interventions (WHO 2010). To enhance patient education, proactive measures such as providing jointly developed brochures or allowing patients to express preferences through advance directives regarding emergency medication administration could be implemented (Haw et al. 2011; Shetty et al. 2023).

Preventing coercive measures: Positive Behavioural Support, & Forensic High & Intensive Care approaches

To prevent the need for coercive interventions in crisis management and enhance care and safety, it is crucial to reduce violence risks. This involves addressing challenges such as non-adherence to treatment protocols, including medication and psychological therapies (Witt et al. 2013), and fostering an environment where staff feel empowered to safely address beliefs and behaviours associated with violence (Kennedy 2022).

The positive behavioural support (PBS) approach is particularly relevant in forensic settings. By applying behavioural psychology principles, PBS aims to manage challenging behaviours, promote positive changes, and reduce the use of punitive measures. It focuses on understanding behavioural triggers and reinforcing pro-social skills, creating a supportive environment that prioritises rehabilitation and safety (Hughes & Davies 2018). PBS emphasises collaboration with patients to develop adaptable care plans that support motivation for change. Given the significant restrictions on forensic patients' freedom, creating an environment grounded in empowerment is vital (WHO 2010). Empowerment involves offering care options that patients can voluntarily accept rather than imposing them (Davies et al. 2016).

For example, patients managing substance-related disorders who willingly engage in monitoring may benefit from reduced restrictions, encouraging accountability and reducing risks related to both substance use and violence. This approach would also promote their personal responsibility and understanding of risk, thus fostering their ability to make better life choices (Pickard & Fazel 2013). The Dynamic Appraisal of Situational Aggression (DASA-IV) tool can help tailor intervention levels based on short-term violence risk indicators, such as irritability, impulsivity, and refusal to follow instructions (Ogloff & Daffern 2006). Guidelines align DASA-IV scores with PBS interventions: primary prevention for low scores (0–1), secondary strategies for moderate scores (2–3), and reactive measures for high scores (4 or more) (Davies et al. 2023). Despite its benefits, implementing PBS in FPICUs can be challenging due to the need for extended hospital stays, sufficient staff resources, and effective coordination for accurate information sharing (Davies et al. 2023).

Similar to PBS, high intensive care (HIC) offers tailored, evidence-based interventions to meet diverse mental health needs. Both approaches advocate collaborative efforts among multidisciplinary teams, patients, and families to develop personalised care plans that promote recovery and minimise coercion. In forensic settings, HIC emphasises risk assessment, incident response, and team consistency aligned with forensic care (Gerritsen et al. 2022). This model is being adopted at the Centre Régional Psychiatrique 'Les Marronniers' in Tournai, where staff managing patients in intensive care often face challenges such as inadequate problem identification, insufficient staff training, and inappropriate treatment plans (Atakan & Duddu 2008). The implementation of PBS and HIC approaches would help overcome these

obstacles to care and prevent lengths of stay from much longer than those usually found in PICU units (30 days) (Beer et al. 1997; Crowhurst & Bowers 2002; Felix 2023) or FPICU (Dolan & Lawson 2001; Kasmi 2010; Jones et al. 2023). Lengths of stay are closer to those found in the Unités pour Malades Difficiles (Lassus Saint-Genies et al. 2024). Differentiating between FPICU and Unités pour Malades Difficiles would enable us to better target patients in crisis. Indeed, half of all patients are referred to a new unit after their stay in the FPICU. In addition, we think it is necessary to establish a transfer protocol with clear communication between the teams and better collaboration on FPICU referral, including: reason for admission, proposed/expected interventions, patient orientation on leaving the crisis, feedback on what enabled de-escalation and stabilisation of the patient.

Limitations & future directions

It would be highly valuable to extend this study by adopting a dynamic and longitudinal approach to better understand how patients are triaged for both clinical care and risk management purposes. Regarding treatments, crisis management relied solely on the six previously mentioned intramuscular medications. Expanding the range of treatments, including oral and intramuscular options, would be beneficial. Additionally, some benzodiazepine injections may have been administered to manage epileptic seizures, highlighting the need for further investigation into their specific use.

A detailed study on medications used for agitation states and the evaluation of long-term treatments for these patients would provide meaningful insights. Similarly, future research could offer a more precise assessment of restraint and seclusion practices, considering their frequency and duration rather than merely noting their occurrence over six years. It would also be important to consider potential differences in staff composition and professional roles between FPICU and non-FPICU settings, as such variability may influence the use of restrictive practices and treatment approaches.

Furthermore, assessing the quality of life of FPICU patients within this forensic setting is relevant (Saloppé & Pham 2006, 2007; Pham & Saloppé 2013). Beyond examining civil status, evaluating perceived social support using tools such as the Social Support Questionnaire (SSQ6) (Bruchon-Schweitzer et al. 2003) and objective metrics such as visit frequency, telephone contacts, and family interviews, would provide a comprehensive understanding of their social well-being.

Conclusion

This inaugural Belgian study of FPICU patients highlights their complex psychiatric profiles, marked by substance abuse, psychotic disorders, and antisocial personality disorders with psychopathy. These individuals also present a heightened risk of violence, non-sexual violent offences, and frequent use of coercive measures, including involuntary treatment, seclusion, and restraint. The findings emphasise the need for tailored interventions and multidisciplinary approaches in forensic psychiatric care, such as positive behavioural support (PBS) and high intensive care (HIC) models. Implementing these strategies, particularly in forensic settings like the Centre Régional Psychiatrique 'Les Marronniers' may help address challenges in managing patients in intensive care units, reduce lengths of stay, and support patient reintegration into their original care units through enhanced crisis management protocols and improved inter-team communication.

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Author contributions

Conceptualization Oriane de Martynoff (OdM), Caroline Benouamer (CB), Ann Darsonville (AD), Frédéric Bacart (FB), Benjamin Delaunoit (BD), Gwenaelle Tantot (GT), Xavier Saloppé (XS); **Formal Analysis** XS; **Investigation** OdM, CB, AD, FB, BD, Gaëlle Dupont; **Methodology** OdM, CB, AD, FB, BD, GT, XS; **Supervision** XS; **Visualization** XS; Writing **– Original Draft** OdM, XS; **Writing – Review & Editing** OdM, CB, AD, GT, Thierry H. Pham, XS.

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