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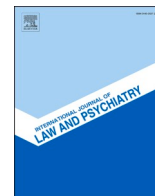
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Dual harm: Violent behaviour to others and self-harm behaviour in adults compulsorily admitted to a Dutch psychiatric hospital

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ABSTRACT

Background: Verbal and physical violence in psychiatric hospitals can have harmful consequences for staff members, such as physical injury, traumatisation, and sick leave, and they often accompany involuntary admission. Harm to others may co-occur with self-harm, i.e., dual harm. However, little is known about the association between dual-harm and violent behaviour towards staff members and its clinical outcomes, such as seclusion and rapid tranquilisation after involuntary admission to a psychiatric inpatient unit.

Method: A convenience sample of patients admitted involuntarily ($N = 384$; mean age = 48.03, $SD = 19.92$) between January 2016 and December 2019 in Western Brabant, the Netherlands, was used to design a retrospective file audit. Distinct harm groups, marked by the presence/absence of self- and/or other-harm, were investigated using multivariate linear regression modelling on the seriousness of violent acts and the total length of admission. Logistic regression analyses were used to study the association between harm groups and the administration of rapid tranquilisation, seclusion, and extended involuntary admissions.

Results: Several harm groups were identified, including self-harm only, other-harm only, and dual-harm groups. Psychiatric patients admitted to the hospital because of (the risk of) violence towards others had a higher risk of violent incidents during admission and some restrictive measures. In a subgroup of patients with psychotic disorders, patients with dual harm committed the most serious violent incidents compared to those in the other harm groups.

Conclusion: Distinct harm groups were identified in a sample of involuntarily admitted patients. In a general adult psychiatric setting, patients at risk for violent behaviour, especially dual-harm patients, should be identified and monitored as part of the risk assessment. Future research is needed to explore more clinical correlates in the proposed distinction between harmful groups and to assess long-term prognosis.

1. Background

Verbal and physical violence in psychiatric wards is a major hazard. In addition to physical injury to staff workers or other patients, it may result in higher levels of burnout, anxiety, or sleep disturbances among

staff workers, and higher staff turnover and incidence of sick leave (Inoue, Tsukano, Muraoka, Kaneko, & Okamura, 2006; Sofield & Salmond, 2003). Physical violence committed by a patient in psychiatric wards is also associated with longer involuntary admissions at the individual patient level (Dack, Ross, Papadopoulos, Stewart, & Bowers,

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2013; Iozzino, Ferrari, Large, Nielssen, & de Girolamo, 2015).

Recently, increased attention has been paid to the combined occurrence of self- and other-directed aggressive behaviour in adults (Harford, Chen, Kerridge, & Grant, 2018; Sahlin et al., 2017). Previous systematic reviews have confirmed the co-occurrence of suicidal behaviour, non-suicidal self-injury, and other-directed aggression in clinical samples (O'Donnell, House, & Waterman, 2015; Shafiqi, Taylor, Forrester, Handerer, & Pratt, 2023). The combination of violent behaviour towards others and self-harming behaviour, also called dual harm, is associated with more child victimisation, lower self-control, lower IQ, more substance use problems, and the display of more psychotic experiences compared with self-only harm (Richmond-Rakerd et al., 2019).

The developmental trajectory of dual harm puts individuals at risk of developing substance use disorders, personality disorders (notably borderline or antisocial personality disorders), and completed suicide (Harford et al., 2018; Harford, Chen, Kerridge, & Grant, 2019; Steeg et al., 2019). To date, dual harm and its association with inpatient aggression and clinical outcomes have not been extensively studied. Tardiff (1981) compared violent and nonviolent adult long-stay inpatients with suicidal behaviour and found no differences in psychopathology between the dual-harm group and the self-harm-only group; however, the dual-harm group experienced involuntary medication and seclusion more frequently. In a sample of acute involuntarily admitted patients, Swogger, Walsh, Homaifar, Caine, and Conner (2012) found that the dual-harm group had more anger and antisocial traits than the no-harm and self-harm-only groups. In summary, while inconsistencies remain in the definitions of both suicidal behaviour and aggression (Shafiqi et al., 2023), most studies have indicated that dual harm is associated with poorer clinical outcomes.

Little is known about dual harm and compulsory acute treatment in the context of general adult psychiatry and inpatient treatment. Psychiatric emergencies arise in the context of enduring psychological and social stress, often exacerbated by acute adversities experienced by the patient. After an assessment, involuntary admission to a psychiatric hospital may be warranted because of several criteria, such as the risk of attempted or completed suicide, the risk of violent behaviour towards others and/or other forms of neglect, victimisation, or societal threats, in combination with having a dangerous psychiatric disorder and no alternative for admission. In the Netherlands, the Dutch Law on Special Admissions to Psychiatric Hospitals (*Wet bijzondere opnemingen in psychiatrische ziekenhuizen*; Bopz), which was active until the end of 2019, covered both emergency procedures for involuntary admission in a psychiatric hospital, ordered by the local mayor, and non-acute procedures, ordered by a civil court. Crisis teams operating 24 h a day and seven days a week typically initiate emergency procedures when patients suffer from a severe psychiatric disorder that causes danger to themselves and/or others. Involuntary admission is only allowed when patients do not consent to admission or treatment, and immediate action is necessary to reduce the level of danger. The dangerousness criteria can involve both harm to the patient and harm to others. Further involuntary interventions, such as seclusion and rapid tranquilisation, were permitted only in the context of involuntary admission until the end of 2019. Moreover, until recently in the Netherlands, seclusion was considered less invasive to patient autonomy than involuntary rapid tranquilisation (Janssen et al., 2011). Other restrictive measures such as restraint are rarely applied in the Netherlands (Steinert et al., 2010).

In a survey of 40 EU countries, the legislation on compulsory treatment was based on the need for both medical treatment and dangerousness (Wasserman et al., 2020). Few studies have addressed the dangerousness criteria for compulsory admission and their association with clinical features (e.g., De Jong, Wierdsma, van Baars, Van Gool, & Mulder, 2019). However, none of these studies considered the distinction between harmful groups. Investigating the clinical correlates of dual harm could provide insights into new ways to prevent inpatient aggression and raise awareness among staff workers regarding elevated

risks in the clinical management of these patients. To date, there is a lack of high-quality proof of pre-event risk assessment in reducing aggressive incidents directed at healthcare workers in psychiatric settings (Spelten et al., 2020). Therefore, we examined the following research questions: 1. Can distinct subgroups of dangerous behaviour ("harm groups") be found in a convenience sample of compulsory admitted psychiatric patients? 2. Are any harmful subgroups associated with verbal or physical violence towards caregivers during hospital admission (primary outcome)? 3. Are any of the subgroups associated with short-term involuntary measures such as forced rapid tranquilisation, seclusion, or extended (in)voluntary admission (secondary outcome)?

We hypothesised that patients with dual harm and harm to others only caused more violent acts towards caretakers during hospital admission and were more often treated with further involuntary measures than patients with self-harm only or patients with no harm at all. Next, we hypothesised that dual harm and other harm-only patients caused violent incidents equally.

2. Methods

A convenience sample of patients admitted involuntarily from January 2016 to December 2019 in Western Brabant, a semi-rural region in the Netherlands, covering approximately 300,000 inhabitants, was collected using a nationwide register database that collects data on all emergency procedures resulting in compulsory admission. We collected data only until December 31, 2019, due to the introduction of a new mental health law, the Compulsory Mental Health Care Act (CMHCA) (*Wet verplichte geestelijke gezondheidszorg*), on January 1, 2020, in the Netherlands which regulates compulsory care for persons suffering from a mental disorder instead of regulating involuntary admission alone. Under current law, involuntary treatment can also be imposed outside hospitals, communities, and homes.

Additional clinical information was retrieved through a retrospective medical file audit and by scrutinising a register archived to report incidents within psychiatric hospitals, which is mandatory in the Netherlands according to regulations imposed by Dutch law (*wet kwaliteit klachten en geschillen in de zorg*). Healthcare workers reporting incidents during inpatient treatment are trained to safely report incidents (PRISMA/HFMEA), with regular follow-up courses.

Data were collected from medical files and the institute incident register by two independent researchers with excellent clinical experience.

2.1. Ethical issues and data processing

Under the Netherlands Agreement on Medical Treatment Act (WGBO), patient record research does not require informed consent if individual patients cannot be identified based on the data. Our study was approved by the Medical Research Committee (MREC) of GGZ WNB, which classified the study as outside the scope of the Netherlands Medical Research Involving Human Subjects Act (Dutch abbreviation WMO) and confirmed that no informed consent was required. As required by applicable Dutch laws, all researchers involved were bound to strict confidentiality.

According to our protocol, two independent researchers gathered data from the patient records. The patient record numbers were irreducibly coded to a research number by a research assistant at the Research Bureau, who was not involved in the research itself and had no access to the patient records. The coding list was stored at the Research Bureau and was inaccessible to all researchers involved. All data derived from the patient records were anonymised and saved according to the research numbers.

Inclusion and Exclusion criteria: All involuntarily admitted patients between 1 January 2016 and 31 December 2019 and within the age range of 18–99 ($N = 520$) were included. We excluded 12 minors (patients aged <18 years on the date of admission) and 47 patients admitted

to other hospitals or settings (including nursing homes). We were unable to find patient records for seven patients. A total of 454 involuntary admissions of 384 patients were included in the analyses. Regression analyses were performed on the first involuntary admission of patients by excluding those with a main diagnosis of neurocognitive disorders ($N = 52$).

2.2. Measures

2.2.1. Dangerousness criteria

The eight immediate dangerousness criteria of the emergency procedure of the Dutch Mental Health Act are as follows: 1) Danger of completed suicide or serious self-harming behaviour. 2) Danger of an individual's social breakdown. 3) Danger of the individual seriously neglecting him/herself. 4) The danger that the individual's behaviour will provoke other people's aggression towards him/herself. 5) Danger that the patient will kill or hurt someone else. 6) Danger relating to others' psychological well-being 7) Danger: The patient will neglect someone else for whom he/she cares. 8) Danger relating to the general safety of persons or goods.

Four dangerousness categories were created based on these eight items that are coded in the medical report: a) the 'self-harm only' group included patients with criterium 1 (suicidal behaviour and/or self-harm), but without criterium 5 and 8; b) the 'other-harm only' group, included patients with criterium 5 and/or 8 (aggressive behaviour directed to other persons and/or goods), but without criterium 1; c) the 'dual-harm' group, including patients with criterium 1 and criterium 5 and/or 8; and d) the 'no harm group', including patients with other dangerousness criteria, but without criteria 1, 5 and 8.

Covariates included age, sex, and country of birth, which were derived from the medical records. The country of birth status was double-checked using municipal registration data. Country of birth was defined as 1) born in the Netherlands, 2) born in another Western country, or 3) born in a non-Western country. According to the Dutch standard classification criteria for Statistics Netherlands includes all the countries in Europe (except Turkey), North America, Oceania, Indonesia, and Japan. Non-Western countries included all countries in Asia (except Indonesia and Japan), Africa, Latin America, and Turkey.

Psychiatric diagnoses were obtained from medical reports upon involuntary admission. The main psychiatric diagnosis is a mandatory field in medical reports, as persons without (a seriously suspected) severe psychiatric disorder are not allowed to be admitted to a psychiatric hospital. Additional comorbidities were included separately. Psychotic disorders included schizophrenia, delusional disorders, or other psychotic disorders. Mood disorders included unipolar and bipolar disorders with or without psychotic features. Other diagnoses included intellectual disabilities, developmental disorders, personality disorders, substance use disorders, and behavioral disorders.

2.3. Outcome variables

Violent acts towards staff workers were defined as any acts of violence during the first 30 days of involuntary hospital admission and included verbal and/or physically violent acts directed towards staff workers. Examples of verbal violence include threats, insults, and discriminatory remarks. Examples of physical violence include hitting, throwing objects, kicking, pushing, stalking, and biting. The severity of any incident occurring 24 h/7 days was scored by trained staff on a 4-point Likert scale ranging from 1 (near incident) to 4 (very serious incident with long-lasting physical and/or mental injury to the victim). The incidents were registered in a digital safety portal within the hospital. Incidents at Levels 3 and 4 were discussed and analysed by a committee for quality and safety improvement.

Administration of involuntary *rapid tranquilisation* within seven days after admission (yes/no) was derived from the doctor's daily reporting on the administration of drugs. The timeframe of seven days was chosen

as most acts of violence in an inpatient ward occur in the first week of admission (Serper et al., 2005).

Seclusion within seven days of admission (yes/no) was derived from daily reports on seclusion.

Continuation of involuntary admission after three days, as judged by the court (yes/no), was derived from the court's decision which is mandatory to keep in the medical file.

Total length of admission (number of days; upper threshold: 199 days) was retrieved from the medical files.

2.4. Statistical analysis

All analyses were performed using IBM SPSS v26. Demographics for the entire sample and each sex are described (age, sex, and country of birth). Comparisons of baseline characteristics between sexes were performed using *t*-tests for normally distributed continuous variables, Mann-Whitney *U* tests for non-normally distributed continuous variables, and chi-square tests for categorical variables. Correlations were measured for all covariates, predictors, and outcome variables using Pearson correlations for continuous and dichotomous variables and Spearman's rho for categorical variables. All assumptions for performing the linear regression analysis were checked, and no violations were found for linearity, multicollinearity, or homoscedasticity. We used linear regression models to assess the effect of harm groups (dummy-coded categorical determinants) on the seriousness of violent acts and the total length of admission, controlled for age and gender. Patients who were involuntarily admitted due to self-harm belonged only to the reference category. We used logistic regression analyses to assess the effect of the harm group on the administration of rapid tranquilization, seclusion, and extended involuntary admissions. A *p*-value of <0.05 was considered statistically significant.

3. Results

3.1. Baseline characteristics and attribution to harm groups

The interrater agreement for all determinants and outcome variables ranged from 90% to 98.6%. Data are available for all the variables of interest.

The baseline characteristics of the study participants are shown in Table 1. Overall, the sample consisted predominantly of individuals of Dutch origin, equally distributed across sexes, with psychotic disorders as the main psychiatric diagnosis at the time of assessment. Males were overrepresented in the other-harm-only subgroup and females in the self-harm-only group, whereas no significant sex differences were found in the prevalence of dual harm as a dangerous subgroup.

Also, when integrating comorbid disorders at the time of assessment, psychotic disorders remained the most prevalent in the total sample ($N = 198$; 52%), followed by mood disorders ($N = 120$; 31%), personality disorders ($N = 117$; 30%), and substance use disorders ($N = 101$; 26%). The most prevalent main psychiatric diagnoses in the self-harm-only group were mood disorders (39%), whereas psychotic disorders were the most prevalent diagnoses in the other-harm-only (58%) and dual-harm groups (37%). Personality disorders were associated mostly with the self-harm-only group (54%), followed by the dual-harm group (24%), and the other-harm-only group (18%).

Regarding outcomes, 70 of 384 (18%) patients were admitted involuntarily more than once in the 4-year timeframe (range 1–7 times). In total, 84 (22%) patients experienced a violent incident within 30 days of involuntary admission (range 1–4 times per admission), resulting in a total of 111 incidents. These incidents concerned 53 physically violent acts, 9 verbally violent acts, and 49 acts with both physical and verbal violence. The median length of hospital stay was 34 days (range 2–199 days). The involuntary admission was sustained by the judge in 64% of admissions, involuntary rapid tranquilisation was administered in 28% of admissions, and involuntary seclusion was applied in 40% of

Table 1

Baseline characteristics and classification of psychiatric diagnosis and harm groups.

	Total Sample	Male	Female	Test statistic m/f comparison
Age (M, SD, range 18–93)	48.0 (19.9)	47.8 (20.2)	48.2 (19.6)	$T = 0.56, p = 0.57$
Sex (N, %)	384	202 (53%)	182 (47%)	–
Country of birth (N, %)				$\chi^2 = 3.27, p = 0.19$
Dutch	312 (81%)	157 (41%)	155 (40%)	
Other Western	28 (7%)	17 (4%)	11 (3%)	
Non-Western	44 (12%)	28 (7%)	16 (4%)	
Main psychiatric diagnosis (n, %)				$\chi^2 = 36.19^*$
Psychotic disorder	153 (40%)	96 (48%)	57 (31%)	3.2**
Mood disorder	90 (23%)	32 (16%)	58 (32%)	–3.7**
Personality disorder	27 (7%)	4 (2%)	23 (10%)	–4.1**
Substance use	25 (7%)	14 (7%)	11 (6%)	0.4
Neurocognitive Disorder	52 (14%)	33 (16%)	19 (10%)	1.7
Other	37 (10%)	23 (11%)	14 (8%)	1.2
Harm group (N, %)				$\chi^2 = 60.21^*$
Self-Harm only	97 (25%)	25 (12%)	72 (40%)	–6.1**
Other-Harm only	160 (42%)	113 (56%)	47 (26%)	6.0**
Dual Harm	88 (23%)	53 (26%)	35 (19%)	1.6
No Harm	39 (10%)	11 (5%)	28 (15%)	–3.2**

* $p < 0.001$ significance level; **Adjusted Residual significant (< -1.96 or > 1.96) between sexes (male to female).

admissions.

3.1.1. Correlations

As age and sex were significantly correlated with at least one outcome variable, we included these covariates in the regression analysis. We found no association between country of birth and any outcome variable. The occurrence of violent incidents was moderately correlated with rapid tranquilisation ($r = 0.22; p < 0.01$), seclusion ($r = 0.21; p < 0.01$), and length of admission ($r = 0.18; p < 0.01$).

3.2. Harm groups and clinical outcome measures

Table 2 shows the results of logistic and linear regression analyses comparing the harm groups (with the self-harm group as a reference) corrected for age and sex.

The non-harm group scored higher on the severity of violent incidents during admission than the self-harm-only group. Pairwise comparisons of the dual-harm group with the other-harm-only group were also not statistically significant. In a sensitivity analysis including only patients with psychotic disorders ($n = 179$), the dual-harm group contributed uniquely to the model with the severity of violent incidents as the outcome ($B = 0.69; 95\% \text{ CI: } 0.11; 1.27, p = 0.01$), while this effect was not found for the other groups.

The duration of admission was significantly longer in the other-harm-only group than in the self-harm-only group.

In the logistic regression analyses, with the no-harm group as the reference category, we found no indication of a significant effect between the harm groups and the occurrence of a violent incident. However, comparing the other-harm-only group to the self-harm-only group revealed significantly higher odds of violent incidents (see **Table 2**). In the sensitivity analysis that included only patients with psychotic

Table 2

Associations between harm groups and clinical outcome measures in a compulsorily admitted sample of psychiatric patients.

	Severity of violent incidents during admissions		Length of admission (in days)	
	<i>B</i> (95% CI)		<i>B</i> (95% CI)	
Self-harm only (N = 91)	reference		reference	
Other-harm only (N = 141)	0.12 (–0.38; 0.64)		24.87** (8.96; 40.78)	
Dual harm (N = 74)	0.48 (–0.19; 1.17)		1.38 (–17.04; 19.82)	
No harm (N = 26)	0.02 (–0.79; 0.84)		4.34 (–22.51; 31.19)	
	Violent incidents	Rapid tranquilisation	Seclusion	Extended involuntary admission
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Self-harm only	reference	reference	reference	reference
Other-harm only	2.84** (1.30; 6.17)	2.56** (1.29; 5.07)	2.71** (1.41; 5.23)	1.69 (0.92; 3.08)
Dual harm	1.46 (0.60; 3.54)	1.61 (0.75; 3.44)	3.49** (1.70; 7.15)	0.87 (0.45; 1.67)
No harm	1.30 (0.37; 4.49)	1.20 (0.39; 3.72)	0.88 (0.29; 2.72)	1.04 (0.41; 2.59)

All analyses were controlled for age and sex; pairwise contrasts between harm groups with the self-harm-only category as a reference; * $p < 0.05$, ** $p < 0.01$.

disorders ($N = 179$), we found no indication of a statistically significant addition to the model for either harm group.

Table 2 shows the results for the harm group on rapid tranquilisation, seclusion, and extended involuntary admission. Being in the other-harm-only or dual-harm groups was significantly associated with higher odds of becoming secluded. Furthermore, the other-harm group had higher odds of receiving involuntary rapid tranquilisation than the self-harm group.

4. Discussion

In a sample of involuntarily admitted patients, we explored the associations between different forms of dangerousness and associated outcomes, including violent incidents in the ward, involuntary rapid tranquilisation, seclusion, and extended court-ordered involuntary admission. In a subgroup of patients with psychotic disorders, patients with dual harm committed the most serious violent incidents compared to those in the other harm groups.

We grouped all patients into no-harm, self-harm-only, other-harm-only, and dual-harm groups based on the dangerousness criteria upon admission. Although males were more frequently compulsorily admitted due to (the risk of) violence against others than females, we found no sex differences in the dual = harm group. Moreover, patients with dual harm in our sample did not have higher rates of either personality disorders or psychotic disorders compared to self-harm-only and other-harm-only patients. Previous research has found more psychotic experiences in dual-harming adolescents than in self- or other-harming individuals (Richmond-Rakerd et al., 2019; Spaan et al., 2022) but the association of dual harm relative to the no/self-only/other-only harm group with full-

blown psychotic disorders has not yet been established (Shafti et al., 2023). In contrast, dual harm in adults has been associated with borderline and antisocial personality disorders relative to no-harm and self-harm-only groups (Harford et al., 2018; Liem, Hengeveld, & Koenaardt, 2009); and a link between emotional dysregulation and early life adversity has been suggested (Shafti, Taylor, Forrester, & Pratt, 2021).

Our results extend earlier findings in detention settings which showed increased odds of interpersonal violence and property offences in dual-harm prisoners (Slade, 2018; Slade, Forrester, & Baguley, 2020). Notably, our sample contained relatively few patients with personality disorders and relatively more patients with psychotic disorders, whereas prison populations largely contain persons with personality disorders and a much lower proportion of persons with psychotic disorders (Fazel & Danesh, 2002). We found that the severity of violent incidents in the dual-harm group did not differ when compared to the self-harm-only and the other-harm-only groups. However, in a subsample of patients with psychosis, we found evidence of more serious violent incidents in dual-harm patients than in those showing no dual harm. Contrary to our expectations, we did not find increased odds in the dual-harm group for other markers such as length of admission, extended court order, or rapid tranquilisation. However, dual-harmers had the highest odds compared to the no-harm and self-harm-only groups who underwent seclusion.

The clinical implication of this study is that dual-harm patients have different associations with violent incidents and restrictive measures on wards. It is important to identify and monitor patients with dual harm in general adult psychiatric settings as part of a risk assessment. It is possible that to prevent future violent incidents, nursing staff are more inclined to monitor other-harm-only patients than dual-harm patients, as they may be more focused on the self-harm behaviour of the latter. Future research should assess whether these harmful groups, as defined within an involuntarily admitted clinical population, have different intrinsic risk profiles, or whether contextual factors or perceptions from staff members also play a role in these outcomes. While heterogeneity exists in operationalising the co-occurrence of self- and other-directed harm (e.g., O'Donnell et al., 2015; Shafti et al., 2021), further prospective research should clarify the validity of using a single time point of assessment of a psychiatric emergency, thus narrowing the scope to the last days, and using a broader scope when it comes to the dangerousness criteria, by including both imminent and attempted self-and/or other-directed harm. Preliminary evidence suggests that dual-harm behaviour may persist over time, highlighting the importance of signalling this subgroup (Boxer, 2010).

4.1. Strengths and limitations

Our study included a large number of patient records and full data from mandatory legal documents. Additionally, we measured a broad spectrum of violent incidents and restrictive measures. However, this study has some limitations. First, the potential reporting bias of violent incidents and dangerousness criteria could not be excluded. It is possible that some violent incidents were not reported in the register, or that attributions of severity made by staff may have been biased, for example, by the emotional state caused by the incident itself. No independent observer rated the psychiatric assessments during the emergencies. However, staff members followed proper training in reporting incidents (the PRISMA method), and all medical reports on involuntary admission were performed by consultant psychiatrists with high clinical expertise. Second, the results apply only to involuntarily admitted patients, making it impossible to conclude voluntarily admitted patients with similar dangerousness criteria. External validity may also be hampered by the specific sample, with low ethnic diversity compared to more urban samples (e.g., De Jong et al., 2019), and by the specific legal framework in the Netherlands. Third, the methodology of a retrospective file audit implied that some variables, such as the presence or lack of insight or educational level, were excluded because they were not

reliably recorded in the medical files. Future studies should include measures such as low IQ, childhood maltreatment, and victimisation which have been associated with dual harm (Richmond-Rakerd et al., 2019). Finally, disentangling violent incidents and coercive measures in real-life practice is hard to achieve, as violent incidents can be preceded or followed by coercive measures, and coercive measures can prevent or induce violent incidents.

In conclusion, psychiatric patients admitted to a psychiatric hospital because of (the risk of) violence towards others had a higher risk of violent incidents during admission and some restrictive measures. In addition, in patients with psychotic disorders, it is advisable to screen for dual-harm behaviour, as this was associated with committing the most serious violent incidents compared to all other harm groups. Future research is needed to explore more clinical correlates in the proposed distinction between harmful groups and to assess long-term prognosis.

CRedit authorship contribution statement

Philip J.S. Michielsen: Writing – review & editing, Writing – original draft, Supervision, Software, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Sander Hoogveldt:** Investigation, Data curation. **Nordin L'oihmi:** Software, Methodology, Data curation. **Sascha Sneep:** Investigation, Data curation. **Arno van Dam:** Writing – review & editing, Resources. **Cornelius L. Mulder:** Writing – review & editing, Supervision. **Witte J.G. Hoogendijk:** Writing – review & editing, Supervision. **Sabine J. Roza:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

Declaration of competing interest

The authors declare no conflicts of interest.

Data availability

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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