Patient interventions after the assessment of violence risk:
Observational study in a Finnish psychiatric admission ward

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Tiivistelmä - Referat - Abstract

Tavoitteet. The Dynamic Appraisal of Situational Aggression (DASA) on arviointimenetelmä psykiatristen potilaiden akuutin väkivaltaisuuden arviointiin. DASA mittaa seitsemän käyttäytymistavan avulla potilaan todennäköisyyttä väkivaltaiseen käyttäytymiseen seuraavan 24 tunnin aikana. Tämän tutkimuksen tarkoitus oli tarkastella DASA:n sensitiivisyyttä suomalaisessa psykiatrisessa tahdonvastaisessa hoidossa olevien potilaiden populaatiossa, tarkastella korkean riskin potilaille tarjottuja interventioita, sekä niiden efektiivisyyttä 24 tunnin seuranta-aikana. Tutkimuksessa tarkasteltiin myös käytettyjen interventioiden lukumäärän vaikutusta havaittuun väkivaltariskiin.

Menetelmät. Aineisto kerättiin kuuden kuukauden aikana vastaanotto-osastolle sisään kirjattujen potilaiden potilastiedoista (n = 300). Interventiot jaoteltiin neljään ryhmään niiden käyttöfrekvenssin mukaan: (1) Mielenterveyslain rajoittamat interventiot, (2) tarvittava lääkitys, (3) keskustelu hoitajan kanssa ja (4) muut interventiot. Yhteyttä interventioiden ja DASA-pistemäärien välillä tutkittiin sekä jokaisen interventioryhmän kohdalla erikseen, että kaikkien interventioiden yhdistelmämallilla, käyttäen logistista regressioanalyysia.

Tulokset ja johtopäätökset. Potilas oli eristetty tai asetettu lepositeisiin 44 tapauksessa. Näistä tapauksista 61 %:ssa (n = 27) potilas oli aiemmin arvioitu korkean riskin potilaaksi (DASA ≥ 4), kun taas 16 %:ssa (n = 7) tapauksia potilas oli arvioitu vaarattomaksi (DASA = 0). Yleisimmin käytetyt interventiot olivat tarvittava lääkitys (33.5 % kaikista käytetyistä interventioista), eristys (15.8 %) ja keskustelu hoitajan kanssa (10.8 %). Mielenterveyslain alaiset interventiot (eristys, lepositeiden käyttö, tahdonvastainen injektio, liikkumisvapauden rajoitus, kiinnipito ja yhteydenpidon rajoittaminen), tarvittava lääkitys sekä keskustelu hoitajan kanssa eivät olleet yhteydessä seuraavan päivän DASA-pistemäärään. Ainoastaan ”muut interventiot”-kategoria (esim. päivittäiset aktiviteetit) oli yhteydessä matalampaan DASA-pistemäärään. Tulokset osoittivat lisäksi, että DASA-pistemäärä laski, jos potilas sai yhdestä kolmeen interventiota korkean väkivaltariskin toteamisen jälkeen. Neljä tai useampi interventio ei ollut yhteydessä seuraavan päivän DASA-pistemäärään.
DASA on tehokas menetelmä tunnistamaan aggressiota suomalaisessa psykiatrisessa potilasjoukossa, vaikkakin osa väkivallasta jää menetelmällä huomaamatta. Hoitajat käyttävät useasti pakkokeinoja interventioina, vaikka tulosten mukaan DASA-pistemäärät laskivat vain potilailla, joille tarjottiin kevyempiä interventioita.

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Tiivistelmä - Referat - Abstract

Background. The Dynamic Appraisal of Situational Aggression (DASA) is a 7-item rating scale used to predict imminent aggression in psychiatric inpatients. DASA measures the presence of seven behaviors that predict the probability of violence within 24 hours. The purpose of this research was to validate the sensitivity of DASA in a Finnish psychiatric inpatient population, examine the risk decreasing interventions applied after identifying high-risk patients and study which interventions were the most effective in decreasing the DASA score over one day of follow-up. Examinations also took into account the number of interventions needed to decrease the perceived risk of violence.

Methods. The data (n = 300) were collected in a naturalistic setting during a six-month period in an acute psychiatric admission ward. Interventions were clustered into four groups by frequency of use: (1) interventions restricted by the Finnish Mental Health Act, (2) PRN-medication, (3) discussion with nursing staff, and (4) other interventions. Associations between interventions and change in DASA scores were examined separately for each intervention and also in a single model adjusted for all other interventions.

Results and conclusion. There were 44 incidents in which a patient had been mechanically restrained or secluded. Patients had been rated as potentially violent (DASA ≥ 4) in 61 % (n = 27) of the incidents and non-violent (DASA = 0) in 16 % of the incidents (n = 7). The most frequently used interventions were PRN-medication (33.5 % of all interventions), seclusion (15.8 %) and focused discussion with nurse (10.8 %). Interventions regulated by the Finnish Mental Health Act (seclusion, mechanical restraint, involuntary intramuscular medication, limitation of the freedom of movement, physical restraint, and limitation of contacts), PRN-medication, and discussion with nursing staff were not associated with DASA score the following day. Only the category of "other interventions" (e.g., daily activities) were associated with lower DASA score the following day when examined separately or when adjusted for the use of other concurrent interventions. The results showed that the total DASA score decreased if the patient received one to three interventions. Four or more interventions had no statistical relevance on DASA score the following day. DASA is an effective method to predict imminent aggression in the Finnish psychiatric patient population, even though there remains unpredictable violence that is foreseen through DASA scores. Psychiatric staff tend to use fairly restrictive and coercive methods, but DASA scores were seen to decrease only in individuals who received non-coercive interventions.

Muita tietoja - Övriga uppgifter - Additional information

PREFACE

This Master's thesis is part of the study conducted in Kellokoski Hospital, Southern Finland. The aim of the study was to examine the interventions in psychiatric inpatient care after the assessment of violence risk, and to validate a specific structured violence risk assessment method in the Finnish inpatient population, as it had not yet been validated in Finland. The data collection started in May 2013, and has yet generated this Master's thesis and an international to-be-published article.

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1. INTRODUCTION

Patient aggression and violence against staff members and other patients are common concerns in psychiatric units (Kynoch, Wu, & Chang, 2011; Virtanen, et al., 2011). In a Finnish nationwide interview study, 8 % of psychiatric staff reported experiencing violence from patients at least once a week and 16 % one to three times per month (Virtanen, et al., 2011). In a study by Ross and colleagues (2012) 21 % of patients had experienced an aggressive incident with another patient during the first two weeks of hospitalization. Patient aggression affects the physical and psychological health of personnel (Happell & Harrow, 2010; Rippon, 2000) and the fear generated from working in a climate of potential danger can undermine patient care (Foster, Bowers, & Nijman, 2007).

Violence management should be a key component when working with potentially violent patients, and psychiatric staff should have a variety of forms of intervention in use to manage violent situations. To modulate the context and interaction with potentially violent patients, preventive measures are of special importance (Abderhalden, et al., 2006). The reduction of coercive methods such as seclusion or mechanical restraints has recently gained great attention in several countries (Steinert, Birk, Flammer, & Bergk, 2013; Vruwink, Mulder, Noorthoorn, Uitenbroek, & Nijman, 2012), and there are many alternative means to prevent violent incidents and to minimize the need for coercive methods (Bowers L. , 2014; Bowers, et al., 2014). In order to reduce the use of coercive methods, more effective methods to assess and intervene in patient aggression are needed.

Traditionally, clinicians have used only unstructured clinical risk assessment methods (e.g., the hospital's own checklists) – with varying degrees of effectiveness (Hanson, 2005). Recently, a number of structured professional risk assessment tools have been found more accurate than unaided clinical judgments (Almvik, Woods, & Rasmussen, 2000; Hanson, 2005; Ogloff & Daffern, 2006). Numerous instruments have been constructed based on actuarial assessment of dynamic risk factors and clinical risk assessment (Ogloff & Daffern, 2006) and systematic risk assessment has been recommended for overall management of patients' propensity for aggression (Abderhalden, et al., 2008). A valid and structured risk assessment instrument could identify patients more likely to engage in physically

aggressive behavior (Abderhalden, et al., 2008; Ogloff & Daffern, 2006), or who are at high risk of restraint and seclusion (van de Sande, et al., 2013). The risk assessment instruments are shown to support decision-making processes among health professionals (Björkdahl, Olsson, & Palmstierna, 2006). By using a list of empirically supported risk factors, the staff identify patients' behavior as possible triggers for upcoming aggressive events (Abderhalden, et al., 2008). Identifying empirically supported risk factors also provides the staff more time to prepare themselves for the forthcoming event, or to prevent these events by means of specific interventions (Björkdahl, Olsson, & Palmstierna, 2006). In order to be effective, however, patient risk assessment should be related to early preventive interventions and be used as a part of a comprehensive risk assessment (Abderhalden, et al., 2008; Björkdahl, Olsson, & Palmstierna, 2006).

Although many violence risk assessment instruments have been developed and tested, their systematic implementation and utility is still limited, awakening an ongoing debate around the usefulness and purposefulness of current tools (Allnutt, et al., 2013; Large, Ryan, Callaghan, Paton, & Singh, 2014). Personnel may also have mixed or ambivalent views towards structured violence risk assessment procedure, and may prefer clinical judgment over structured and standardized methods (Daffern M. , et al., 2009; Dumais, Larue, Michaud, & Goulet, 2012).

The Dynamic Appraisal of Situational Aggression (DASA) is an instrument developed in Australia by Daffern and Ogloff (2006) to be used in the clinical ward setting to identify acute risk of patient aggression within 24 hours of the assessment. DASA is a survey consisting of seven items representative of patient behavior: (1) irritability, (2) impulsivity, (3) unwillingness to follow directions, (4) sensitivity to perceived provocation, (5) easily angered when requests are denied, (6) negative attitudes, and (7) verbal threats. The occurrence of these items during the previous 12 hours is estimated on a two-point scale (0=absent, 1=present). The estimations are summed up to form a total score from zero to seven, to describe violence risk. In addition to the total score there is also a clinical assessment of violence risk (high, medium, low) included in DASA in which the staff evaluates the patient's risk to act violently based on the total score and clinical assessment. The risk assessment, comprised of both the total score and clinical assessment, considers the upcoming 24 hours and is done by nursing staff for each patient separately. DASA has

proven to be useful in a non-forensic clinical environment (Griffith, Daffern, & Godber, 2013).

The aim of the present study was to determine what are the risk-decreasing interventions applied by staff during the 24 hours after a high risk patient is identified, how effective these interventions are and how many interventions are needed to decrease the perceived risk of violence. The patient's perceived risk of violence before the implementation of seclusion or mechanical restraint was also studied.

1.1 The assessment of violence risk

The key point in violence management is the assessment of risk. Previous studies have shown that unaided clinical judgments recognize part of the threatening situations, but with structured methods assessment accuracy can be significantly enhanced (Griffith, Daffern, & Godber, 2013; Ogloff & Daffern, 2006). Structured methods have been stated to outperform unstructured clinical assessment in their sensitivity (i.e. the proportion of actually violent patients which are correctly identified as such) when predicting patient violence within the following eight hours, the sensitivity being 67.5 with structured methods, and 11.7 with unstructured methods (Griffith, Daffern, & Godber, 2013). Furthermore, in the same study by Griffith and colleagues (2013), the specificity (i.e. the proportion of actually non-violent patients which are correctly identified as such) of the structured method was 65.9, compared to 91.4 on unstructured clinical assessment, implying that with unaided clinical assessment professionals tend to see most of the patients as presumably non-violent, and can therefore easily identify the non-violent patients, but the identification of the violent patients is considerably less accurate than chance. In their study, Ogloff and Daffern (2006) have stated that with a structured violence risk assessment method nurses' assessment accuracy increased; without a structured method over 30 % of patients who were later violent were categorized as low-risk patients, while with a structured method only 18 % of later violent patients were categorized as low-risk patients.

Generally, the problem of the assessment of imminent violence risk is that some assessment methods assess static baseline risk factors rather than dynamic factors

(Hanson, 2005). These static risk factors are for example a patient's age, gender, history of violence, psychiatric diagnosis, and history of substance abuse. These predictors are useful in situations in which patient's stable risk status needs to be assessed (e.g., on discharge from psychiatric ward) although they do not tell when aggression is expected to happen (Ogloff & Daffern, 2006). Methods that estimate static risk factors make the aggression management with interventions more difficult, as rapid changes in aggression levels are unable to be observed thereby (Ogloff & Daffern, 2006). Moreover, it has been stated that static risk factors help professionals to predict aggression, but that we still need to know the dynamic factors to be able to intervene (Hanson, 2005). In comparison to static risk factors, most of the increasing factors of violence risk are dynamic, thus they change over time and in different situations, and are harder to predict. These dynamic factors are for example the violence-triggering situation, patient's mood, irritability, anger, negative attitudes, impulsivity, and verbal threats. The prediction of acute aggression is highly important when working with psychiatric patients as the risk of violence changes over time.

1.2 Interventions in psychiatric wards

Studies have listed multiple interventions that are in use in psychiatric wards to manage patient aggression. The Finnish Mental Health Act (1116/1990, chapter 4, sections 22 a–22 k) has legitimized the use of seclusion, mechanical restraints, physical restraints, involuntary intramuscular medication, limitation of the freedom of movement, and limitation of contacts in psychiatric inpatient care. These coercive methods seriously limit the patient's fundamental rights.

Seclusion means isolating the patient from others into a locked room to help him/her to calm down and to prevent him/her from damaging others or property. Under mechanical restraint the patient is isolated in a room and tied down to a bed with limb restraints. Physical restraint means the staff members physically hold the patient, preventing movement. Mechanical restraints are used to prevent the patients from seriously jeopardizing their own safety and/or to ensure they are getting the required intravascular medication. Physical restraint, however, is used to prevent and manage a violent act and

to calm the patients down. Involuntary intramuscular medication means an intramuscular injection of sedating drugs given without consent. The ward psychiatrist can limit the patient's freedom of movement for a predefined time, meaning the patient may be prohibited to leave the ward or may walk outdoors only when accompanied by nurses, to prevent the patient from leaving the hospital area. A patient's contacts (for example by telephone) with predefined persons outside the hospital may also be limited.

According to the Finnish Mental Health Act, coercive methods can only be used if the patient is under observation or in involuntary treatment. An individual can be involuntarily hospitalized if the following requirements are met: (1) the patient is psychotic and due to illness in need of treatment, (2) failure to treat the patient would result in deterioration of his/her mental illness or would endanger his/her health or safety or that of others, and (3) other treatment options are inadequate. A physician examines the patient in order to evaluate the likelihood of the commitment criteria being fulfilled and writes a referral for observation. In the hospital, the patient is placed under observation, which can last for a maximum of 4 days. At the end of the observation period, the psychiatrist in charge of the observation writes a recommendation as to whether or not the patient should be detained. The chief psychiatrist then makes the decision as to whether the patient is to be detained in involuntary treatment or not.

Internationally there has been an active discussion about decreasing the use of coercive methods (Bowers L. , 2014), as there is an ethical dilemma regarding the use of coercive methods and patient's self-determination rights. The Finnish Ministry of Social Affairs and Health, and Regional State Administrative Agencies have amongst various international operators repeatedly aligned that special attention must be paid to patients' self-determination rights about their psychiatric treatment and care. Patients have reported that experiences with coercive methods have been harmful and traumatic (Frueh, et al., 2005; Kontio, et al., 2010). However, there are certain situations in which coercive methods are considered to be necessary, and aggressive behavior against objects, other people or oneself, or the risk of violence are the most widely accepted reasons (Keski-Valkama, Koivisto, Eronen, & Kaltiala-Heino, 2010). Coercion is mostly used with patients with a diagnosis of schizophrenia (Keski-Valkama, et al., 2010) and various alternatives have been

offered to replace these methods (Kontio, et al., 2010). Previous studies have found that the availability of seclusion rooms on ward increases the number of seclusions, implying that reducing the amount of seclusion rooms on wards would automatically impact the seclusion use rates (Bowers, et al., 2010). In their recent review Bowers and colleagues (2014) have found that ward structure is also associated with lower restraint and seclusion use. A functional ward structure makes the ward easier to observe and manage, helping nurses to prevent violent incidents in advance and to avoid the use of coercive methods. In addition, nurses' understanding of the reasons behind patient aggression and their interaction skills reduce the use of seclusion (Bowers L. , 2014; Bowers, et al., 2014).

In addition to coercive methods, there is also a wide range of non-coercive methods, which are often in use on psychiatric wards. Non-coercive methods include practically all the other interventions, for example pro re nata (PRN, as needed) medication, discussion with the psychiatrist, walking outdoors, calling a relative, and other activities. PRN-medication is frequently used in psychiatric care; previous studies reporting 68 % to 83.9 % of patients receiving PRN-medication at least once during their care (Haw & Wolstencroft, 2014; Stein-Parbury, Reid, Smith, Mouhanna, & Lamont, 2008; Stewart, Robson, Chaplin, Quirk, & Bowers, 2012), although its effectiveness seems to have only limited evidence (Srivastava, 2009). PRN-medication is mostly used to decrease patient agitation (Haw & Wolstencroft, 2014; Stein-Parbury, Reid, Smith, Mouhanna, & Lamont, 2008) or to help the patient to get sleep or to decrease anxiety (Stewart, Robson, Chaplin, Quirk, & Bowers, 2012). The evaluation of effectiveness is difficult as it mainly relies on nurses' visual perception of the patient. Side effects (e.g., dystonia, extrapyramidal symptoms, excess sedation, and autonomic disturbances) resulting from PRN-medication are a rather unstudied field, as most of the studies are retrospective register studies leaning on information registered in patient files. Adverse events are partly inadequately reported, ranging from 6 % to 37 % of patients receiving PRN-medication depending on research (Srivastava, 2009).

1.3 Hypotheses

Based on current knowledge, the use of structured risk assessment methods is of special importance in the assessment and management of aggression in psychiatric wards (Griffith, Daffern, & Godber, 2013; Ogloff & Daffern, 2006). Based on previous studies DASA has proven to be a valid and reliable method to predict violence among psychiatric inpatients (Ogloff & Daffern, 2006), however, it has not been studied in the Finnish inpatient population. To our knowledge, DASA is currently the only structured, clinical, short-term violence risk assessment tool that assesses dynamic factors of violence in inpatient settings. Therefore DASA seems to be a promising tool for routine clinical use, and was used in this study. The aim of the study was to investigate the associations between interventions and the perceived risk of violence in the Finnish psychiatric inpatient population. The objective was to ascertain what were the risk decreasing interventions applied by staff during the 24 hours after a high-risk patient was identified and how effective these interventions were, considering that there has been an international debate about reducing the use of coercive methods (Steinert, Birk, Flammer, & Bergk, 2013; Vruwink, Mulder, Noorthoorn, Uitenbroek, & Nijman, 2012). Furthermore, we were interested in determining the required amount of interventions for decreasing violence risk, as there is a lack of such knowledge in the field. Due to the evidence about the validity of DASA found in international studies, we considered it important to study whether the method would be equally sensitive in a Finnish patient sample and whether its use would offer important information on violence management. Therefore, we were interested in knowing the patient's violence risk level (i.e. total DASA score) before the implementation of seclusion or mechanical restraints in order to evaluate the sensitivity of DASA in a Finnish patient sample.

The hypotheses are as follows:

1. DASA is as sensitive method to assess imminent patient violence in the Finnish psychiatric population as it has been reported to be in previous international studies.

2. Non-coercive methods are more often than coercive methods used to decrease the perceived risk of violence.

3. Non-coercive methods are the most effective interventions in decreasing violence risk.

4. The hypothesis about the necessary amount of interventions for aggression management is not set, as it is an unstudied question.

2. METHODS

2.1 Setting and sample

The data were collected in a naturalistic setting between 1.5.-31.10.2013 in one acute psychiatric admission ward in Southern Finland. The ward for adults (≥ 18 years) with 18 beds serves a catchment area of 185 000. During the study period there were 331 inpatients admitted to the psychiatric ward, of which 300 were included in the analysis. Ward staff included two psychiatrists, nursing staff (20.5 positions) and the services of a psychologist, social worker, occupational therapist and ward secretary. The staff had been trained to use methods to prevent aggressive incidents, and to decrease the use of restrictive measures.

2.2 Ethics

The study protocol was approved by the Ethics Committee of Helsinki and Uusimaa hospital district and conducted in compliance with the Declaration of Helsinki, Guideline for Good Clinical Practice (ICH GCP), and current national regulations. The permission for the study was obtained from the organization's authority (HUS, Hyvinkää Hospital Region, 31.3.2014, §40). Given the nature of the study, patients' consent was not requested. The data were treated confidentially.

2.3 The Dynamic Appraisal of Situational Aggression (DASA)

The Dynamic Appraisal of Situational Aggression (DASA) is an instrument developed in by Ogloff and Daffern (2006) to be used in the clinical ward setting to recognize the acute risk of patient aggression. The survey consists of seven items of which the occurrence during the previous 12 hours is estimated on a two-point scale (0 = absent, 1 = present). The items represent patient's behavior (irritability, impulsivity, unwillingness to follow directions, sensitivity to perceived provocation, easily angered when requests are denied, negative

attitudes, and verbal threats) and the estimations are summed up to form a total score from zero to seven, describing violence risk. The items were gathered by Ogloff and Daffern during a thorough study of items on two violence assessment methods (Broset Violence Check-list, BVC, and Historical-Clinical-Risk, HCR-20) and researchers' previous studies. The items included in DASA showed the strongest relationship with physical aggression, with the highest area under the ROC curve (AUC) value (0.82) of all item combinations. The procedure of creating DASA is more thoroughly presented in the original study of Ogloff and Daffern (2006). The total scores are divided into three categories; 0, 1-3, and 4 or more representing no risk, moderate risk, and high risk, respectively. Violence risk might be immediate for patients who score 6 or 7, implying that preventive measures (such as discussion with the patient) should be used.

DASA has proven to be useful in a non-forensic clinical environment where it detected aggression more effectively than structured and unstructured clinical assessment (Griffith, Daffern, & Godber, 2013). Studies have shown the predictive validity of DASA to be moderate to high in Europe (AUC = 0.66 – 0.71) (Dumais, Larue, Michaud, & Goulet, 2012) and Australia (AUC = 68.1) (Griffith, Daffern, & Godber, 2013). In the present study, the Finnish version of the instrument was used. It was prepared using the iterative process of translation and independent back translation, followed by a discussion to resolve minor differences in 2012 by four specialists in the field of psychiatry and forensic psychiatry (Laiho T., Sailas E., Putkonen H. and Lindberg N) in Kellokoski Hospital.

2.4 Design and procedure

Comprehensive coaching was held for nurses and a senior doctor discussing the use of DASA in the clinical environment. DASA ratings were completed separately for each patient daily at 1 pm during the afternoon ward report. Nursing staff on duty filled in DASA with psychiatrists present when available. The assessment represents a consensus statement. When high-risk patients were recognized, preventive measures were planned. Before the study, there was a two-week pilot phase to practice the use of DASA on the ward. In the current study only the total DASA scores were used, leaving out the clinical risk assessment (low, moderate, high).

All patients who experienced seclusion or mechanical restraint were identified and their previous DASA score was studied to find out how accurately DASA predicts the forthcoming violence and therefore needed coercive methods. Furthermore, to identify the high-risk patients we used the DASA score with a cut-off point of 4. To gain knowledge of the variety of preventive measures used by staff, the patient files and nursing reports of all patients above the cut-off point were studied with inductive content analysis. Moreover, applied interventions were clustered into four groups (interventions regulated by the Finnish mental health act, PRN-medication, discussion with nurse, and other interventions) by the frequency of use. DASA values between an intervention day and the subsequent day were compared to examine the effectiveness of each intervention group. Finally, we studied the amount of the applied interventions' effect on the total DASA score.

As background information we also collected the number of aggressive incidents that happened on the ward during the study period. Staff reported all incidents of threats, danger and violence to the Hospital District's Risk Report System. The aim of the system is to increase overall safety and improve risk management and prevention on hospital wards.

2.5 Statistical analysis

The total DASA score percent distribution was calculated of all patients who received seclusion or mechanical restraints during the preceding 24 hours after DASA was completed. In these analyses we included the situations where (1) physical attack was directed to other patients or staff members, and/or (2) deliberate property damage was caused. Following Ogloff and Daffern (2006), physical aggression against self was eliminated from the analysis (n = 10 incidents).

Interventions applied to high-risk patients (DASA ≥ 4) were classified into four groups by frequency of use: (1) interventions regulated by the Finnish Mental Health Act, (2) PRN-medication, (3) discussion with nurse, and (4) other interventions. The frequency and percent distribution of interventions and intervention groups were counted.

Moreover, to study the associations between interventions and violence risk after the intervention had been applied, we fitted five logistic regression models: four models to

study the separate associations of the four intervention categories with the DASA score the next day, and the fifth model to study the associations when adjusted for the use of multiple interventions. Finally, we used logistic regression to study how the number of applied interventions affected the total DASA score the next day. Baseline DASA score was adjusted in all the models.

In addition we compared the patient characteristics of gender and primary diagnosis by Chi-square analysis and age by t-test, between the patients with high DASA score and low DASA score. Statistical analyses were carried out using the IBM SPSS Statistics version 22.

3. RESULTS

3.1 Characteristics of the sample

During the research period there were 331 patients in total admitted to the ward with a total of 427 inward periods due to multiple periods by some of the patients. 163 treatment periods started with involuntary admission. Thirty-one patients (9.4 %) were discharged from the ward before the afternoon DASA scoring. DASA assessment was completed with 300 patients (men 49 %, women 51 %) with altogether 396 treatment periods. 2193 assessments were done in total. 64 patients (21.3 % of all rated patients) scored four or more at least once during their care. Occupancy rate was 74 %. The length of stay ranged from 1 to 44 days, with the total of 2399 inward days. Patients' mean age was 42.85 years (SD = 17.39). Characteristics can be seen in Table 1.

Table 1

Descriptive statistics

	N	%	Median	Mean	SD	Min	Max
Patients admitted to the ward	331	100					
DASA scored patients	300	90.6					
High-risk patients (DASA ≥ 4)	64	21.3					
Treatment periods of all admitted patients	427	100					
Voluntary	264	61.8					
Involuntary	163	38.2					
Length of hospitalization, days			4	6	6.5	1	44
Age			42	42.85	17.39	18	90
Sex							
Women	152	51					
Men	148	49					
Assessments in total	2193						
Assessments, DASA ≥ 4	217	9.9					

According to the International Classification of Diseases (ICD-10) (World Health Organization, 1993), most patients had a primary diagnosis of mood disorder (n = 123, 41 %) or schizophrenia, schizotypal or delusional disorder (n = 106, 35.3 %). Mental and behavioral disorders due to psychoactive substance use were a primary diagnosis for 9.2% (n = 28) of patients. Primary diagnosis can be seen in Appendix 1.

In comparisons between high and low DASA score patients, the Chi-square analysis revealed that the gender distribution (X^2 = 0.993, p = NS) and mean age (t = -.501, p = NS) did not significantly differ between the two groups. Patients with high DASA scores did differ significantly from low score group when diagnosis was observed (X^2 = 24.426, p < .001). The patient group with high DASA scores comprised significantly more patients with organic brain disorders (X^2 = 14.599, p < .001), and significantly less patients with depressive disorders (X^2 = 11.749, p < .001). The diagnoses were not based on structured interviews, but were taken from patient medical files. In this regard, in Finland, the basic diagnostic procedures have been proven reliable (Isohanni, et al., 1997; Pihlajamaa, et al., 2008).

In addition to DASA scoring, staff reported all incidents of threats, danger and violence to the Hospital district's Risk Report System. During the study period there were 22 reported incidents altogether of which eight included physical violence, 12 included psychological violence and two included violence towards property.

3.2 The sensitivity of DASA in a Finnish psychiatric inpatient population

The results imply that seclusion or mechanical restraint were used in 65 violent incidents and directed to 48 (14.5 %) of 331 patients. On 55 (85 %) of 65 incidents physical attack was directed to other patients, staff members and/or property. Physical aggression against self (n=10/65, 15 %) was eliminated from statistical analysis. After eliminating aggression against oneself, there were 55 incidents (41 patients) where physical attack was directed to other patients, staff or property. 11 of these 55 incidents happened during the admission when there were no DASA scores available. This left us with 44 incidents (33 patients; 14 women, 19 men) with available DASA scores. On 16 % (7 out of 44) of incidents the patient

had been rated as non-violent (DASA = 0). 23 % (10/44) scored 1-3, 20 % (9/44) scored 4-5, and 41 % (18/44) scored 6-7. This being the case total DASA score was 4 or more in 61 % (27/44) of all incidents, meaning that DASA detected 61 % of all high-risk patients who were later violent, and consequently were either secluded or mechanically restrained.

3.3 Interventions followed by the high DASA score

Total of 217 assessments met the criterion cut-point (DASA ≥ 4). One or more interventions were followed in 91.2 % (n = 198) of all 217 observed high DASA scores. In 8.8 % (n = 19) of cases no intervention was used. During the study period there were a total of 400 interventions reported. The average amount of interventions used was 1.8 per day (median = 2, SD = 1.1). The most frequently used interventions were PRN-medication, seclusion and focused discussion with a nurse. PRN-medication was used in 33.5 % of all situations where intervention was present. It was also used alone without any other intervention in 15.7% of situations. Seclusion was used 63 times (18.8 %) and focused discussion with nurse 43 times (10.8 %). During the research period, 26.3 % of all interventions were coercive interventions. Interventions can be seen in table 2.

Table 2

Intervention/s followed by 217 observations with a DASA total score ≥ 4

No following intervention (n, %)	19/217 (8.8)
One or more interventions	198/217 (91.2)

Total number of observed interventions	n=400	
Distribution of various interventions	n	%

Interventions regulated by the Finnish Mental Health Act

Seclusion	63	15.8

Intramuscular medication administered without consent	15	3.8
Restriction of freedom of movement	13	3.3
Mechanical restraint	9	2.3
Physical restraint	3	0.8
Restriction of communication	3	0.8
Other Interventions		
PRN-medication[a] per os	134	33.5
Focused discussion performed by nurse	43	10.8
Verbal restriction	25	6.3
Medication change	23	5.8
Discharge or transfer to another ward	14	3.5
Relative visiting patient on ward	11	2.8
Daily activities/sport/walk outdoors	11	2.8
To guide patient to her/his own room	10	2.5
Physical restriction without coercion	5	1.3
Seclusion with the door unlocked	4	1.0
Discussion with the doctor	3	0.8
Patient room change	3	0.8
Intramuscular medication with consent	2	0.5
Home leave	2	0.5
Giving structural self-assessment instrument to patient (e.g., Beck Depression Inventory)	2	0.5
Medication dosage given earlier than prescribed	1	0.3
Discussion with the social worker	1	0.3

[a] PRN-medication = pro re nata, medication given as needed.

3.4 DASA scores following interventions

Logistic regression showed that only the category of "other interventions" (e.g., discussion with a relative or daily activities) was associated with a lower DASA score the following day, and this was observed both when examined separately (B = -0.70) or when adjusted for the use of other concurrent interventions (B = -1.07). Interventions regulated by the Finnish Mental Health Act, PRN-medication and discussion with nurse, were not associated with a lower DASA score the following day (Table 3).

Table 3

Intervention's effect on the total DASA score the next day

Intervention group	Separate association			Mutually adjusted associations		
	B	CI (95 %)	p	B	CI (95 %)	p
Intervention restricted by Finnish mental health act	0,25	-0,35; 0,86	.41	0,27	-0,34; 0,87	.38
PRN-medication[a]	-0,44	-1,00; 0,11	.12	-0,34	-0,91; 0,23	.24
Discussion with the nurse	-0,32	-0,98; 0,34	.34	-0,08	-0,75; 0,60	.82
Other intervention	-0,7	-1,24; -0,16	.01	-1,07	-1,17; -0,05	.032

[a]PRN-medication = pro re nata, medication given as needed

3.5 Effect of the number of applied interventions on violence risk

The effect of the amount of applied interventions on the next day's total DASA score was studied with logistic regression. The results showed that the total DASA score decreased if the patient received one, two or three interventions. However the 95 % confidence intervals of these three were overlapping, so there seems to be no difference in receiving one, two or three interventions. If the patient received four or more interventions, it had no statistical relevance on DASA score. Results are shown in figure 1.
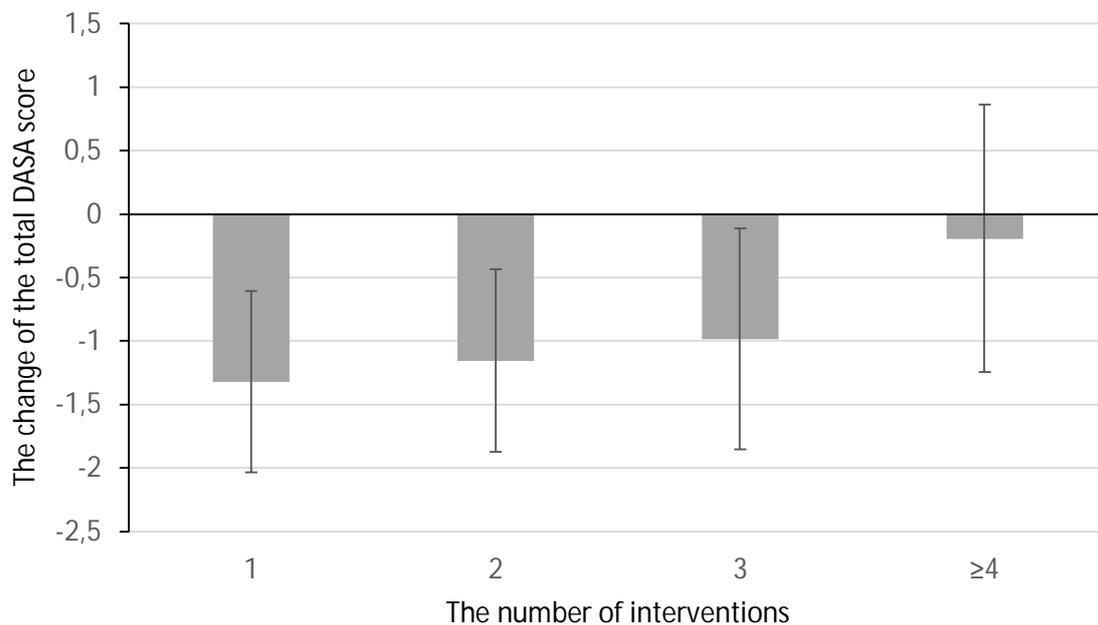

Figure 1. The amount of applied interventions' effect on the total DASA score the next day

4. DISCUSSION

The results point out a few important findings. PRN-medication and seclusion are the most frequently used interventions in Finnish inpatient care for patients who exhibit high scores in violence risk assessment. DASA ratings were moderately good in predicting the risk of patients being secluded or mechanically restrained during the following 24 hours, with 61 % of these patients being rated as high-risk patients. Analysis of changes in DASA scores associated with different types of interventions suggested that the category of relatively mild interventions were associated with the largest decrease in DASA scores assessed the day after the intervention. Furthermore, the study showed that there were no differences on perceived risk of violence based on the amount of given interventions.

4.1 The sensitivity of DASA

Nursing staff identified 61 % of the potentially violent patients who were later secluded or mechanically restrained, supporting the first hypothesis of DASA being a sensitive method in Finnish psychiatric population. 16 % of patients who received the above-mentioned interventions were previously assessed as non-violent (DASA = 0), which suggests that part of violence is so unpredictable that it cannot be foreseen with a structured clinical assessment method. This is in line with previous international studies (Dumais, Larue, Michaud, & Goulet, 2012; Griffith, Daffern, & Godber, 2013; Ogloff & Daffern, 2006). Relatively high rates of false negative cases might be explained by the fact that DASA does not screen instrumental violence or psychotic symptoms. Instrumental violence is difficult to assess with current short-term violence risk assessment measures (e.g., BVC, DASA), as these measures do not assess personality traits that are linked to increased risk of violent behavior (Walsh, Swogger, & Kosson, 2009). Also, these measures do not screen commanding auditory hallucinations or paranoid ideation, although these are commonly linked with violent behavior of patients with psychotic disorders (Otto, 2000).

In the study only the actuarial risk assessment (i.e. the total DASA score) was used leaving out the clinical risk assessment (low, medium, high risk) that is also included in DASA.

Therefore, it is possible that part of these patients who were assessed as non-violent on the actuarial scale could have been assessed as high-risk patients based on clinical judgement. This implies that part of the violent incidents by patients scored as non-violent were in fact predictable to staff. In light of these results, continuing the use of DASA in psychiatric inpatient care is encouraged.

Using an assessment method based on direct sum, there is a question of whether some behaviors assessed with DASA are more accurate than others to predict the forthcoming violence. The possibility of paying special attention to some specific items would give valuable information to clinicians, especially while working with patients with low DASA scores. As this is an unstudied question, further research is warranted. When creating the method, Ogloff and Daffern (2006) used items that showed the strongest relationship with physical aggression, with the highest predictive accuracy of all different behavior combinations, but the predictive validity of different items were not informed.

Evaluating the sensitivity and specificity of DASA, it comes with a question of which to value the most. Whether the method should prefer the power of recognizing the right positives (i.e. the actually violent patients) to effectively prevent the forthcoming violent acts, even if that might result in a situation where more patients than necessary were given interventions (e.g., seclusion), or whether the method should prefer the specificity (i.e. rightly assessing the non-violent patient as non-violent) taking the risk that not all forthcoming violent acts could therefore be identified, but in the same time assuring that patients who are not going to act violently will not be intervened without a coherent reason. With these kind of methods clinicians are always on the knife's edge making decisions about how and when to intervene.

4.2 The effect of interventions on violence risk

In the current study, the most frequently used interventions to high-risk patients (DASA ≥ 4) were PRN-medication, seclusion and focused discussion with a nurse. PRN-medication is frequently used in psychiatric care (Haw & Wolstencroft, 2014; Stein-Parbury, Reid, Smith, Mouhanna, & Lamont, 2008; Stewart, Robson, Chaplin, Quirk, & Bowers, 2012), although

its effectiveness seems to have only limited evidence (Srivastava, 2009). In our study PRN-medication was used in 33.5 % of situations where intervention was present. It was also used alone without any other intervention in 15.7 % of situations. However, results showed that PRN-medication had no effect on the following day's DASA score, implying that PRN-medication did not decrease the perceived risk of violence. The evaluation of the effectiveness of PRN-medication is difficult as it mainly relies on nurses' visual perception of the patient. In light of previous studies it is not surprising to see the results on PRN use and its effectiveness on this study. To work towards the goal of decreased use of PRN-medication, Mullen and Drinkwater (2011) have argued that increasing the amount of staff members on ward – among many other things (e.g., patient allocated nurse, questioning the traditional approach to PRN use, and strong leadership on ward), reduce the use of PRN-medication.

Another commonly used intervention in current study was seclusion. It was used in 15.8 % of all situations where an intervention was present. The use of restrictive methods has been widely debated (Happell & Harrow, 2010) and various attempts have been made to decrease the use of seclusion, mechanical restraints and involuntary medication (Bowers, et al., 2014; Kontio, et al., 2010). One solution for decreasing seclusion rates is the use of time out, which has been reported to be equally effective as seclusion in the management of patient aggression (Bowers, et al., 2012). Time out means the patient is asked to voluntarily move into a room alone and stay there until s/he becomes calm. In their wide review article, Bowers and colleagues (2014) listed a handful of ideas how to replace or decrease the use of coercive methods. Nurses' understanding about patient behavior and the reasons behind it (e.g., a mental disease) influenced the way nurses manage disturbed behavior. Nurses' ability to regulate their own emotions (anxiety and fear) helps to maintain structure on ward (routine and rules) and therefore decreases the use of seclusion. Staff training in interaction skills, in addition, significantly reduced the use of seclusion (Bowers, et al., 2014). Nurses have also generated a handful of alternatives to seclusion and restraint including for example daily activities, conversations with the patient, constant observation, and seclusion with the door unlocked in agreement with the patient (Kontio, et al., 2010). The use of coercive methods has been reported to impair the therapeutic alliance (Happell & Harrow, 2010; Sailas & Wahlbeck, 2005), which is not a

surprise as patients consider the use of coercive methods mainly as a form of punishment (Keski-Valkama, Koivisto, Eronen, & Kaltiala-Heino, 2010; Kontio, et al., 2012) and see them as negative interventions (Sailas & Wahlbeck, 2005; Kuosmanen, Hätönen, Malkavaara, Kylmä, & Välimäki, 2007). Patients themselves have hoped for meaningful activities inside and outside the ward, a homelike environment on the ward, and more contact with the staff (Kontio, et al., 2012).

The Finnish Ministry of Social Affairs and Health, and Regional State Administrative Agencies have repeatedly aligned that special attention must be paid to human rights and patients' self-determination rights about their psychiatric treatment and care. This is important given the fact that national policies have been noticed to reduce the use of seclusion (Bowers, et al., 2014). It seems that high usage rates of restrictive methods may somehow reflect the culture of Finnish psychiatric care. However, Laiho and colleagues (2014) have argued for the contrary; ward culture does not affect the use of restrictive methods according to their results. Staff understandably feels safe to use methods they are familiar with and the effectiveness of which they believe in. PRN-medication and coercive methods may seem effective to staff, which could explain part of the high use. However, nurses have also reported to often feel relieved after the seclusion is over and concerned whether they did the right thing secluding the patient or failed to find alternative methods (Kontio, et al., 2010). Researchers disagree on whether decreasing the use of seclusion results in an increase of violent incidents (Khadivi, Patel, Atkinson, & Levine, 2004) or whether it has no effect (Smith, et al., 2005) or a decreasing effect (Smith, Ashbridge, Davis, & Steinmetz, 2015) on the amount of violent incidents. Studies have also found that restrictive methods and coercion may aggravate the use of aggression among patients (Bowers, Allan, Simpson, Jones, & Van Der Merwe, 2009) resulting in more violent situations on ward.

In the current study coercive method(s) were applied to a quarter of patients with a risk of violence perceived as high (DASA ≥ 4). While using the standardized risk assessment methods, it should be noted that they are not meant to replace the individual assessment of a current situation but to offer standardized information to help the decision-making process about the patient's psychiatric care. If violence risk rates are used as a decision-

making automation it may lead to a situation where the majority of high-risk patients are restricted or secluded without an individual judgment. Therefore there is a risk that false-positive patients will be restricted without a coherent reason. In the best case scenario, violence risk assessment methods help nurses to predict upcoming violence and react before the situation escalates. Therefore psychiatric staff may avoid the use of coercive methods when elevated risk is recognized in advance and decreased with lighter interventions. It is also highly recommended that the clinician discuss the perceived risk of violence with the patient, which would itself work as an intervention.

The third most often used intervention in the current study was focused discussion with nurse (10.8 % of all used interventions). Somehow it was not effective enough to decrease the perceived risk of violence. It is possible that during the research period a great deal of discussions between nurses and patients were left unreported, which would partially explain the ineffectiveness. Moreover, contents of discussions might not have been supportive of patients' anger management, implying that nurses need further education to be able to help patients to calm down and manage their behavior. It has been found to be important to offer patients therapeutic guidance to support them in the evaluation of their behavior styles, to find alternatives to ineffective reactions to aggression, and to offer patients possibilities to try these new methods with nurses in the situation of the potential use of coercive methods (Bak, Brandt-Christensen, Sestoft, & Zoffmann, 2012). In this study we did not delve into the contents and aims of these discussions as those were not reported in the patient files.

Other non-coercive interventions such as daily activities or calling a relative were not as frequently used as the above-mentioned interventions, in contrast with the second hypothesis about the high usage of non-coercive interventions. Nevertheless, they turned out to be the most effective interventions to decrease the perceived risk of violence, supporting the third hypothesis. The category of "other interventions" consisted of a variety of interventions and the frequency of their use varied largely from 25 incidents of verbal restriction to only one discussion with the social worker. Verbal restriction, medication change and discharge formed over a half of the other interventions category, implying that special effort on patient guidance about anger management techniques may not have been made. Discussion with the psychiatrist was mentioned as an intervention

only three times (0.8 % of all mentioned interventions) during the whole six-month study period, although there were two psychiatrists working on the ward. It appears that psychiatrists are so overladen by other consecutive duties that no time remains to participate in the preventive actions on the ward. Not once was an appointment with a psychologist or occupational therapist mentioned as an intervention. The results imply that nurses can consult supplemental staff if needed but mainly they remain to be outsourced from the violent situations and the situations with threat of violence. There is a constitutional need to reconsider the policy of special workers' (e.g., psychologists, social workers, occupational therapists) ability to participate in the ward's everyday routines. Attendance with patients must be increased to identify the potentially aggressive incidents and to integrate all parts of the multi-professional team as a part of the ward environment.

Although it seems that the use of a wide range of interventions is not effectively divided between different methods, it may be possible that psychiatric staff use many methods that are not orthodoxly marked on patient files, leading to a situation where parts of the psychiatric care may be left in the dark. For example, coercive methods and medication must be marked down on patient files and reported to Regional State Administrative Agency by law in Finland, unlike non-coercive methods, which may distort the real picture of used interventions. This also reflects the nature of register studies: one can only study methods that are actually stated in the register, which might lead to a situation where the gathered material limitedly reflects the reality.

4.3 The number of applied intervention's effect on violence risk

In this study, the perceived risk of violence decreased if the patient received one, two or three interventions. Nevertheless, the 95 % confidence intervals of these three were overlapping, implying that there was no difference whether the patient received one, two or three interventions. However, if the patient received four or more interventions, it had no effect on the violence risk. The results imply that when it comes to intervening with patients, quality beats quantity. If the staff only has time for one intervention, it is as effective as multiple interventions. This is comforting as violent situations usually come

abruptly when there are no time for various interventions, and as nurses often state that they don't have enough time on ward to intervene as effectively as possible on different situations (Kontio, et al., 2010). Since findings are preliminary, further research is warranted.

4.4 Strengths and limitations of the study

The study is a valuable representation of the Finnish psychiatric system as it was done using statistics gathered from a regular psychiatric admission ward. During the research period, all admitted patients who were not discharged before the afternoon DASA scoring were included in the analysis. Only on sensitivity tests incidents including physical aggression against self were excluded. Nurses on duty did the assessments as a team, thus it represents a consensus statement rather than an opinion of a staff member. Comprehensive coaching was held for psychiatric staff discussing the use of DASA in a clinical environment before the assessments began. None of the researchers worked in the ward in question, therefore the study represents an objective evaluation. Psychiatric staff received no benefits by participating in the research.

This research has a number of limitations that should be noted. First, it is a register study meaning that only interventions that had been mentioned in the patient files were included in the analysis. If anything were to be left out of the files, it would not have been part of the analysis. Daily writings in the patient files were partly slight, which might have biased the view of the actual psychiatric care. Second, only one ward from one hospital was included in the study, and therefore the generalizability of the results may be questioned. Third, the study was an observational study in natural settings without any randomization. Therefore, the observed changes in DASA scores associated with different interventions may have been confounded by unmeasured third variables and by indication bias. Indication bias may have arisen if less severe violent incidents were treated with milder interventions and more severe incidents with coercive methods, and if the less severe incidents represented more temporal and short-term aggressive behavior than the severe incidents. The analysis was adjusted for baseline DASA score, which removes some of the

confounding but cannot exclude it completely. Cluster randomized trials would be needed to reliably determine the effectiveness of different intervention types. Furthermore, the effect of interventions and the amount thereof was studied only on high-risk patients, and the sensitivity of DASA on all secluded, restrained and/or involuntary medicated patients, meaning that the populations in different analysis are not identical. When sensitivity was studied, the index DASA score was the score preceding the start of either seclusion or mechanical restraint (44 incidents). Many patients, however, spent multiple days in seclusion or restraints, leading to a situation where studying the number of interventions followed by high DASA scores, the number of these two interventions were higher (n= 72).

In addition, critique has been directed towards the use of actuarial methods. It has been suggested that clinicians should rather use the mean and peak values of the previous week's DASA scores than the latest total score while predicting inpatient aggression (Chu, Thomas, Daffern, & Ogloff, 2013). In the present study we used the latest total DASA scores, as most of the patients were on ward only for four to six days.

4.5 Conclusion

To conclude, this study states that the Dynamic Appraisal of Situational Aggression is a sensitive method to be used in a Finnish psychiatric inpatient care. Whether the method is fully reliable and valid in the Finnish psychiatric inpatient population requires further research to be determined. In this study PRN-medication, seclusion, and focused discussion with a nurse were the most frequently used interventions, although they did not predict a decrease in DASA scores the next day. Non-coercive interventions were the most effective in decreasing perceived risk of violence, encouraging psychiatric staff to use imagination when choosing intervention techniques. In light of this study, it is important to focus on the quality rather than the quantity of interventions, which is encouraging as the situations of violence risk usually come abruptly when there is no time for various interventions. We have argued that the use of non-coercive interventions should be increased to enable more ethical and self-determined psychiatric care to patients. To reduce the use of coercive methods, it is important to offer ward staff further education about the use of non-coercive

methods and information about the reasons behind aggression, as well as tools for interaction with aggressive patients and for emotion regulation. The reduction of the use of coercive methods has lately gained great attention internationally and it seems that when the psychiatric staff gets to compose alternative means to prevent violent incidents, they are able to come up with hundreds of feasible methods. The intuitive talent of psychiatric staff should therefore be taken as part of research development and it should be appreciated in wider context.

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Appendixes

Appendix 1. Primary clinical diagnosis of the inpatients with DASA scorings, according to the ICD-10 (WHO, 1993).

Diagnostic group	N	%
F0-09 Organic, including symptomatic, mental disorders	10	3,3
F10-19 Mental and behavioral disorders due to psychoactive substance use	28	9,3
F20-29 Schizophrenia, schizotypal and delusional disorders	106	35,3
F30-39 Mood disorders	123	41
F40-49 Neurotic, stress related and somatoform disorders	14	4,7
F50-59 Behavioral syndromes associated with physiological disturbances and physical factors	2	0,7
F60-69 Disorders of adult personality and behavior	7	2,3
F70-79 Mental retardation	2	0,7
F80-89 Disorders of psychological development	2	0,7
F90-98 Behavioral and emotional disorders	1	0,3
F99 Unspecified mental disorder	5	1,7
	300	100