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FEATURE ARTICLE

Association between short-term structured risk assessment outcomes and seclusion

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ABSTRACT: *Research findings indicate that the symptoms and behaviour of acute psychiatric patients can fluctuate drastically within hours, and that structured daily risk assessments can reduce the risk of aggressive incidents and the duration of seclusion. The aim of this study was to investigate the validity of two structured observation tools, the Brøset Violence Checklist (BVC) and the Kennedy Axis V), as an aid in seclusion-related clinical decision-making. In this study, 7403 day-to-day risk assessments were collected over 10 725 admission days (72% of the maximum number of structured assessments). A total of 7055 daily assessment scores from 301 acute psychiatric patients were used for the multilevel analysis. The sample demonstrated that dynamic and static factors were related to seclusion. Dynamic factors included dysfunctional scores on the item 'confusion' of the Brøset Violence Checklist, and psychological impairment and impairment of social skills on the Kennedy Axis V. Static factors included non-Western descent, male sex, age less than 35 years, unmarried, and to some extent, a personality disorder. McFadden's pseudo R^2 value showed that most of the final model was related to the dynamic factors. We concluded that the incorporation of the BVC and the Kennedy Axis V into standard practice was helpful in identifying patients at high risk of seclusion.*

KEY WORDS: *acute psychiatric ward, risk assessment, seclusion.*

INTRODUCTION

Seclusion as a routine intervention to manage aggressive and disruptive behaviour is still in use in many countries, and a plethora of projects has been conducted to reduce the use of this controversial intervention (Gaskin *et al*. 2007; van der Merwe *et al*. 2013). A study by Steinert *et al*. (2010) revealed that seclusion rates in comparable samples varied considerably between countries, with Dutch and Finnish figures at the higher end. A European study by Raboch *et al*. (2010) found that 21–59% ($n = 2030$) of all involuntarily-admitted psychiatric patients experienced coercive interventions, including seclusion, restraint, or enforced medication. The therapeutic value of seclusion, however, is questioned by many authors (Finke 2001), and the traumatic experiences of secluded patients and nurses have been reported in a number of studies (Frueh *et al*. 2005; Hoekstra *et al*. 2004; Moran *et al*. 2009; van der Nagel *et al*. 2009). It has been observed that decisions about whether to seclude or not are often driven by local protocols and practices

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(Hyde *et al*. 2009; Keski-Valkama *et al*. 2010; Larue *et al*. 2009), without the use of structured risk-assessment tools. A study by Fiorillo *et al*. (2012) in a large sample of inpatients ($n = 3093$) among 11 European countries revealed that severe psychotic symptoms combined with poor social functioning was associated with higher levels of coercion. One of the options to reduce coercion, and more specifically, high seclusion rates, might be to frequently monitor changes in the mental state and behaviour of admitted patients (Abderhalden *et al*. 2008; Clarke *et al*. 2010; Happell & Koehn 2010; van de Sande *et al*. 2011; Slye *et al*. 2009). There is evidence that admitted acute psychiatric patients often present symptom and behaviour patterns that can fluctuate within hours (Linacker & Bush Iversen 1995; Steinert *et al*. 2007). Therefore, it can be argued that clinical decision-making needs to be reviewed on a day-to-day basis in a structured way. Little research has been done on the use of instruments to assess changes in mental state and behavioural problems as risk factors for coercive measures. However, a few studies have dealt with the association of psychiatric symptoms with aggression and seclusion (Amore *et al*. 2008; Doyle & Dolan 2006; Georgiva *et al*. 2012; Vruwink *et al*. 2012). Studies regarding risk assessment on a daily basis and during a complete admission period are scarce. One study showed that the daily use of the Brøset Violence Checklist (BVC) did lead to a significant decrease in seclusion use over a 5-year follow-up period, as the tool supports nurses to recognize early symptoms and to identify high-risks for seclusion among patients (Clarke *et al*. 2010). Two other studies (Abderhalden *et al*. 2006, 2008) have shown an association between a consistent procedure of measuring behaviour with the BVC and the reduction of violence and seclusion.

The aim of the current study was to explore the association of seclusion and static patient characteristics, dynamic mental state, and behavioural characteristics, measured day to day by the BVC (Almvik *et al*. 2000) and the Kennedy Axis V (Kennedy 2003). These instruments were used to routinely assess all patients admitted to four Dutch acute psychiatric wards in a single hospital during their entire admission stay. The effect of this risk-assessment procedure was tested earlier in a cluster randomized, clinical trial (van de Sande *et al*. 2011), and it was found that this approach significantly reduced the number of aggressive incidents and time spent in seclusion.

The present study addressed the association of seclusion and both static trait factors, such as age, sex, ethnicity, and Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association 1994) classifications, as well as dynamic factors, such as Mental Health Act status, symptom profiles, and behavioural changes.

METHODS

Sample

A day-to-day structured risk-assessment protocol was implemented in four locked acute psychiatric wards in one single psychiatric hospital in an urban catchment area in the Netherlands during a 12-month period. At the patient level, no exclusion criteria were set, but a minimum stay of 2 days in the ward was required for data analysis inclusion. The regional medical–ethical committee approved the research protocol.

Instruments

The BVC is currently used on a large scale to identify risk levels regarding the imminent risk of violence of acute in-patient psychiatric patients (Abderhalden *et al*. 2006, 2008; Björkdahl *et al*. 2006; Clarke *et al*. 2010; Vaaler *et al*. 2006; Woods *et al*. 2008). The BVC consists of the following six items: (i) confusion; (ii) irritability; (iii) boisterousness; (iv) physical threat; (v) verbal threat; and (vi) attack on objects. The items are dichotomous, and confirmed scores on more than two items are related to an increased risk of violence (Almvik *et al*. 2000). In line with the BVC, the Kennedy Axis V short version (Kennedy 2003) was also designed for routine outcome measurement, and captures several other short-term risk factors (Higgins & Purvis 2000). However, until recently, the number of Kennedy Axis V research papers has been limited. The Kennedy Axis V short version assesses patients' current functioning in the following four domains: (i) psychological impairment; (ii) social skills; (iii) violence towards self and others; and (iv) activity of daily living occupational skills. The Kennedy Axis V is an anchored scale that includes 20 different descriptions of the severity scores in the range of 0–100. Mundo *et al*. (2010) found high interrater agreement of this instrument in acute psychiatric settings in Italy. A study in the Netherlands also revealed high interrater reliability in nurses working in acute psychiatric wards (Faay *et al*. 2012). Both observation tools were incorporated in nursing reports and were used in daily multidisciplinary meetings for monitoring, and if needed, to act on changes in patient functioning in a systematic way.

Outcome: Being in seclusion compared to not being in seclusion

Coercive measures were rated using the Argus scale (Janssen *et al*. 2009; 2011; Noorthoorn *et al*. 2008). The

Argus scale covers the start and the precise duration of all coercive measures, including seclusion. In the Argus scale, seclusion is defined as the period from the beginning of seclusion (locking the door when the patient is in the room) to the moment of discontinuation (opening the locked door). The term 'seclusion' is used as a synonym of discrete seclusion, according to Crenshaw and Francis (1995). A comparison between Argus scale ratings and other sources, such as medical charts, nursing records, and health inspectorate data on the use coercive measures, revealed a reasonable Cohen's kappa (0.64–0.92). Using Argus scale ratings, we determined the precise time spent in seclusion. We also recorded the day and the precise time of the performed risk assessments. By combining both data sources, we were able to associate being in seclusion with not being in seclusion to risk-assessment scores.

Statistical analyses

A database was constructed and contained all daily assessment scores, as determined by the BVC and the Kennedy Axis V. Patients' characteristics obtained from the hospital's admissions database were also added to the seclusion data in the database. Using this combined file, the characteristics of secluded patients and non-secluded patients were compared with χ^2-test or *t*-test, and differences in baseline scores on the BVC and Kennedy Axis V of the secluded patients were compared to those of non-secluded patients.

The association between seclusion and scores based on the BVC and the Kennedy Axis V were investigated in more detail by using multilevel (mixed-model) analyses, as the risk-assessment scores and seclusion cluster in individuals. By identifying the patient as the higher level, and the BVC and Kennedy Axis V risk-assessment scores as the lower one, we corrected for repeated incidents within the patient. In addition, such modelling enables the identification of the level in which specific relationships are found. We performed a multilevel logistic regression. Using STATA software (version 12; Statacorp LP, College Station, TX, USA), we used generalized linear latent and mixed models of the binomial family with logit link. This technique allows for missing values calculations with variables with low base rates, such as seclusion in the current sample.

Before performing the multilevel analyses, univariate associations between seclusion and patient characteristics were analysed using standard statistical tests. Unadjusted (crude) odds ratios and corresponding 95% confidence intervals were calculated for all variables (data not shown). These analyses were performed using PASW (version 18, IBM, Armonk, NY, USA).

Multilevel logistic regression analyses were performed using stepwise forward and backward procedures. Interaction effects and collinear ties were checked for all significant main factors; continuous variables were centred. Variable selection was based on likelihood ratio tests, and model fit was assessed using McFadden's pseudo R^2 and plots of deviance residuals. The two multilevel models are shown in the Tables 2 and 3. First, the association of the items of the BVC and the Kennedy Axis V with seclusion and patient characteristics with seclusion were calculated for each group of items separately. Second, we present the association of these items together with patient characteristics with regards to seclusion in a final model. As well as determining the model fit, we used Hox's (2010) method of estimating the contribution of variables to the model.

RESULTS

Sample

A total of 398 consecutive patients were admitted to the four participating wards during the 12-month research period. In this study, 7403 risk assessments were made over 10 725 admission days (72% of the maximum number of structured assessments).

Patients were excluded from the analysis for three reasons: (i) 348 risk assessments could not be matched with a patient identification number; (ii) they were admitted for less than 2 days ($n = 61$); however, almost all (97%, $n = 59$) of these patients were not secluded; and (iii) information was lacking because staff failed to complete the scales ($n = 36$). In total, we analysed 7055 daily risk-assessment records for 301 patients. A total of 384 of the 7055 risk assessments (5.4%) were made when the patient was in seclusion.

As well as the baseline patient characteristics, admission day risk assessments of these 301 patients are presented in Table 1. Patients showed various severe mental illnesses, of which psychotic disorders were most frequent (48%).

Baseline patient characteristics

Analyses of baseline patient characteristics of the current sample revealed that 66% of the patients were involuntarily admitted. We identified 87 patients (28%) who had experienced seclusion at least once, resulting in a total of 154 seclusion episodes. As shown in Table 1, secluded patients were less often diagnosed with depression, and more often diagnosed with bipolar disorder or substance-dependency disorders, involuntarily admitted, and had a longer length of stay in the wards on average than patients who were not secluded.

TABLE 1: *Patient characteristics and admission assessments in sample*

	Seclusion		
	No seclusions	One or more seclusions	Totals
Patients (*n*)	214	87	301
Static factors			
Men	61%	65%	62%
Women	39%	35%	38%
Mean (SD) age	39 (12)	38 (14)	39 (13)
Age <35 years	41%	44%	43%
Marital status			
Unmarried	89%	89%	87%
Married	9%	7%	11%
Divorced	2%	4%	2%
Ethnic background			
Western	69%	71%	70%
Non-western	31%	29%	30%
Diagnosis DSM Axis 1			
Diagnosis unknown	4%	3%	4%
Depressive disorder*	5%	1%	4%
Bipolar*	7%	11%	8%
Psychosis	49%	46%	48%
Drug abuse*	11%	21%	13%
Diagnosis DSM Axis II	23%	20%	22%
Mean (SD) stay in days*	19 (11)	31 (18)	23 (14)
Involuntary admission (Mental Health Act status)**			
None	40%	12%	34%
Short-term involuntary admission	46%	78%	44%
Long-term involuntary admission	14%	10%	22%
Having been secluded		100%	25%
Dynamic factors			
Admission day risk assessments			
Brøset Violence Checklist score			
Mean (SD)**	0.9 (1.1)	1.7 (1.5)	1.2 (1.3)
No risk (%)	48	24	40
Reasonable risk (%)	43	48	45
High risk (%)	10	27	16
Brøset Violence Checklist items			
Confusion (%)**	40	66	49
Irritability (%)**	29	51	37
Boisterousness (%)**	13	25	17
Physical threat (%)	2	10	5
Verbal threat (%)*	3	14	6
Attack on objects (%)	3	9	5
Kennedy Axis V scores			
GAF equivalent mean (SD)**	41 (10)	33 (10)	38 (11)
Psychological functioning (mean & SD)**	47 (12)	40 (12)	44 (13)
Social functioning (mean & SD)*	52 (13)	44 (13)	50 (13)
Violence (mean SD)**	67 (16)	60 (17)	65 (16)
ADL (mean & SD)**	45 (12)	36 (11)	42 (13)
Kennedy Axis V criteria			
Below criterion (%)**	43	72	53
Psychological functioning below criterion**	15%	36%	22%
Social functioning below criterion**	25%	53%	34%
Violence below criterion*	22%	34%	26%
ADL below criterion**	15%	40%	23%

t-test or χ^2 = *$P < 0.05$/**$P < 0.001$. ADL, activity of daily living; DSM, Diagnostic and Statistical Manual of Psychiatric Disorders; GAF, global assessment of functioning; SD, standard deviation.

Admission day risk assessments

At admission, patients showed significantly higher scores on all of the BVC items and dysfunctional scores on three of the four Kennedy Axis V items.

Stepwise multilevel analysis (1): Separate analysis of item groups

In the multilevel logistic regression analysis, several patient characteristics showed a significant association with seclusion when entered separately (Table 2). The BVC items assessing confusion and irritability showed a significant association with seclusion. Psychological impairment and poor social skills, as measured by the Kennedy Axis V, were also found to be significantly associated with seclusion. Of the various patient characteristics studied, only male sex showed a significant association with seclusion before any correction of level 1 was conducted.

Stepwise multilevel analysis (2): Final model

In the final model (Table 3), the confusion item of the BVC and psychological impairment and social skills on the Kennedy Axis V remained significantly associated with seclusion. At the patient level (i.e. level 2), the findings indicated that non-Western descent, male sex, age less than 35 years, not being married, and having a personality disorder were all associated with a higher likelihood of seclusion. Inclusion of the DSM-IV Axis I classification and several interaction terms showed no improvement of the model.

As shown in Table 3, the level 1 variables (i.e. dynamic factors) were used to determine most of the McFadden's pseudo R^2 values (0.2014/0.2115). With regards to model fit, the final model showed a reasonable McFadden's pseudo R^2 of 0.2115, considering the large portion of zeros (95%) in the outcome variable, seclusion. In interpreting these findings, the day-to-day chance of being secluded of approximately 5% should be considered.

From the findings of the multilevel analyses, the seclusion risks for patients with combinations of risk-increasing characteristics can be estimated. Following Hox's (2010) estimation method, the risk of seclusion based on a dysfunctional score on all the level 1 variables (i.e. confusion,

TABLE 2: *Association of daily risk assessments and patient characteristics with being secluded or not by multilevel logistic regression analyses*

	Brøset Violence Checklist, Kennedy Axis V and patient characteristics analysed separately						
Items	Coefficient	95% CI		Ex (B)	95% CI		*P*-value
Dynamic factors							
Brøset Violence Checklist							
Constant	–5.118	–5.518	–4.719	0.005	0.004	0.008	0.000
Confusion	1.595	1.298	1.891	4.929	3.664	6.629	0.000
Irritability	0.515	0.180	0.849	1.673	1.198	2.338	0.003
Boisterousness	–0.196	–0.580	0.187	0.821	0.559	1.205	0.315
Physical threats	0.009	–0.660	0.679	1.001	0.516	1.973	0.977
Verbal threats	0.168	–0.377	0.714	1.183	0.685	2.042	0.546
Attack on objects	0.064	–0.520	0.649	1.066	0.594	1.914	0.829
Kennedy Axis V							
Constant	0.612	–0.115	1.340	1.844	0.890	3.819	0.099
Psychological impairment	–0.054	–0.071	–0.036	0.614	0.525	0.718	0.000
Social skills	–0.040	–0.057	–0.023	0.695	0.598	0.807	0.000
Violence	–0.001	–0.010	0.008	0.988	0.909	1.075	0.790
ADL occupational skills	–0.015	–0.032	0.001	0.867	0.744	1.011	0.069
Static factors							
Patient characteristics†							
Constant	–6.293	–10.756	–1.830	0.001	0.002	0.164	0.006
Sex	–1.357	–1.832	–0.882	0.257	0.160	0.413	0.000
Young age	–0.089	–0.476	0.297	0.914	0.621	1.364	0.651
Unmarried	0.713	–0.051	1.477	2.040	0.950	4.389	0.067
Non-Western descent	–0.072	–0.504	0.359	0.930	0.604	1.432	0.742
Diagnosis DSM Axis I‡							
Psychosis	1.637	–2.842	6.117	5.143	0.058	453.950	0.474
Bipolar	2.904	–1.598	7.407	18.259	0.202	1648.226	0.206
Substance abuse	2.277	–2.244	6.800	9.755	0.105	897.884	0.324
Diagnosis DSM Axis II	3.040	–1.423	7.504	20.911	0.240	1816.105	0.182

†Involuntary admitted was a constant in case of a seclusion and was left out of the analysis. ‡Diagnosis axis 1 was encoded as a series of four dummy variables, with diagnosis unknown as reference category. Depression and anxiety disorders occurred too infrequently to sustain in the analysis. ADL, activity of daily living; CI, confidence interval; DSM, Diagnostic and Statistical Manual of Psychiatric Disorders.

TABLE 3: *Association of daily risk assessments with seclusion corrected for patient compilation by multilevel logistic regression*

		Final model				
Items	Coefficient	95% CI (coefficient)		Ex (B)	95% CI (Ex (B)		*P*-value
Constant	–0.985	–1.999	0.027	0.373	0.135	1.028	0.057
Confused (Brøset Violence Checklist)	1.082	0.755	1.410	2.953	2.128	4.097	0.000
Psychological impairment (Kennedy Axis V)	–0.037	–0.054	–0.020	0.963	0.946	0.979	0.000
Social functioning (Kennedy Axis V)	–0.036	–0.051	–0.021	0.964	0.949	0.978	0.000
Non-Western descent	–1.645	–2.053	–1.237	0.192	0.128	0.290	0.000
Male Sex	–0.400	–0.772	–0.029	0.669	0.461	0.971	0.034
Young	1.238	0.850	1.627	3.451	2.340	5.091	0.000
Unmarried	–0.620	–1.338	0.097	0.537	0.262	1.102	0.090
Personality disorder	0.439	0.025	0.854	1.552	1.025	2.349	0.000

	Model testing		
	McFadden's pseudo R^2 goodness of fit	Random effects (level 2)	
Seclusion	0.1049	3.594	0.376
Brøset Violence Checklist	0.1628	3.972	0.479
Kennedy Axis V	0.2014	4.440	0.514
Patient characteristics	0.2061	5.744	0.653
Patient characteristics and diagnoses	0.2105	5.121	0.678
Final model	0.2115	5.497	0.711

CI, confidence interval.

severe psychological impairment, poor social skills) increased from an average of 5.4% to 10.5%. However, based on level 2 variables, a young, male, non-Western, patient with psychosis, for example, might have a 14.5% chance of being secluded, whereas an older depressed or anxious female patient has a likelihood of 0.03%, as opposed to the average 5.4% in the complete sample.

These findings imply that in the current sample, a number of level 1 (daily assessment) scores are associated with seclusion, especially with young, unmarried, non-Western male patients with a personality disorder. Although these findings need validation among larger samples, they support the clinical validity of daily risk assessments.

DISCUSSION

The aim of the current study was to determine the association between static patient characteristics and dynamic characteristics (symptom profiles and changes in behaviour measured daily using the BVC and the Kennedy Axis V), and seclusion episodes. The study addressed this association in a small sample in four admission wards. These pattern analyses are important for the early recognition of factors associated with the risk of seclusion, and can promote the use of tailored interventions to reduce this risk.

Analyses of the association between the BVC and the Kennedy Axis V scores with respect to seclusion showed that the BVC item confusion and Kennedy Axis V items psychological impairment and social skills were significantly associated with seclusion. That is, these BVC and Kennedy Axis V items appear to be helpful in determining dynamic factors and changes observed daily that identify patients at risk of seclusion. In the final analysis, the findings indicated that with the exception of these significant BVC and Kennedy Axis V items, the final analysis model also demonstrated that static factors, such as male sex, age 18–35 years, not being married, and having a personality disorder, were associated with an increased risk of seclusion. These factors were all significantly and independently associated with an increased risk of seclusion. Non-Western descent was associated with a decreased risk.

Static factors

In line with our findings, Dumais *et al*. (2011) found that young adults with bipolar disorder and patients with an above-average length of admission were associated with a risk of seclusion. In a single-ward sample, Noorthoorn *et al*. (2008) reported that patients with bipolar and personality disorders were secluded more often. This could be explained by the fact that psychological or medical intervention is less likely for personality disorders, as opposed to some DSM Axis 1 disorders. In particular, patients with borderline personality in a crisis accompanied by self-destructive or disruptive behaviour appear to be more at risk of being secluded during short episodes. In line with the findings of Noorthoorn *et al*. (2008), we

recommend more detailed de-escalation protocols to support psychotic and manic patients, as well as patients with personality disorder patient during a behavioural crisis. A Pan-European study by Steinert *et al*. (2010) revealed varying outcomes and less clear-cut findings (Steinert *et al*. 2010). Differences in local ward cultures (Bowers *et al*. 2011), as well differences in regulatory issues between countries, are also presumed to determine much of the variation in containment measure figures (Keski-Valkama *et al*. 2010; Wyn 2002). That is, similar patient behaviours might be addressed with different containment measures among cultures.

According to Thomas *et al*. (2009), static factors, such as a history of violence, need to be taken into account in the process of interpreting the current dynamic changes in symptoms and behaviour. However, our findings are more in line with those of Vaaler and colleagues (2012), who found that dynamic factors captured by the BVC had greater short-term predictive value in imminent escalation than static variables.

Dynamic factors

In the few studies performed on the basis of repeated measures of short-term changes in behaviour, seclusion proved to be primarily associated with previous aggression in patients with schizophrenia or a personality disorder and a number of (positive) psychotic symptoms, such as suspiciousness, hostility, thought disturbance, as well as externalizing behaviour in combination with, and independent of, depression (Amore *et al*. 2008; Gullick *et al*. 2005; Raja & Azzoni 2005). In a study of 14 psychiatric admission wards in London, Gudjonsson *et al*. (2004) found an association of seclusion with ethnic minority, but found no association with specific behavioural patterns measured on a day-to-day basis. In a comparable Dutch study, Vruwink *et al*. (2012) noted an association of seclusion with patient characteristics, such as age, Mental Health Act status, and aggression, as measured by the Staff Observation Aggression Scale–Revised (Nijman *et al*. 1999), but their study also detected no association with specific behaviours.

The association between scores that represent severe psychological impairment, as determined by the Kennedy Axis V, and seclusion were also reported in an earlier Dutch study by Georgiva *et al*. (2012). However, the current findings, as well as those of Georgiva *et al*. (2012) were based on relatively small samples. Both studies need to be replicated with larger samples over more hospitals, preferably in non-urban catchment areas.

From our findings, it can be concluded that both the BVC and the Kennedy Axis V could be helpful in identifying risks of seclusion. For clinicians, we recommend using the following cut-off scores: <30 for psychological functioning and social functioning on the Kennedy Axis V, and <50 for assessing violence. BVC scores above 2 should lead to immediate team discussion about short term de-escalation options, such as close observation and emergency medication. Because both scales determine different behaviours, we recommend the consistent and combined use of both instruments in routine practice. The BVC is specifically designed to assess the first signs of aggression and violence, whereas the Kennedy Axis V captures a broader scope of mental state and general functioning. The association between the Kennedy Axis V scores and seclusion suggests that seclusion is used in response to a broader spectrum of problematic behaviour than just aggression. To prevent seclusion, this might mean improving the level of psychological and social functioning, which could lead to less coercive measures. In line with the findings of Beck *et al*. (2008) and Clarke *et al*. (2010), our study confirms that risk assessments should not only include aggression predictors, but also frequent mental health state assessments performed throughout the entire admission period.

Our findings suggest that daily assessments using the BVC and Kennedy Axis V might increase objectivity in managing risks at a patient level in acute psychiatric wards. The use of both tools during the patient's entire admission episode might also contribute in the establishment of a higher level of instrument-based clinical reasoning, as opposed to relying on non-structured and potentially highly-subjective interpretations of the need for seclusion interventions, as problematized by Keski-Valkama *et al*. (2010). In contrast with the recommendations of Abderhalden *et al*. (2008), we suggest continuous monitoring of the mental state and behaviour of patients throughout the admission period. Using these instruments facilitates a joint clinical language between disciplines. For this reason, several mental health services in the Netherlands use these instruments as part of the continuous education of nurses and doctors. We strongly recommend continuous training on the job to enhance the quality of the process of assessment and dynamic clinical reasoning. The use of the Kennedy Axis V and BVC appears to be important in tailoring de-escalation interventions. This was also an important conclusion derived from our previous cluster randomized, clinical trial in which we used these scales to reduce the seclusion rates (van de Sande *et al*. 2011). Continuous clinical supervision and training could be part of the role of an advanced nurse practitioner. The

training includes guiding nurses through the instrument manuals, case scenario e-learning modules, face-to-face case vignette training, and critical companionship in the process of rating the scales. This training is important to ensure team interrater reliability of the assessments and joint risk-assessment language are at an acceptable level. However, assessing only risk is not enough; assessments need to be linked to dynamic factors and should be tailored for individual patients. That is, the assessments need to be incorporated in treatment planning meetings and during shift handovers. Thorough, individualized analyses of risk-assessment findings can also contribute to joint, tailored crisis plans after the peak of the crisis. These options might result in less escalations and coercion, according to Henderson *et al*. (2009). However, a crisis plan-controlled trial by Thornicroft *et al*. (2013) revealed an improved therapeutic relationship, but no significant reduction of coercion. The limitation of their trial was that there were indications that the crisis plans were not fully implemented in routine review meetings in some of participating teams. These findings are promising, but also serve as a warning of the risk of implementation failures.

During the course of the present study, we found that the efficiency of multidisciplinary meetings and nursing shift handovers improved when using a joint language based on the consistent use of the ratings. To maintain solid implementation over a number of years, case vignettes were developed to ensure that interrater reliability in the clinical team remained at an acceptable level; this training is a continuous process for the entire multidisciplinary team.

Hankin *et al*. (2011) addressed the management of agitation, seclusion, and restraint, and also confirmed the importance of early recognition in changes in patients' mental state. That is, consistent and frequent risk assessments can bring to light alarming severity levels of the risk of seclusion in a more objective way and can be an important aid in clinical decision-making. In most countries, the use of standardized risk-assessment tools is not a common practice. In order to support seclusion- and restraint-reduction policies, our cluster randomized, clinical trial (van de Sande *et al*. 2011), as well the present study, suggest that timely recognition of a decline in clinical and behavioural statuses can lead to more tailored and better timed de-escalation interventions. By means of continuous monitoring, milder scores, as determined by the two observation tools, can also support moving towards less restrictive approaches or discharge planning after a behavioural crisis.

STRENGTHS

The strength of the current study is that it is one of the first to relate day-to-day assessments of psychiatric and behavioural symptoms to the likelihood of being secluded. Second, all patients admitted to the participating acute psychiatric wards could be included in this study because the BVC and Kennedy Axis V assessments were incorporated in routine clinical practice to support clinical decision-making and treatment planning. Therefore, these recordings did not result in additional burdens on the patients. All patients in the study were systematically monitored using the BVC and Kennedy Axis V from the first day of admission until the last day of admission, and were included in the study if they stayed longer than 2 days in the ward.

LIMITATIONS

The data for the current study were from a single hospital serving an urban catchment area, which admits a relatively large proportion of ethnic-minority patients. For this reason, some patients' background characteristics were missing (21%).

As opposed to many other districts in the Netherlands, the catchment area of this hospital has a threefold higher proportion of patients from non-Western decent when compared to the Dutch national average (Janssen *et al*. 2013). Thus, the generalizability of these data to more rural admission wards in the Netherlands can be questioned. A replication of the current study in a rural catchment area is currently being undertaken.

A number of patients were admitted during a very short timeframe (1–2 days), which resulted in approximately 30% of missing data. This might have influenced the findings to some extent.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study suggest that day-to-day assessments can be important to guide decisions about managing psychiatric and behavioural crisis situations. These short-term risk-assessment scales could be useful as an aid in decisions about admission, transfer to another ward, and discharge. Balancing the nurse–patient ratio based on the number of patients with high-risk profiles, as assessed with the Kennedy Axis V and the BVC, is currently performed in some wards in the Netherlands. We recommend considering the inclusion of such structured risk assessments in professional guidelines for nurses working in acute psychiatric admission wards. While the current

study revealed a number of primarily dynamic factors associated with seclusion, replication studies are required for broader recommendations. The current results, as well those of a number of other recent empirical studies in the Netherlands, all emphasize that the consistent use of the BVC and the Kennedy Axis V can be an aid in proactive crisis management. The findings of the present study contribute to future research questions related to the validity of the BVC and Kennedy Axis V cut-off scores, the validity of those cut-off scores in other populations, as well testing de-escalation intervention scenarios.

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