

MENTAL HEALTH

The investigation of early warning signs of aggression in forensic patients by means of the 'Forensic Early Signs of Aggression Inventory'

Frans AJ Fluttert, Berno Van Meijel, Stål Bjørkly, Mirjam Van Leeuwen and Mieke Grypdonck

Aims and objectives. The Forensic Early Warning Signs of Aggression Inventory (FESAI) was developed to assist nurses and patients in identifying early warning signs and constructing individual early detection plans (EDP) for the prevention of aggressive incidents. The aims of this research were as follows: First, to study the prevalence of early warning signs of aggression, measured with the FESAI, in a sample of forensic patients, and second, to explore whether there are any types of warning signs typical of diagnostic subgroups or offender subgroups.

Background. Reconstructing patients' changes in behaviour prior to aggressive incidents may contribute to identify early warning signs specific to the individual patient. The EDP comprises an early intervention strategy suggested by the patient and approved by the nurses. Implementation of EDP may enhance efficient risk assessment and management.

Design. An explorative design was used to review existing records and to monitor frequencies of early warning signs.

Methods. Early detection plans of 171 patients from two forensic hospital wards were examined. Frequency distributions were estimated by recording the early warning signs on the FESAI. Rank order correlation analyses were conducted to compare diagnostic subgroups and offender subgroups concerning types and frequencies of warning signs.

Results. The FESAI categories with the highest frequency rank were the following: (1) anger, (2) social withdrawal, (3) superficial contact and (4) non-aggressive antisocial behaviour. There were no significant differences between subgroups of patients concerning the ranks of the four categories of early warning signs.

Conclusion. The results suggest that the FESAI covers very well the wide variety of occurred warning signs reported in the EDPs. No group profiles of warning signs were found to be specific to diagnosis or offence type.

Relevance to clinical practice. Applying the FESAI to develop individual EDPs appears to be a promising approach to enhance risk assessment and management.

Key words: aggression, early warning signs, forensic psychiatric nursing, interaction, risk management

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Introduction

Nurses in forensic and acute general psychiatric clinical care have to manage patients' aggressive behaviours on a daily basis (Bowers *et al.* 2006, Martin & Daffern 2006). Abderhalden *et al.* (2008) emphasised that violence and aggression are multifaceted and complex phenomena. Aggression is mostly defined as: '*any behaviour directed towards another individual that is carried out with the proximate (immediate) intent to cause harm*' (Anderson & Bushman 2002, p. 28). Palmstierna and Wistedt (2000) explained that aggression may be described as expressed behaviour and inner experienced emotions. They proposed the following dimensions to categorise aggression: (1) inner experience versus outward behaviour, (2) aggressor's perception versus observer's perception and (3) persistent state versus episodic occurrence. These dimensions may be useful for clinical practice and research to analyse the nature of observed aggressive behaviour and the way it develops over time. Early warning signs of aggression can be defined as subjective experiences, thoughts and behaviours that occur prior to actual aggressive behaviour (van Meijel *et al.* 2003, Fluttert *et al.* 2008). Warning signs can be perceived by the patient or observed by others in the patient environment.

A profound insight into patient's vulnerability to cope with stressful conditions and situations (e.g. delusions and limit-setting interactions), and into the developmental process of aggression, is essential in a dynamic interactional understanding of violence (Björkly 2006). So far, clinical research in forensic psychiatry has mainly addressed the issue of precursors of inpatient aggression using structured assessment instruments (Almvik *et al.* 2000, Ogloff & Daffern 2006, Dolan *et al.* 2008, McDermott *et al.* 2008). However, these tools are characterised by a relatively low number of items and a limited capacity to capture idiosyncratic warning signs typical of the individual patient. To improve assessment, nurses and patients need a broad-spectrum tool that may better meet the demand of an individual approach to estimate warning signs. This may contribute to cooperation and successful development of individual preventive risk management strategies (Martin & Daffern 2006, Meehan *et al.* 2006, Fluttert *et al.* 2008, Mason *et al.* 2009). Patients' insight into their inner experiences and their perceptions of the outside world are important issues for risk management (Duxbury & Whittington 2005, Meehan *et al.* 2006, Fluttert *et al.* 2008, 2011). Knowledge of these insights and perceptions may contribute to a better understanding of the origin of aggressive behaviours. Patient's active participation in reconstructing his or her change in behaviour prior to aggressive incidents may con-

tribute to identify warning signs specific to the individual patient (Nicholls *et al.* 2009, Fluttert *et al.* 2010).

Although there is a need for methods to better understand, monitor and intervene on the basis of early warning signs concerning inpatients' aggressive behaviours, such methods are scarce (Fluttert *et al.* 2008, Daffern & Howells 2009). However, a growing body of knowledge regarding the role of warning signs of inpatient aggression provides some optimism concerning further methodological development (Björkly 2000, Dolan *et al.* 2008, Daffern & Howells 2009). An investigation by Fluttert *et al.* (2010) suggested that nurse-patient cooperation concerning analysis of early warning signs and implementation of subsequent preventive measures may reduce incidents of inpatient aggression. Early warning signs can be described in an early detection plan (EDP) offering the possibility for nurses and patients to regularly monitor them. An EDP is a structured scheme that enables patients and nurses to monitor patients' early warning signs of aggression. Fluttert *et al.* (2011) developed the Forensic Early Signs of Aggression Inventory (FESAI) as a tool to be used by professionals in forensic care to list and describe early warning signs of aggression in a systematic way.

To our knowledge, there is not much research on early warning signs related to a risk management strategy and as a precursor of inpatient aggression and accordingly the use of restraints (Fluttert *et al.* 2011, Knutzen *et al.* 2011). For this purpose, we applied and studied the scores on the FESAI in subpopulations of patients in two different forensic treatment settings.

Research question

We addressed the following research questions: (1) What is the prevalence of early warning signs of aggression, measured with the FESAI, in a sample of forensic patients and (2) what are the differences in early warning signs in offender subgroups of patients concerning type of warning signs.

Methods

The EDP of forensic patients in two forensic hospitals were examined for early warning signs. Following that, we investigated the relationship between early warning signs and patient characteristics. The study procedure was approved by Utrecht University and by the research departments of the participating forensic hospitals.

Early warning signs in the existing EDP were retrospectively recorded for all 171 patients participating in this study, using the FESAI (Fluttert *et al.* 2011). The recorded

FESAI scores of subgroups of patients with similar diagnoses and types of offences were compared. Additionally, the FESAI scores were examined in subgroups of patients with regard to psychopathy, which is a separate assessment apart from assessing the diagnoses.

The Forensic Early Signs of Aggression Inventory

The FESAI (Fluttert *et al.* 2011) consists of 45 items of early warning signs, divided into 15 categories. Item 45, *other early signs*, is an open category to be used for a warning signal that is different from the other 44 items. The FESAI was constructed to assist forensic nurses and patients in scrutinising individual early warning signs and to elaborate an EDP. According to the nurses and patients who described the early warning signs in the EDP, these signs were related to their onset of aggressive behaviours. The assumption is that without de-escalating interventions when these early warning signs occur, the risk of aggressive behaviour is increased (Fluttert *et al.* 2008). An estimate of 74% has been reported for absolute inter-rater agreement at item level for the FESAI (Fluttert *et al.* 2011).

Settings and subjects

The patients were admitted to two forensic hospitals in the Netherlands. Hospital 1 is a state hospital containing 189 beds in which forensic patients are confined by court order after having committed severe offences. The participants ($n = 171$) had (1) committed a serious violent offence and (2) major problems with the management of aggression. The main diagnosis of the participants from this hospital ($n = 130$) was antisocial personality disorder ($n = 65$, 50%) and schizophrenia ($n = 61$, 44.2%). Hospital 2 is a private forensic hospital containing 78 beds to which patients also are admitted by court order. Participants from this hospital were mostly diagnosed with schizophrenia ($n = 35$, 85.4%). In both hospitals, early warning signs of aggression were identified and registered in EDPs.

A total of 171 patients were involved, of which there were 130 from hospital 1 (76%) and 41 from hospital 2 (24%). Inclusion criterion was that the individual patient had an EDP in which early warning signs of aggression were described and monitored. The mean age of the patients was 38 years ($SD = 9.4$). The DSM-IV assessment of these patients showed that 96 (56.1%) were diagnosed with schizophrenia, 74 (43.3%) with antisocial personality disorder and 12 (7.0%) with autism spectrum disorder. Eighty-three (48.5%) patients were convicted for severe violent offences (e.g. aggravated assault and manhandling), 40

patients (23.4%) for manslaughter, 32 (18.7%) for sexual offences and 14 (8.2%) for arson.

The early recognition method (ERM; Fluttert *et al.* 2008, 2010) was the core forensic mental health nursing intervention in hospital 1, which resulted in descriptions of early signs in EDPs. ERM was not applied in hospital 2, and still, in this hospital, early warning signs of risk were discussed and recorded in weekly evaluation reports involving nurses and patients.

Procedure and data collection

Data were gathered from hospital records. The diagnoses were assessed on the basis of the Diagnostic and Statistical Manual of Mental Disorders-IV DSM-IV (American Psychiatric Association (APA) 2002). Psychopathy was assessed using the Psychopathy Checklist-Revised (PCL-R; Hare 1991). The PCL-R is an assessment instrument with 20 items to be scored on three-point scales. The maximum score is 40, but in Europe, a score of 26 or higher is considered to indicate a psychopathic personality (Grann *et al.* 1999). The main offence was scored by means of a classification that is used in Dutch forensic hospitals (Van Kordelaar 2003). This contains the following categories: (1) violence, (2) manslaughter, (3) pedo-sexual offences, (4) sexual offences with adult victim, (5) arson and (6) other offences. In this study, the FESAI results were examined for the subgroups: aggression, manslaughter and sexual offences. The sexual offence subgroup comprised pedo-sexual offenders and sexual offenders with adult victim.

Statistical data analyses

Data analysis was performed for the total population and for subgroups of patients. These subgroups were distinguished on the basis of patients' characteristics, such as the diagnostic categories schizophrenia and personality disorder, types of offence and degree of psychopathy and the two hospitals (Fig. 1). The categories concerning diagnoses and offences were exclusive, that is, a patient belonged only to one of the subgroups schizophrenia or Anti Social Personality Disorder (ASPD) and to one of the subgroups severe violence or sexual offence. Patients with comorbid schizophrenia or ASPD were excluded from the analysis. The PCL-R could not be assessed for all patients. For some patients with $PCL-R \geq 26$, the early warning signs were recorded in the EDP by the nurses alone, while for the other patients, the recording was a collaborative effort.

The FESAI main categories were rank-ordered according to the frequency of occurrence in the EDPs. Finally, for

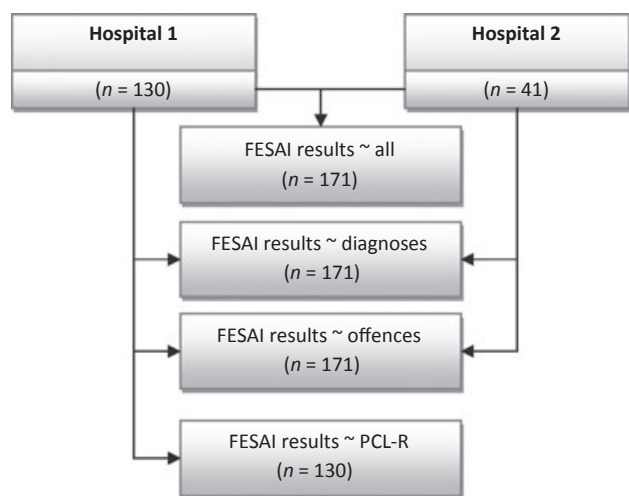


Figure 1 Flowchart of the study.

hospital 1, the FESAI results of patients with PCL-R < 26 were compared to those with PCL-R $\geq$ 26. The FESAI rank order scores of the subgroups of patients were compared by means of Spearman's rho rank order correlation (Field 2005). In all calculations, the Statistical Package for Social Science, SPSS-17, was used (SPSS Inc., Chicago, IL, USA).

Results

The total of 171 EDP contained 1478 early signs of risk. Table 1 provides an overview of the FESAI category scores. Almost half of the recorded early warning signs (48.7%) fell within the categories *tension*, *agitation*, *anger*, *social isolation*, *decreased social contact* and *changes in daily activities*.

The FESAI scores are presented in more detail on the *item* level regarding all patients and regarding the subgroups of patients in Table 2. The six highest ranked items for the different subgroups are listed in Table 2.

When comparing the early warning signs of the total sample of patients within the different subgroups, there appears to be no substantial differences concerning the rank order correlation values of the top six ranks (see Table 3). When comparing rank order of the exclusive subgroups, there appeared significant correlation between these subgroups (see Table 4).

For the subgroups regarding high or low PCL-R scores, the correlation was $r = 0.768$, $p < 0.001$. However, for patients with PCL-R ≥ 26 ($n = 38$), the highest rank score pertained to *overstepping others' boundaries*, *humiliating*, *being cynical/sarcastic*. In this subgroup, for 21 (56%) of the 38 patients, the EDP was drawn up by the nurse alone because of lack of these patients to refuse to collaborate in ERM. Scores for these patients were significantly higher

Table 1 Results of the FESAI categories

Rank order	Category	Corresponding items in Table 2	Number of early warning signs n (%)
1	Tension, agitation, anger	1, 4, 8, 17, 25	305 (20.6)
2	Social isolation, decreased social contact	2, 3, 21, 35	235 (15.9)
3	Change in daily activities	5, 7, 20, 34	181 (12.2)
4	Non-aggressive antisocial behaviour	6, 12, 24, 31, 39	152 (10.3)
5	Changed substance needs	33, 10	106 (7.2)
6	Dejection and anxiety	13, 23, 28, 29, 37, 38, 41, 44	96 (6.5)
7	Irrational ideas, perceptions	11, 16, 27	96 (6.5)
8	Change in self-management	18, 26, 42	68 (4.6)
9	Very person-specific changes of behaviours	15, 22, 40	67 (4.5)
10	Disinhibition and impulsivity	9	55 (3.7)
11	Cognitive changes	19, 30	46 (3.1)
12	Physical changes	14	36 (2.4)
13	Criminal behaviour	43, 32	21 (1.4)
14	More (extreme) sexual fantasies, needs, behaviour	36	14 (0.9)
15	Other early signs	45	0 (0)
Total		45	1478

FESAI, Forensic Early Signs of Aggression Inventory.

(65.8%) compared with those of patients of the subgroups 'severe violence' (33.7%), 'schizophrenia' (31.9%) and 'PCL-R ≤ 25 ' (30.0%). Estimates of differences in percentage ranged from (1) 9.62 $p = 0.002$ to (1) 12.74 $p = 0.001$ (Pearson's chi-square test).

Discussion

In this study, we examined the early warning signs of aggression in forensic patients. Results indicate that the clinical relevance of the FESAI in terms of capturing a wide variety of individual warning signs is promising. The findings also suggest that there were no significant differences between different groups of diagnosis or offences concerning early warning signs. However, patients with PCL-R ≥ 26 were assessed significantly more often on the item *increasingly overstepping others' boundaries*, *humiliating and/or being cynical/sarcastic* compared with the other subgroups of patients.

Table 2 Results of early warning signs in subgroups of patients

FESAI early warning signs (rank order)	All <i>n</i> = 171		Schizophrenia <i>n</i> = 69		ASPD <i>n</i> = 47		Manslaughter <i>n</i> = 40		Severe violence <i>n</i> = 83		Sexual offence <i>n</i> = 32		PCL-R ≤ 25 <i>n</i> = 90		PCL-R ≥ 26 <i>n</i> = 38	
	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%
1. Increased anger, frustrations and/or tensions	1	59.6	3	59.4	1	70.2	1.5	60.0	3	57.8	1	71.9	4	50.0	2.5	60.5
2. Increasing isolation, withdrawal	2	57.3	2	60.9	5	53.2	4	50.0	2	60.2	2	65.6	1	61.1	4.5	55.3
3. Increasing superficial contact	3	56.7	1	62.3	4	55.3	1.5	60.0	1	62.7	4	53.1	2	54.4	2.5	60.5
4. Increasingly responding in a verbally/physically aggressive manner	4	54.4	5	50.1	2	68.1	3	55.0	4	54.2	4	53.3	3	53.1	4.5	55.3
5. Difficulties complying with agreements, daily structure	5	45.6	4	52.2	8	38.3	6	40.0	5	51.8	6	40.6	5	45.6	6	47.4
6. Increasingly overstepping others' boundaries, humiliating and/or cynicism/sarcasm	6	39.8	10	31.9	3	59.6	5	45.0	8	33.7	4	53.3	7	30.0	1	65.8
7. Change in day-night rhythm	7	35.1	8	36.2	10	36.2	11.5	27.5	6	38.6	10	31.3	6	41.1	10	28.9
8. Less open to others' ideas, thoughts or ways of behaving	8	33.9	11	30.4	6.5	40.4	7.5	32.5	7	34.9	8	34.4	12.5	22.2	7	44.7
9. Increasingly chaotic, restless and/or impulsive	9	32.1	7	37.7	11.5	27.7	9.5	30.0	9	32.5	11	28.1	8.5	28.9	10	28.9
10. Increasing substance abuse (alcohol and/or drugs)	10	27.5	21	18.8	6.5	40.4	9.5	30.3	10.5	27.7	16.5	18.6	8.5	28.9	8	36.8
11. Increased paranoid thoughts or feeling threatened	11	26.9	6	39.1	20.5	12.8	13.5	25.0	10.5	27.7	8	34.4	10	27.8	18	13.2
12. Provoking conflict(s), coercive, demanding	12	26.3	14	24.6	9	36.2	7.5	32.5	18	19.2	8	34.4	12.5	22.2	10	28.9
13. Increasing feelings of sadness and/or desperation	13	25.1	14	24.6	11.5	27.7	13.5	25.0	12	25.3	13.5	21.0	11	25.6	18	13.2
14. Increasing physical complaints	14	21.1	12	27.5	20.5	12.8	11.5	27.5	13.5	21.7	24.5	12.5	14.5	20.0	27.5	7.9
15. Idiosyncratic behaviour	15	19.9	14	24.6	26	10.6	15.5	22.5	15.5	20.5	20.5	15.6	23	13.3	12	21.1
16. Hallucinations	16	18.1	9	33.3	41	2.1	17	20.0	18	19.3	30	9.4	19.5	15.6	34	5.3
17. Increased experiences of stress	17	17.5	21	18.8	15.5	19.1	15.5	22.5	22	15.7	13.5	21.0	16	18.9	21.5	10.5
18. Declining self-care and/or care for environment	18.5	17.0	16.5	21.7	26	10.6	19	17.5	15.5	20.5	20.5	15.6	14.5	20.0	15.5	15.8
19. Increasing difficulties in thinking, recalling, concentrating	18.5	17.0	18	20.3	36.5	2.3	31.5	10.0	18	19.3	12	25.0	19.5	15.6	27.5	7.9
20. Decreased activity	20	15.8	21	18.8	17	17.0	19	17.5	20	16.7	24.5	12.5	18	16.7	13.5	18.4
21. Avoidance of eye contact	21	14.0	16.5	21.7	20.5	12.5	36	7.5	13.5	21.7	30	9.4	34.5	7.8	34	5.3
22. Changing eating/drinking habit patterns	22	13.5	24	15.9	26	10.6	21.5	15.0	22	15.7	30	9.4	17	17.8	27.5	7.9

Table 2 (continued)

FESAI early warning signs (rank order)	All <i>n</i> = 171		Schizophrenia <i>n</i> = 69		ASPD <i>n</i> = 47		Manslaughter <i>n</i> = 40		Severe violence <i>n</i> = 83		Sexual offence <i>n</i> = 32		PCL-R ≤ 25 <i>n</i> = 90		PCL-R ≥ 26 <i>n</i> = 38	
	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%
23. Increasing anxiety	24	12.9	21	18.8	36.5	4.3	25.5	12.5	22	15.7	43.5	0	23	13.3	38.5	2.6
24. Increased failure to take responsibility	24	12.9	34.5	7.2	15.5	19.1	25.5	12.5	30	10.8	20.5	15.6	28	11.1	18	13.2
25. Increased suppression of emotions	24	12.9	30	10.1	20.5	12.5	19	17.5	32.5	9.6	16.5	18.6	21	14.4	27.5	7.9
26. Decreased problem-solving skills	26	11.7	37.5	5.8	14	21.3	31.5	10.0	27	12.0	20.5	15.6	23	13.3	21.5	10.5
27. Delusions, irrational convictions	28	11.1	21	18.8	41	2.1	21.5	15.0	24.5	14.5	39.5	3.1	28	11.1	34	5.3
28. Increasing feelings of hurt, being offended and/or rejected	28	11.1	32.5	8.7	36.5	4.3	31.5	10.0	27	12.0	30	9.4	28	11.1	27.5	7.9
29. Increasing loneliness	28	11.1	26.5	11.6	26	10.6	25.5	12.5	27	12.0	30	9.4	31	10.0	34	5.3
30. Increasing associative disturbances or chaotic thinking	30.5	9.9	26.5	11.6	20.5	12.5	25.5	12.5	30	10.8	35.5	6.3	34.5	7.8	27.5	7.9
31. Increased splitting behaviour, playing people off against each other	30.5	9.9	37.5	5.8	13	23.4	25.5	12.5	35	8.4	24.5	12.5	37	5.6	13.5	18.4
32. Criminal contacts and/or criminal activities	33.5	9.4	41	4.3	20.5	12.5	31.5	10.0	39.5	6.0	24.5	12.5	34.5	7.8	15.5	15.8
33. Decreased medication compliance	33.5	9.4	26.5	11.6	41	2.1	25.5	12.5	30	10.8	39.5	3.1	25	12.2	21.5	10.5
34. Increasing boredom	33.5	9.4	32.5	8.7	30.5	8.5	42.5	2.5	24.5	14.5	35.5	6.3	28	11.1	38.5	2.6
35. Walks away from conversation or other activities	33.5	9.4	34.5	7.2	26	10.6	42.5	2.5	35	8.4	16.5	18.6	34.5	7.8	27.5	7.9
36. Increasingly having extreme sexual fantasies, needs and/or behaviour	36	8.2	37.5	5.8	30.5	8.5	31.5	10.0	41	4.8	16.5	18.6	28	11.1	43	0
37. Increasing behaviours of self-harm or considering it	37	7.6	30	10.1	30.5	8.5	36	7.5	32.5	9.6	35.5	6.3	39	4.4	38.5	2.6
38. Increasing worries	38	7.0	30	10.1	33.5	6.4	39.5	5.0	37.5	7.2	30	9.4	39	4.4	34	5.3
39. Increasingly being unreliable or lying	39	6.4	37.5	5.8	41	2.1	39.5	5.0	39.5	6.0	30	9.4	32	8.9	38.5	2.6
40. Speaking in a different manner	40	5.8	26.5	11.6	41	2.1	44.5	0	35	8.4	39.5	3.1	41.5	3.3	43	0
41. Decreasing self-esteem	41	5.3	41	4.3	30.5	8.5	39.5	5.0	37.5	7.2	39.5	3.1	41.5	3.3	27.5	7.9
42. Increasing financial problems	42	4.7	41	4.3	33.5	6.4	36	7.5	42.5	3.6	35.5	6.3	43.5	2.2	21.5	10.5
43. Absconding or considering it	43	2.9	43.5	2.9	36.5	4.3	31.5	10.0	44	1.2	43.5	0	39	4.4	43	0
44. Increased nightmares	44	1.2	43.5	2.9	44.5	0	39.5	5.0	42.5	3.6	43.5	0	43.5	2.2	43	0
45. Other early warning signs	45	0	45	0	44.5	0	44.5	0	45	0	43.5	0	45	0	43	0

FESAI, Forensic Early Signs of Aggression Inventory; PCL-R, Psychopathy Checklist-Revised.

Table 3 Rank order results of the first six FESAI signs

First six rank order FESAI early signs all patients <i>n</i> = 177	Diagnoses		Offence			PCL-R	
	Schizophrenia <i>n</i> = 69	ASPD <i>n</i> = 47	Manslaughter <i>n</i> = 40	Severe violence <i>n</i> = 83	Sexual offence <i>n</i> = 32	PCL-R ≤ 25 <i>n</i> = 90	PCL-R ≥ 26 <i>n</i> = 38
	Rank <i>n</i> (%)	Rank <i>n</i> (%)*	Rank <i>n</i> (%)	Rank <i>n</i> (%)	Rank <i>n</i> (%)	Rank <i>n</i> (%)	Rank <i>n</i> (%)
1. Increased anger, frustration and/or tension	3 41 (59.4)	1 33 (70.2)	1.5 24 (60)	3 48 (57.8)	1 23 (71.9)	4 45 (50)	2.5 23 (60.5)
2. Increasing isolation, withdrawal	2 42 (60.9)	5 25 (53.2)	4 20 (50)	2 50 (60.2)	2 21 (65.6)	1 55 (61.1)	4.5 21 (55.3)
3. Increasingly superficial contact	1 43 (62.3)	4 26 (55.3)	1.5 24 (60)	1 52 (62.7)	4 17 (53.1)	2 49 (54.4)	2.5 23 (60.5)
4. Increasingly responding in a verbally/physically aggressive manner	5 35 (50.1)	2 32 (68.1)	3 22 (55)	4 45 (54.2)	4 17 (53.3)	3 38 (53.1)	4.5 21 (55.3)
5. Difficulties complying with agreements, daily structure	4 36 (52.2)	8 18 (38.3)	6 16 (40)	5 43 (51.8)	6 13 (40.6)	5 41 (45.6)	6 18 (47.4)
6. Increasingly overstepping others' boundaries, humiliating and/or cynicism/sarcasm	10 22 (31.9)	3 28 (59.6)	5 18 (45)	8 28 (33.7)	4 17 (53.3)	7 27 (30)	1 25 (65.8)

FESAI, Forensic Early Signs of Aggression Inventory; %, percentage patients; PCL-R, Psychopathy Checklist-Revised.

*Number of early warning signs.

Table 4 Rank order correlation coefficients

Subgroups	ASPD	Severe violence	Sexual offence
Schizophrenia	0.925*		
Manslaughter		0.856*	0.770*
Severe Violence			0.747*

Spearman's correlation coefficients.

*Correlation is significant at the 0.01 level (two-tailed).

The similarities of rank order in the top of the results are striking. A possible explanation could be that nurses and patients identify and detect early warning signs from a broad view on patients' behaviours and perceptions and that they are less focused on differences in signs and symptoms related to an illness or disorder or to the nature of the offence. Another explanation of the similarities in the results of the first rank orders could be related to this study being the first study of early warning signs by means of the FESAI. Further validation of the FESAI, and a possible revision of the FESAI, could, in case of a replication of this study, provide other results. However, concerning the number of records we studied within the applied method, we value the results meaningful for the field of (forensic) mental health nursing.

The FESAI scores reflected inpatient warning signs on a broad spectrum of behaviours. Previous studies have

emphasised aggressive behaviours from inpatients to be precipitated by internal states such as anger, or interactional factors such as non-aggressive threatening behaviour towards staff (Doyle & Dolan 2002, Daffern & Howells 2009, Vitacco *et al.* 2009). This concurs with our finding that *anger* and *responding in a verbally and physically aggressive manner* had the highest ranks. It could be expected that responding in an aggressive manner will be the precursor of further deterioration leading towards aggressive incidents. However, in this study, *increasing isolation*, *withdrawal* and *superficial contact* were among the items with the highest rank. There were also some clear differences in results comparing the subgroup patients with schizophrenia with the subgroup patients with personality disorder (ASPD). The results concerning *increasingly overstepping others' boundaries*, *humiliating and/or being cynical/sarcastic* of patients with ASPD showed a higher rank (rank order 3, 59.6%), compared with patients of the subgroup schizophrenia (rank order 21, 18.8%). This could be expected because of lack of social skills in patients with antisocial personality disorder. Less obvious were the results concerning *increasing substance abuse (alcohol and/or drugs)*; the rank order of patients with schizophrenia at this item was higher, 21 (18.8%), compared to that of patients with personality disorder, 6.5 (40.4%). This is remarkable because it is known that patients with schizo-

phrenia often are involved in substance abuse. Concerning item *increasingly being unreliable or lying*, one would expect the rank order of patients with antisocial personality disorder to be higher compared with that of patients with schizophrenia. However, results of the subgroup with antisocial personality disorder showed a lower rank order (41, 2.1%), compared to the results of the subgroup patients with schizophrenia (rank 37.5, 5.8%).

The FESAI items cover a broader spectrum of behaviours compared with other tools for the assessment of warning signs of inpatient aggression. The Broset Violence Checklist (BVC; Almvik & Woods 1999) contains the following items: irritability, physically threatening, verbally threatening, boisterous, confused and attacking objects. It appears that scoring *early* warning signs of aggression by means of the FESAI allows access to significant, but less striking behavioural changes such as *isolation*, *withdrawal* and *superficial contact*. Furthermore, nurses may apply the FESAI as an inventory to explore and identify a broader scope of possible inpatient aggressive precursors in terms of changes in thoughts, cognition, awareness and idiosyncratic behaviours (Fluttert *et al.* 2008). The user involvement in the application of the FESAI and the development of an individual EDP may generate an empowerment effect in the patient and have a positive impact on the treatment alliance, too.

However, in this study, we also recorded early signs from EDPs of patients who did not collaborate with nurses. In this subgroup of patients, the PCL-R scores were higher than 25 (see also Fluttert *et al.* 2010). In 56% ($n = 21$) of these cases, the early warning signs in EDPs were recorded only according to nurses' perceptions and observations. This invites for cautious interpretations concerning this select subgroup of patients. The records of early warning signs presented in the current study pertain to the context of two forensic hospitals. This implies that the findings may not be representative of an extramural context and that they may not directly be trans-

lated to other psychiatric contexts. Naturally, further large-scale research is needed to validate the FESAI.

Conclusion

The early warning signs of aggression, which were derived from EDP and recorded on the FESAI, appeared to be associated with changes in both internal/interactional states (such as anger) and internal/interactional behaviours (such as social contact). No significant differences were found when comparing early warning signs in subgroups of patients with different diagnoses and offences. Aggressive behaviour associated with psychopathy seems to be precipitated by scores on the FESAI item 'increasingly overstepping others' boundaries', 'humiliating' and/or 'cynical/sarcastic behaviour'.

Relevance for clinical practice

The FESAI seems to be a helpful tool in gaining insight into a wide spectrum of early warning signs in forensic patients. Applying the FESAI invites nurses to record and respond to warning signs that are observable and even those only accessible through patients' self-report. The core feature of the FESAI is enhancing constructive patient–nurse cooperation to reduce violence risk.

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Contributions

Study design: FF, BvM, SB, MvL, MG; data collection and analysis: FF, BvM, SB, MvL, MG and manuscript preparation: FF, BvM, SB, MG.

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