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EVIDENCE-BASED VIOLENCE RISK ASSESSMENT IN PSYCHIATRIC INPATIENT CARE: AN IMPLEMENTATION STUDY

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To my mother Anneli and
my father Kimmo

Tella Lantta

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University of Turku, Faculty of Medicine, Department of Nursing Science, Finland
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ABSTRACT

The aim of this study was to promote evidence-based violence risk assessment in inpatient psychiatric care. The study was an implementation study with three phases utilizing a mixed-method approach. The Ottawa Model of Research Use was used as a theoretical framework. The setting was three closed adults' psychiatric wards and two associations for families of mental health patients. The violence risk assessment intervention implemented was the Dynamic Appraisal of Situational Aggression.

First, assessment of key elements for implementation was explored from the perspectives of nursing staff, relatives of mental health patients, and the practice environment. In addition, the intervention was specified. Second, implementation was monitored on the wards: barriers and facilitators for the implementation, knowledge transfer strategies, adaptation and use of the intervention were explored. Third, evaluation of outcomes of the intervention implemented was done from perspectives of nursing staff and mental health inpatients. The feasibility of the intervention was explored.

Assessment of key elements revealed the views of nursing staffs and relatives of mental health patients on the complexity of violent events in psychiatric care and identified common needs for the development of violence prevention and management. Monitoring the implementation yielded knowledge about intervention implementation in the clinical practice setting and its challenges. Evaluation of implementation outcomes revealed mixed perceptions of violence risk assessment intervention and the feasibility criteria set were not fully met.

This dissertation provides new insights which can be utilized when implementing novel methods to prevent and manage patient violence in more user-centered manners. On basis of the study results, patient involvement in short-term risk assessment can be seen as a new, promising working method in psychiatric inpatient care. Thus, to confirm this finding, more research is needed.

Keywords: psychiatric nursing, violence risk assessment, implementation, user-centeredness

Tella Lantta

NÄYTTÖÖN PERUSTUVA VÄKIVALLAN RISKINARVOINTI PSYKIATRISISSA SAIRAALAHOIDOSSA: IMPLEMENTOINTITUTKIMUS

Turun yliopisto, Lääketieteellinen tiedekunta, Hoitotiede, Suomi
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TIIVISTELMÄ

Tutkimuksen tavoitteena oli edistää näyttöön perustuvaa väkivallan riskinarviointia psykiatrisessa sairaalahoidossa. Tutkimus toteutettiin implementointitutkimuksena hyödyntäen monimenetelmällisyyttä ja se jakautui kolmeen vaiheeseen *Ottawa Model of Research Use* viitekehyksen mukaisesti. Tutkimusympäristönä olivat kolme suljettua aikuispsykiatrista osastoa ja kaksi mielenterveysomaisten järjestöä. Tutkimuksessa käytäntöön viety väkivallan riskinarviointimenetelmä oli *Dynamic Appraisal of Situational Aggression*.

Ensimmäisessä vaiheessa arvioitiin hoitohenkilökunnan, mielenterveysomaisten ja käytännön työympäristön näkökulmasta tärkeimpiä tekijöitä uuden menetelmän käytäntöön viemisen suhteen. Käytäntöön vietävä menetelmä tarkennettiin. Toisessa vaiheessa intervention käytäntöön viemistä seurattiin osastoilla: Käytäntöön viemistä estävät ja edistävät tekijät tunnistettiin. Strategiat menetelmän käytäntöön viemiseksi valittiin. Menetelmän käyttöönottoa seurattiin. Kolmannessa vaiheessa hoitohenkilökunta ja potilaat arvioivat käytäntöön viedyn menetelmän, sekä menetelmän käyttökelpoisuutta tutkittiin.

Tutkimuksen tulosten mukaan uuden menetelmän käytäntöön viemisen tärkeimpinä huomioitavina tekijöitä olivat hoitajien ja mielenterveysomaisten näkökulmista väkivaltatilanteiden kompleksisuus psykiatrisessa hoidossa. Yhteisiä tarpeita väkivallan ennaltaehkäisemisen ja hallitsemisen kehittämiseksi löydettiin. Tulokset toivat tietoa menetelmien käytäntöön viemisen menetelmistä käytännön työympäristöissä ja siihen liittyvistä haasteista. Näkemykset käytäntöön viedystä väkivallan riskinarviointimenetelmästä olivat ristiriitaiset eivätkä asetetut kriteerit menetelmän käyttökelpoisuudesta täytyneet täysin.

Tämä väitöskirja tuottaa uutta tietoa, jota voidaan hyödyntää vietäessä käytäntöön uusia käyttäjälähtöisiä menetelmiä potilasväkivallan ennaltaehkäisemiseksi ja hallitsemiseksi. Potilaiden mukaanottoa väkivallan lyhyen aikavälin riskinarviointiin voidaan pitää tulosten perusteella uutena, lupaavana lähestymistapana psykiatrisessa sairaalahoidossa. Lisätutkimusta tarvitaan kuitenkin havainnon vahvistamiseksi.

Asiasanat: psykiatrinen hoitotyö, väkivallan riskinarviointi, implementointi, käyttäjälähtöisyys

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ABBREVIATIONS

APA	American Psychiatric Association
AUC	Area under curve
BVC	Brøset Violence Checklist
COREQ	Consolidated criteria for reporting qualitative studies
CFIR	Consolidated Framework for Implementation Research
DASA	The Dynamic Appraisal of Situational Aggression
EU	The European Union
HCR-20	Historical-Clinical-Risk Management-20
ICD-10	The International Classification of Diseases-10
NICE	National Institute for Health and Care Excellence (the United Kingdom)
OMRU	The Ottawa Model of Research Use
ROC	Receiver operating characteristic
SAVRY	Structured Assessment of Violence Risk in Youth
SMI	Severe mental illness
SPSS	Statistical Package for the Social Sciences
TENK	Finnish Advisory Board on Research Integrity
THL	National Institute for Health and Welfare (Finland)
UK	United Kingdom
USA	United States of America
Valvira	National Supervisory Authority for Welfare and Health (Finland)
WHO	World Health Organization

LIST OF ORIGINAL PUBLICATIONS

This doctoral dissertation is based on four publications, which are referred to in the text by their Roman numerals I-IV.

- I Lantta T, Anttila M, Kontio R, Adams CE, Välimäki M. 2016. Violent events, ward climate and ideas for violence prevention among nurses in psychiatric wards: a focus group study. *International Journal of Mental Health Systems*, 10:27. doi: 10.1186/s13033-016-0059-5.
- II Kontio R, Lantta T, Anttila M, Kauppi K, Välimäki M. 2015. Family involvement in managing violence of mental health patients. *Perspectives in Psychiatric Care*, 17 Sep 2015. doi: 10.1111/ppc.12137. [Epub ahead of print]
- III Lantta T, Daffern M, Kontio R, Välimäki M. 2015. Implementing the Dynamic Appraisal of Situational Aggression in mental health units. *Clinical Nurse Specialist*, 29(4):230-43.
- IV Lantta T, Kontio R, Daffern M, Adams CE, Välimäki M. 2016. Using the Dynamic Appraisal of Situational Aggression (DASA) with mental health inpatients: a feasibility study. *Patient Preferences and Adherence*, 10:691-701.

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1 INTRODUCTION

Severe mental illnesses (SMI) imply challenges for both people's everyday functioning (Viertiö et al. 2012) and the lives of their families (Rowe 2012). During the life course, a person's quality of life may be impaired by several factors, such as symptoms of the illness (Gardsjord et al. 2016, Heering et al. 2016) and poor socioeconomic situation (Heider et al. 2007). One challenge that people with SMI may face is connected with violence both perpetrator and victim. It has been estimated that people with SMI are more likely to engage in violent behavior than those in general population or than people with other types of mental illnesses (Cornaggia et al. 2011, Dack et al. 2013, Fazel & Yu 2011). Thus people with SMI have a high risk of being victims of violent and non-violent crimes (Honkonen et al. 2004, Khalifeh et al. 2015, Latalova et al. 2014).

Due to the nature of the illness (World Health Organization [WHO] 2016a), in acute phases of SMI psychiatric inpatient care may be required (American Psychiatric Association [APA] 2010, Duodecim 2015). In psychiatric inpatient care, up to one in five patients may behave violently (Iozzino et al. 2015): in forensic mental health settings the proportion may be even higher (Broderick et al. 2015). Violence against health care professionals is a global challenge (Spector et al. 2014), and especially in psychiatric nursing (Edward et al. 2016). Violence-related problems contribute to staff injuries (Omérov et al. 2004), negative impact on staff's mental well-being (Camuccio et al. 2012), staff turnover (Roche et al. 2010) and increased organizational costs (Rubio-Valera et al. 2015). Quality of patient care may be impaired due to poor ward atmosphere (Bowers et al. 2006) and the physical and mental impact of violent events on nursing staff (Drach-Zahavy et al. 2012).

Managing patients' violent behavior has traditionally involved the use of coercive methods (Happell & Harrow 2010, Thomas et al. 2009), of which particularly the use of seclusion and mechanical restraints have been questioned for reasons of ethics and patient safety (National Institute for Health and Care Excellence [NICE] 2015). Moreover, the use of coercive methods is inconsistent due to the absence of an evidence base about the effectiveness of these interventions in preventing or managing patient violence (Muralidharan & Fenton 2006, Sailas & Fenton 2000). A national challenge in providing patients with SMI with safe and humane care is that coercive methods are most commonly used for patients with psychotic disorders (National Institute for Health and Welfare [THL] 2015). Importantly, in Finnish national mental health policy one of the key targets is to develop care to be safer for patients and staff, and to reduce the need to use coercive methods (THL 2014a).

The need for more efficient methods to prevent and manage patient violence has been globally recognized (Dickens et al. 2013, Edward et al. 2016, Gudde et al.

2015). People with SMI are entitled to receive treatments supported by the best available evidence (WHO 2015a) combined with their own preferences and wishes about their treatment (NICE 2015). In treatment guidelines, non-pharmacological methods are recommended to prevent and manage patient violence in inpatient psychiatric care (APA 2010, NICE 2014, NICE 2015). Structured violence risk assessment intervention (Abderhalden et al. 2008, van de Sande et al. 2011) is one of the methods proposed and having preliminary evidence of the effectiveness in preventing violence (Abderhalden et al. 2008, van de Sande et al. 2011) and reducing the use (Abderhalden et al. 2008) or duration (van de Sande et al. 2011) of coercive methods, namely seclusion and mechanical restraints.

Structured violence risk assessment intervention in psychiatric inpatient care aims to identify patients who are more likely to behave violently (Allnut et al. 2013) to enable monitoring and to reduce violence (NICE 2015) and focus on preventative interventions (Allnut et al. 2013). Although violence risk assessment interventions are recommended as part of prevention and management efforts to reduce patient violence, their use may not be fully integrated into daily practices (Clarke et al. 2010, Daffern et al. 2009). Extensive violence risk assessment research has focused strongly on the predictive validity and other psychometric properties of the methods developed (Chan & Chow 2014, Gammelgård et al. 2015, Michel et al. 2013), and risk assessment has traditionally been conducted retrospectively by researchers in the fields of psychology and psychiatry (Vojt et al. 2013). In addition, patient involvement in violence risk assessment has been suggested in comments (Kumar & Simpson 2005) and recommendations (Department of Health at the United Kingdom 2007, NICE 2015), but is scarcely seen in descriptions of risk assessment procedures in research.

Implementing new initiatives in mental health care may have several barriers to overcome. Barriers to implementing new interventions may include staff's tendency to rely on their intuition (Daffern et al. 2009), old traditions (Zauszniewski et al. 2012) and lack of commitment to new practices (Thorncroft et al. 2013). Challenges may also include difficulties in including the needs and preferences of patients and their families in evidence-based practices (Kross & Karlin 2014, Lyons et al. 2009). Despite this, successful programs in the area of violence prevention and management have been established and implemented. Systematic implementation descriptions are, however, rare. The few existing ones have provided general descriptions of violence-prevention programs (Lipscomb et al. 2006) and coercion reduction policies (Ashcraft et al. 2012). However, reports of the implementation process, particularly in violence risk assessment interventions, are lacking (Vincent et al. 2012). The scarce implementation research in this area acknowledges the need for systematic implementation descriptions in order to promote the use of structured violence risk

assessment in clinical practice (Vincent et al. 2012, Vojt et al. 2011). Thus there is a need to systematically explore this implementation process related to violence risk assessment interventions, where the views of all parties involved in patients' care are acknowledged.

The aim of this doctoral dissertation is to promote evidence-based violence risk assessment in inpatient psychiatric care. As a whole, the dissertation is an implementation study. The Ottawa Model of Research Use (OMRU, Logan & Graham 1998) is used as a theoretical framework, aiming to enhance the implementation process. The OMRU consists of three main domains: assessment, monitoring, and evaluation (Logan & Graham 1998). The three domains of OMRU are used to form the three phases of this study as follows: 1) assessment of key elements for the implementation the violence risk assessment intervention in psychiatric inpatient care, 2) monitoring implementation of the violence risk assessment intervention, and 3) evaluation of the outcomes of the violence risk assessment intervention implemented. The specific evidence-based violence risk assessment intervention which is to be promoted in this study is the use of the Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006) in day-to-day nursing practice. The DASA instrument was developed to assist short-term assessment of risk of violence in psychiatric hospitals (Ogloff & Daffern 2006). This doctoral dissertation is part of the research project "Safer working management", led by the University of Turku and funded by the Finnish Work Environment Fund (111298, 2011-2013). This larger project aimed to develop new methods to care for violent patients in psychiatric inpatient care to support both nurses' well-being at work and quality of patient care (Välimäki et al. 2013).

This doctoral dissertation was conducted in the discipline of nursing science. The main concepts of this dissertation are people with severe mental illnesses, psychiatric inpatient care, violence, violence risk assessment intervention and implementation. Severe mental illnesses refer here to psychotic disorders, diagnoses of schizophrenia and other psychotic disorders (Wittchen & Jacobi 2005). Psychiatric inpatient care includes here, as an environment, both general and forensic psychiatric inpatient care. In this dissertation the emphasizes is on community violence: violence between people who may or may not be known to each other, not related to each other, and taking place outside the home (WHO 2002), in psychiatric inpatient care. Both physical and verbal violence perpetrated by the patients are considered here, and violent and aggressive behavior are used as synonyms. Violence risk assessment intervention refers here the use of a structured assessment method by nurses. More specifically, intervention denotes the short-term prediction (next 24 hours) of violence, as recommended by NICE (2015). Implementation is seen here as a process, where perceived problems, the environment and users' needs are assessed to

identify the area in clinical practice where the best available research evidence, and innovations, need to be integrated. As a result of this process, targeted individuals become skillful, consistent and dedicated in their use of an innovation (Klein & Sorra 1996). The environment in this study is closed psychiatric inpatient wards offering acute or forensic round-the-clock mental health treatment for people with severe mental illnesses. The target groups of this study are nursing staff (registered and enrolled nurses, ward managers and nurse directors), mental health inpatients and the relatives of mental health patients.

2 BACKGROUND OF THE STUDY

This section presents the key literature related to topic of the dissertation. The section sets the stage for the assessment of key elements for the implementation the violence risk assessment intervention in psychiatric inpatient care according to the Ottawa Model of Research Use (OMRU, Logan & Graham 1998): 1) Violence-specific problems, 2) Needs related to new intervention, 3) Characteristics of the practice environment and 4) Attributes of the evidence-based methods to prevent and manage patient violence. The process of identifying the literature is described in Appendix 1.

2.1 Violence-specific problems in psychiatric inpatient care

2.1.1 Definitions of violence

Violence is a phenomenon which threatens the life and well-being of people worldwide. Yearly, more than 1.6 million people die due to violence. Approximately half of violent deaths are suicides, about one third homicides, and one fifth victims of armed conflicts. Moreover, physical and mental problems are caused by violence. (WHO 2002.)

The World Health Organization's report (2002) 'World report on violence and health' defines violence through three broad categories, based on who is indulged in the violent act. The categories are interpersonal violence, self-directed violence, and collective violence. Further, interpersonal violence, as a focus here, can be divided into two subcategories: family and intimate partner violence, and community violence. (WHO 2002.)

On a neurobiological basis, aggression can be further divided into two categories. First, into affective aggression (known as hostile, defensive, or reactive aggression): this category includes all aggression associated with fear or threat. This affective form of aggression has been described to be highly impulsive in nature and not premeditated. Second, into predatory aggression (known as instrumental, premeditated, or proactive aggression): this form of behavior is premeditated with a specific target. (Siegel & Victoroff 2009.) In addition, a third category can be distinguished, namely psychotic aggression. This form is described as aggressive behavior as a consequence of disordered thinking, delusions, and/or hallucinations. (Nolan et al. 2003.) Affective aggression, otherwise impulsive acts of violence, are found to be the most typical form exhibited in psychiatric inpatient care settings (McDermott et al. 2008).

Violence may be directed at different targets in psychiatric inpatient care, for example toward nurses (Zeng et al. 2013), other patients (Foster et al. 2007) or the ward environment (Grassi et al. 2006). The literature on violence and aggression in inpatient settings offers no unambiguous definition for the difference between these two terms. Definitions can be proposed, for example, on the basis of how serious the acts are: acts resulting in physical injuries are then violent and acts not resulting in physical injuries are aggressive (Steadman et al. 1998). Apart from physical violence, one independent form of violence in inpatient care is verbal aggression (Stewart & Bowers 2013). Verbal aggression can be further classified into offensive and abusive language, racist expressions, shouting, hostile voice control, and intimidation (Stewart & Bowers 2013).

2.1.2 Violence against nurses and factors linked to violent behavior of patients

Professions in health and social care are one of the high-risk occupational groups concerning work-related violence (Piispa & Hulkko 2010). Nurses in psychiatric inpatient care are especially at risk of experiencing some form of violence in their workplaces (Flannery et al. 2011). The risk of being physically assaulted is about three times higher for nurses working in psychiatric care than for nurses working in other specialties (Edward et al. 2016). In Finland, about half of nurses (46%) have experienced violence at their workplaces in psychiatric inpatient care (Välimäki et al. 2013). Within a 12-month period, 16% of nurses are physically assaulted (Virtanen et al. 2011). In the UK, about three fourths (78%) of psychiatric nurses have experienced some forms of violence during their working career (Chaplin et al. 2006). In China, the frequency in a six-month period was as high as 82 % (Zeng et al. 2013).

Characteristics of nurses facing most frequently patient violence are reported heterogeneously in the literature. In general, males encounter more violence than women (Edward et al. 2016, Kelly et al. 2015a, Zeng et al. 2013), but women may experience more verbal violence than men (Edward et al. 2016). Also, males and females are both reportedly at higher risk of violence from same-gender assailants (Flannery et al. 2007). On the other hand, the gender ratio in staff has not been found to have any relation to the likelihood of violence (Daffern et al. 2006). Absence of regular staff due to leave and vacancies (Bowers et al. 2007) but also a high proportion of qualified nurses in staffing may increase the risk of patient violence (Bowers et al. 2009, Bowers & Crowder 2012). It is claimed in the literature that less formally educated and less experienced staff members are at risk of being victims of patient violence (Flannery et al. 2014). However, contrary results, namely that length of work experience bears no relation to being assaulted have also been reported (Kelly et al. 2015a).

Violence at the workplace is one of the most significant causes of work-related stress (WHO 2010). Not only does it impair employees' well-being (Nachreined et al. 2007, Camuccio et al. 2012) and cause concerns about workplace safety (Kelly et al. 2015b) but it may also affect quality of patient care (Arnetz & Arnetz 2001, NICE 2015). Violence at the workplace may also cause expenditures such as medical expenses (Flannery et al. 2011), costs from sick leaves (Putkonen et al. 2013) and turnover (Ito et al. 2001, Roche et al. 2010).

In general, mental health disorders and low social status are associated with exposure to risk factors such as violence. Mental health is both a consequence and a cause of exposure to risks. (WHO 2015a.) People with severe mental illnesses (SMI) are more likely to engage in violent behavior than general population or people with other types of mental illnesses (Cornaggia et al. 2011, Dack et al. 2013, Fazel & Yu 2011). On the other hand, people with SMI have a higher risk of being victims of violent and non-violent crimes than the general population (Honkonen et al. 2004, Khalifeh et al. 2015, Latalova et al. 2014), inpatients being at highest risk (de Mooij et al. 2015).

In inpatient psychiatric care, many other factors are also linked to violent behavior of patients. These factors include patients' comorbid substance abuse (Cornaggia et al. 2011, Edlinger et al. 2014), severe psychopathology (Colasanti et al. 2008) involuntary admission to hospital (Cornaggia et al. 2011, Dack et al. 2013), male gender (Amore et al. 2008, Dack et al. 2013), non-forensic legal status in forensic mental health hospital care (Broderick et al. 2015, Kuivalainen et al. 2014), and history of violent behavior (Dack et al. 2013, Iozzino et al. 2015).

Violent behavior occurs typically in the first days after admission to hospital, and the length of hospital stay is longer for those patients (Barlow et al. 2000, Carr et al. 2008). Patient overcrowding may also increase the occurrence of violence in psychiatric inpatient care (Virtanen et al. 2011). According to a meta-analysis by Iozzino et al. (2015), as many as one in five patients in acute psychiatric inpatient care may behave violently (Iozzino et al. 2015). In forensic mental health hospital care, the proportion of patients exhibiting violent behavior may be even higher, almost one third of all patients (Broderick et al. 2015).

2.2 Needs related to new intervention to prevent and manage patient violence

2.2.1 Current practices to address patient violence in psychiatric inpatient care

In recent years a growing global interest has centered on initiatives to change traditional practices in psychiatric inpatient care, especially by reducing the use of coercive methods to prevent and manage patient violence (Jungfer et al. 2014, Maguire et al. 2012, Putkonen et al. 2013, Steinert et al. 2008, Vruwink et al. 2012). Various less restrictive interventions have been developed to prevent and manage violence in psychiatric inpatient care; these include de-escalation (Price & Baker 2012), improved collaboration between patients and nurses (Fluttert et al. 2010), development of the organizational culture (Bowers et al. 2015) in less restrictive directions (Jungfer et al. 2014), staff training in the management of patient violence (Kontio et al. 2014a), and creating safer ward environments (Bader & Evans 2015), also by utilizing novel technological interventions (Tully et al. 2015).

In current practices, prevention and management of patient violence may include coercive or restrictive methods, despite ethical concerns (Georgieva et al. 2012a, Steinert et al. 2010). Such methods may violate human rights and freedom of movement (NICE 2015). Coercive methods commonly include the use of a seclusion room and mechanical restraints (Steinert et al. 2010), physical restraint (NICE 2015), involuntary medication (Georgieva et al. 2012b) or observation (NICE 2015). These methods should be considered only if less restrictive methods of treatment have failed and not be used as preventive methods (Metzner et al. 2007, NICE 2015).

The existing interventions used worldwide in psychiatric inpatient care have a limited evidence-base of their efficacy. For example, two Cochrane systematic reviews (Muralidharan & Fenton 2006, Sailas & Fenton 2000) were unable to include any randomized controlled studies to demonstrate the effectiveness of seclusion and restraints (Sailas & Fenton 2000) or other non-pharmacological strategies used to manage patient violence (Muralidharan & Fenton 2006). Further, widely used de-escalation technique training to improve staff's ability to de-escalate violent events and improve safety on the wards has limited supporting evidence according to a recent systematic review (Price et al. 2015).

2.2.2 Implementation of innovations in psychiatric inpatient care

In health care, despite extensive research, training of undergraduates and continuing education, best possible evidence may not be implemented in practice-level action (Grimshaw et al. 2004, Grol 2001). This gap may result in poorer patient health outcomes (Grimshaw et al. 2004). Some patients may also receive unnecessary or

inappropriate treatments (Schuster et al. 2005), exposing them to unwarranted risks and exposing health care organizations to unnecessary expenditures (Grimshaw et al. 2004). Implementing advances in health care research and stopping invalidated or outdated treatment practices are essential to providing patients with the best possible care (McKibbin et al. 2010). Traditional ways of translating evidence into practice, such as providing professional courses, conferences, clinical practice guidelines and access to electronic databases, may not be enough to achieve change and integrate innovations into practice (Grol & Grimshaw 2003). Pure dissemination of best possible evidence to target populations is seldom enough to ensure implementation (Willis et al. 2016).

Implementation can be defined as a transition period when targeted individuals become skillful, consistent, and committed in their use of an innovation (Klein & Sorra 1996). This innovation can be defined as a practice or an idea new to an individual (Kaminski 2011). It is a critical process between the decision to adopt the innovation and using it in daily practice (Klein & Sorra 1996) as the Oxford Dictionary of English defines it, *put a decision, plan, agreement, etc. into effect* (MOT Oxford Dictionary of English 2016). The process or parts of it can be described in many synonymous or related terms, such as implementation, knowledge translation, diffusion, dissemination, uptake, or adoption (McKibbin et al. 2010).

The Consolidated Framework for Implementation Research (Damschroder et al. 2009) outlines implementation to be influenced by 1) intervention characteristics (e.g. evidence, adaptability, and complexity), 2) the outer setting (e.g. patients' needs, resources, organizational features), 3) the inner setting (e.g. structural characteristics, climate, readiness for implementation), 4) the characteristics of the individuals, and 5) the implementation process (planning, engaging, executing, reflecting, evaluating). Essential for successful implementation is behavioral change and maintenance of that change in both individuals and organizations (Eccles et al. 2009). To facilitate and guide the complex process of implementation, a number of theories, models, and frameworks (hereinafter called frameworks) have been developed (Gawlinski & Rudledge 2008). Frameworks are potentially useful guides for considering the dimensions that the implementation process needs to address (Graham et al. 2007). Different frameworks reflect different purposes, disciplinary or philosophical viewpoints (Eccles et al. 2009).

In a systematic review by Tabak et al. (2012), frameworks have been classified according to characteristics on three dimensions: construct flexibility, target of dissemination and/or implementation, and the socio-ecological framework level. First, the construct flexibility of a framework can be broad, giving loose outlines and constructs for the implementation process, or operational with step-by-step for

completion of the process. Second, frameworks also differ in how they target implementation and dissemination, referring to the dissemination of an innovation to target individuals by using planned strategies. Third, a framework can operate at different levels: individual, organization, community, or system. This part of the classification recognizes that implementation may concentrate on changing behavior on a specific tier (e.g. staff members or the whole organization) or may involve multiple tiers. (Tabak et al. 2012.)

Implementation of new innovations in psychiatric inpatient care may entail challenges to be taken into account. Historically psychiatric nursing has been influenced by old traditions rather than by evidence-based knowledge (Zauszniewski et al. 2012). Innovations are integrated into practice without supporting evidence, in addition to organizations unbending towards change (Wahlbeck 2008). Nurses tend to rely on their own knowledge and experience (Daffern et al. 2009, Woods 2013), and informal sources of information (MacNeela et al. 2010). Practices may be inconsistent between individual professionals (Coombs et al. 2013). There may be a lack of interaction between research and practice (Beebe et al. 2012). Furthermore, there may be resistance towards new innovations (Haas & DeTardo-Bora 2009, Daffern et al. 2009), and a perceived lack of organizational support (Koivunen et al. 2008, Vojt et al. 2011). In general, patients are not commonly involved in the implementation of innovations (van Achterberg et al. 2008). In the field of mental health expertise and the involvement of both patients and their families (Hommelsen 2010) are acknowledged as an important part of the implementation (WHO 2015a).

Against this background, certain requirements for an implementation framework to be used in psychiatric inpatient care can be outlined. A framework needs to concentrate on involving multiple individuals at different levels, provide strong guidance in this complex task and focus also on dissemination to ensure coherent practices. First, identified frameworks (from an extensive review by Tabak et al. 2012) meeting these requirements includes the “4E” Framework for Knowledge Dissemination and Utilization (Farkas et al. 2003). It guides the user to select effective strategies of exposure, experience, expertise and embedding after the innovation to be implemented has been selected (Farkas et al. 2003). Second, Davis’ Pathman-PRECEED Model (Pathman et al. 1996) focuses on awareness, agreement, adoption, and adherence to evidence-based practice. It provides certain strategies for different phases of change (predisposing, enabling, and reinforcing) (Davis et al. 2003). Third, the RE-AIM Framework (Glasgow et al. 1999) has five domains that evaluate the public health impact of an intervention: reach, efficacy, adoption, implementation, and maintenance. This framework offers public health impact metrics to guide the evaluation of alternative interventions. (Glasgow et al. 1999.) Fourth, the Precede–Proceed Model is a health promotion planning framework which

can be used to design, implement, and evaluate interventions (Green & Kreuter 2005, in Crosby & Noar 2011).

Last, the Ottawa Model of Research Use (OMRU) is a practice model for research use (Logan & Graham 1998). It guides in assessing barriers to and facilitators of an innovation, monitoring its use, and evaluating the outcomes (Logan & Graham 1998). OMRU was chosen as a theoretical framework because it emphasizes an active approach to the implementation of innovations using planned strategies (Tabak et al. 2012). Moreover, it provides detailed steps for the implementation process (National Collaborating Centre for Methods and Tools 2010) and guides the selection of appropriate research methods in each domain (Logan & Graham 1998). The framework recognizes not only professionals as target users but also perceives the patients as an essential part of the implementation process (Logan & Graham 1998). Needs in specific settings, as in this study psychiatric inpatient care, are to be discovered within OMRU (Logan & Graham 1998). Therefore relatives of the patients are also seen here as part practice environment in this study. It has previously been used in various clinical settings (e.g. neonatal intensive care [Hogan & Logan 2004], surgical care [Graham & Logan 2004], physiotherapy [Zidarov et al. 2013]) to facilitate innovation implementation.

2.3 Characteristics of the practice environment

2.3.1 People with severe mental illness

Mental illnesses are one of the major public health challenges globally (WHO 2013a, WHO 2015a). Mental health problems cause burden and disability, and are the main cause of early retirement (WHO 2015b). Globally almost 20% of the population (Steel et al. 2014) and 40% of people living in the European Union (EU) countries are estimated to be yearly affected with mental illnesses (Wittchen et al. 2011). The economic burden of mental illnesses is substantial: the global cost was estimated to be 2.3 trillion Euros in 2010 (Bloom et al. 2011).

Typically, the most severe mental illnesses (SMI) are classified as ‘psychotic disorders’. These disorders are covered in the International Classification of Diseases (ICD-10, WHO 2016b) diagnosis of schizophrenia and other psychotic disorders (Wittchen & Jacobi 2005). The worldwide prevalence of SMI is 0.8-6.8%, varying across countries (Kessler et al. 2009). The estimated number of people affected by psychotic disorders in Europe is 5 million (Olesen et al. 2012), or 1.2% of the population (Wittchen et al. 2011). Among certain special groups, such as prisoners, the prevalence is higher. Globally almost 4% of prisoners have some psychotic disorder (Fazel & Seewald 2012). In Finland, treated cases of SMI are about 1.5% of

the population (WHO 2015c). The estimated lifetime prevalence of all psychotic disorders is 3% (Perälä et al. 2007) and the number of people affected in Finland is 51,156 (Gustavsson et al. 2011).

The yearly costs of the SMI are the third highest of all brain disorders, after dementia and mood disorders. The estimated annual cost of psychotic disorders in the EU totals 93.9 billion Euros (including direct health care costs and indirect costs) and 18,796 Euros per patient. (Olesen et al. 2012.) The total costs in Finland are slightly higher for individual patients with psychotic disorders (19,595 Euros). The yearly estimated costs of psychotic disorders in Finland in total are 1,002 million Euros. (Gustavsson et al. 2011.) The cost of these disorders seems to be rising: the estimated yearly costs in 2004 were 35.2 billion Euros, and in Finland 204 million Euros (Andlin-Sobocki & Rössler 2005).

Severe mental illnesses have diverse impacts on people's daily lives. Schizophrenia, for example, causes distortions of thinking and perception, and is characterized by inappropriate affects. The course of the disease may be continuous or episodic, or there may be episodes of complete or partial remission. (WHO 2016a.) People with SMI may have problems in everyday functioning (Viertiö et al. 2013). In general, there may be cognitive impairments (Tuulio-Henriksson et al. 2011). Problems may be due to experienced poor memory, difficulties in speaking, and understanding speech and directions (Viertiö et al. 2013). The symptoms of SMI (Gardsjord et al. 2016, Heering et al. 2016), poor socioeconomic situation (Heider et al. 2007) and adverse events with medication (Yamauchi et al. 2008) may impair people's quality of life and lead, for example, to withdrawal from social relationships (Narvaez et al. 2008). The life expectancy of people with SMI is 20–30 years lower than that of general population (WHO 2015a). Increased mortality risk has also been confirmed in Finnish adult population with psychotic disorders (excluding mood disorder-related psychosis) (Suvisaari et al. 2013).

Besides the patients, SMI imposes unexpected and unfamiliar demands on their families (Rowe 2012). Families are in a significant role in the treatment of patients with SMI (Rowe 2012). They may experience different challenges related to their role as carers. Burden (Chien et al. 2007, Roick et al. 2007), distress and feelings of exhaustion may be experienced by carers (Jones et al. 2009). Difficulties in getting help for patients with SMI have been reported by families (Jones et al. 2009, Lyon et al. 2009). Various distressing situations and the prevailing mental state of the patient may cause family members to be subjected to violent behavior by patients (Hsu & Tu 2014, Kageyama et al. 2015, Onwumere et al. 2014).

Psychiatric services and the workforce have been criticized by relatives due, for example, to unjust use of power (Brophy et al. 2016) and control toward patients (Al-Sagarat et al. 2014), families not having a say with professionals (Lyons et al. 2009) and being discouraged from approaching psychiatric services (Gray et al. 2008). Families' involvement in care may be troubled because of patients' refusal to share information with their family members (Cohen et al. 2010) or conflicting thoughts between families and the patient (Weimand et al. 2013). Most patients with SMI, however, would prefer family involvement in their care (Cohen et al. 2013). In Finland, only a few (31%) of families are reportedly actively involved in patients' care on psychiatric inpatient wards. Families could not be contacted at all concerning almost half (45%) of the patients. (THL 2015.) Hence, supporting the well-being and situation of families caring for patient with mental illness is one of the key actions proposed by World Health Organization in the European Mental Health Action Plan for the years 2013-2020 (WHO 2015a).

2.3.2 Mental health treatment for people with severe mental illness

In many countries clinical practice guidelines give directions on the treatment of people with SMI, such as 'Psychosis and schizophrenia in adults: prevention and management' by the National Institute for Health and Care Excellence (UK, NICE 2014), 'Practice Guideline for Treatment of Patients With Schizophrenia' by the American Psychiatric Association (USA, APA 2010), 'S3 guideline on psychosocial therapies in severe mental illness: evidence and recommendations' by the German Society for Psychiatry, Psychotherapy and Neurology (Germany, Gühne et al. 2015) and National Current Care Guidelines for Schizophrenia by the Finnish Medical Society Duodecim (Finland, Duodecim 2015).

Mental health treatment in Finland is outlined in the Mental Health Act (1116/1990). The general principles prescribed by law are that a person must be treated in collaboration with him/herself, as far as it is possible. Every patient should have a care plan. A person treated in mental health care is entitled to treatment for physical illnesses as well. (FINLEX 1116/1990.)

Severe mental illnesses are often chronic diseases. Treatment of these diseases is thus multidimensional. The American Psychiatric Association, for example, has described treatment planning in schizophrenia as having three main goals: 1) relieving symptoms, 2) promoting a person's functioning and life quality, and 3) supporting recovery (APA 2010). The core treatment of SMI, such as schizophrenia, is person-centered care (Duodecim 2015). The needs of the patient and the families should be taken into account in a regularly updated treatment plan (Duodecim 2015).

Empathetic and supportive relationships between the patient, families, and the professionals are an essential part of care (NICE 2014).

Treatment options include antipsychotic medication in conjunction with psychological interventions (NICE 2014). It is crucial to find the medication with the least side effects but with a therapeutic effect (Duodecim 2015). Monitoring treatment response, side effects, overall physical health, and adherence is essential during antipsychotic medication treatment (NICE 2014).

Psychological interventions may include cognitive-behavioral therapy (Duodecim 2015, NICE 2014), family psychoeducation (Gühne et al. 2015), social skills training (Gühne et al. 2015), psychosocial rehabilitation aiming to improve functioning and quality of life of the patient, and forms of rehabilitative work (Duodecim 2015), like supported employment programs (Gühne et al. 2015, NICE 2014). The focus of treatment is on outpatient care services in the communities (Duodecim 2015, Gühne et al. 2015, NICE 2014), including multidisciplinary teamwork (Gühne et al. 2015). In long-term treatment, supporting adherence, preventing relapses, and promoting social relationships, integration into society and a meaningful daily life for the patient are essential (Duodecim 2015). Further, peer support and self-management programs are an important supplement added to the renewed treatment guidelines for SMI (NICE 2014). In addition, special attention should be paid to assessing individuals' well-being concerning comorbid substance abuse and suicidality (Duodecim 2015, NICE 2014).

Reducing the need for hospital treatment periods is one of the targets in outpatient care. However, hospital services are needed, for example, in acute phases of psychotic disorders, when a person is acting violently towards others or self, if a person's behavior is strongly directed by delusions or hallucinations, or if the outpatient care resources are insufficient (APA 2010, Duodecim 2015). Suboptimal adherence to medication, social stressors, and substance abuse may be causes of relapse in mental illness (Casher & Bess 2010). Patients needing psychiatric inpatient care should primarily be hospitalized on a voluntary basis (APA 2010). The overall treatment plan in hospital includes relief from the acute phase of illness, accomplished mainly with antipsychotic medication. Meaningful activities should be provided. Discussion with the patient about the causes leading to hospitalization and how to prevent these in future are also key functions, besides supporting treatment adherence. Safe transition to outpatient care is essential. (Casher & Bess 2010.)

2.3.3 Mental health hospital services and regulation

Deinstitutionalization in mental health services across Western Europe has been evident since the 1990's (Priebe et al. 2005, Priebe et al. 2008). At the national level, after patients with poor clinical and psychosocial state were transferred from mental health hospital services to outpatient care in the 1990's, the reformed psychiatric treatment system seemed to work well for most deinstitutionalized patients (Honkonen et al. 2003). For example, in many other EU countries the size of the prison population has increased along with deinstitutionalization. In Finland the development has been opposite and the size decreased by approximately 10% between 1993 and 2011. (Blüml et al. 2015.) In Finland, the degree of deinstitutionalization in mental health services has been among the highest across Europe (Taylor Salisbury et al. 2016).

Despite the movement of providing mental health services in the community, acute hospital services are still needed. People who need immediate medical assessment, who have severe psychiatric conditions, behavioral disturbance, and high levels of suicidality or violent behavior will typically require urgent support on acute inpatient hospital wards. (Thornicroft & Tansella 2004.) Alternatives to inpatient care have been developed (acute day hospital, crisis houses, crisis resolution/home treatment) and preliminary evidence suggests the acceptability and cost-effectiveness of these alternatives to voluntary hospital admission (Thornicroft & Tansella 2013). However, a large proportion of psychiatric beds continue to be located in mental health hospitals around Europe (Taylor Salisbury et al. 2016).

In Finland, mental health hospital services are classified as specialized care, and are organized by hospital districts or municipalities (THL 2015). The main funds for caring for people with SMI are governmentally based (WHO 2015c). The Mental Health Act in Finland (1116/1990) outlines the general conditions for mental health work, and especially the conditions of involuntary care, the use of coercive methods and other restrictions (e.g. bodily search, limitation of contacts) in mental health hospital services (FINLEX 1116/1990). An explicit regulation about the use of mechanical restraint and seclusion has been included in the Mental Health Act since 2002 (Steinert et al. 2010). Inpatient care is provided in Finland at 11 mental hospital facilities and at 35 psychiatric units in general hospitals (WHO 2015c).

The present Finnish national mental health policy was launched in 2009. The policy called "Mieli – a plan for mental health and substance abuse work", was set to operate until the end of 2015, but the implementation of the policy has continued (Ministry of Social Affairs and Health 2016). The key action targets of this policy for mental health work were to reinforce clients' status, mental health promotion, and

organize outpatient services for all age groups. Concerning hospital treatment, the aim is to develop care to be safer for patients and staff, and reduce the need to use coercive methods. (THL 2014a.) This aim is important, especially for people with SMI, who have stated to be at risk of exposure to violations of their human rights, like long detainment in institutions (WHO 2015b). The action targets are in line with European and global health policies (Mental Health Action Plan 2013–2020 [WHO 2013a] and The European Mental Health Action Plan 2013–2020 [WHO 2015a]). By 2020, global mental health policy aim to promote mental well-being and human rights, to prevent mental disorders, provide care, enhance recovery, and reduce mortality, morbidity and disability for people with mental illnesses. (WHO 2013a).

The number of psychiatric beds decreased by about 50% between the years 1993 and 2011 in Finland (Blüml et al. 2015). The number of psychiatric beds is 19.9 in mental health hospitals and 48.6 in psychiatric units in general hospitals (per 100,000 inhabitants) (WHO 2015c). Prioritizing outpatient care can be seen in a decrease in the number of treatment periods in psychiatric inpatient care (20% in the period 2006 – 2013). Meanwhile visits to outpatient care increased by 31%. In 2013, 24,403 adult patients were treated in psychiatric inpatient care with over 38,000 treatment periods. This means that approximately 5.1 patients receive inpatient care per 1,000 inhabitants. The average duration of a treatment period is 36 days. Of these inpatients 35% have psychotic disorders, schizophrenia being the most common (~22%). Gender differences exist, while schizophrenia is the most common (60%) diagnosis among men treated in inpatient care. In general, men and women are equally represented among patients needing inpatient care. (THL 2015.)

Use of coercive methods and days in involuntary treatment has decreased in recent years (2006-2013). A substantial decrease can be seen especially in the use of the seclusion room (~30 %) and mechanical restraints (~38%). During the year 2013, about one fourth (24%) of patients had an involuntary referral to care. The rate of involuntary treatment days is 148 per 100,000 inhabitants. Out of all adult inpatients, about 6% had been secluded, 3% mechanically restrained and/or a forced injection administered and 2% psychically restrained. These coercive methods were most commonly used for patients with psychotic disorders. (THL 2015.)

One special feature in mental health hospital services care is forensic mental health care. The core function of forensic mental health care is to provide forensic psychiatric evaluations and treatment both for patients committed to compulsory forensic mental health hospital care and those who are too dangerous or difficult to be treated in regular mental health care (Eronen et al. 2000). It has been stated that deinstitutionalization in mental health services has led to an increasing need for

forensic mental health services, measured by the ratio of forensic mental health beds (Priebe et al. 2008).

A total of eight units provide forensic mental treatment and carry out mental examinations on adults in Finland: two state mental hospitals provide special forensic mental health care for the whole country, in two psychiatric hospitals for prisoners and in three psychiatric clinics in three hospital district areas (THL 2011). The Mental Health Act in Finland (1116/1990) stipulates the conditions for forensic mental hospital services for mental examinations and the involuntary treatment of people accused of a crime (FINLEX 1116/1990).

In Finland, a court of law determines if a forensic examination is necessary to assess the criminal responsibility of a person accused of a crime. (Ojansuu et al. 2015). The examination is done in special hospitals or in prisons where there are forensic psychiatrists available. The examination is extensive, including, for example, standardized psychological tests and repeated interviews. The examination may last a maximum of 2 months. (Männynsalo et al. 2009.)

If the offender is determined in forensic examination to have an SMI then the individual can be exempted from legal punishment. She/he will be then committed to compulsory forensic mental health hospital care. (Ojansuu et al. 2015.) The criteria for committing an individual to forensic mental health care varies between countries: in Finland, a person needs to be determined as psychotic or mentally retarded (FINLEX 1116/1990). The average treatment duration in Finnish forensic mental health care is 4.5 years (men) and 3.9 years (women) (Ojansuu et al. 2015). In 2013 a total of 498 patients were admitted to treatment for mental examination or compulsory forensic mental health hospital care. Most of them were men (86%) with an average age of 44 years (THL 2015.)

2.3.4 Workforce in mental health hospital services

In Finland, the size of the workforce in mental health services is one of the largest in world. The number of psychiatrists is 26 per 100,000 inhabitants and is the second highest in the Europe. The number of nurses is 163 per 100,000 inhabitants in mental health services, which is the highest ratio in Europe. (WHO 2016c.)

Nurses in mental health care in Finland have either a higher polytechnic degree (registered nurses) or vocational qualifications (enrolled nurses) (National Supervisory Authority for Welfare and Health [Valvira] 2016). Registered nurses' education in polytechnics in Finland lasts 3.5 years (Lahtinen et al. 2014), and includes a half-year specialization period (EU 2007). The specializations offered vary between polytechnics: some offer an option in mental health care. (EU 2007).

Vocational training is provided in vocational schools with duration of three years. It includes a one-year specialization and mental health care is one of options offered. (Finnish National Board of Education 2010.) Continuing training of nurses in Finland is regulated by law: the Act on Health Care Professionals (FINLEX 28.6.1994/559), the Health Care Act (FINLEX 1326/2010) and the Social Welfare Act (FINLEX 710/1982) regulate the continuing training. There are no limits set regarding the annual amount of continuing education for a nurse. Recommendations have been given for health care professionals to undergo from 3 to 10 days per year (Finnish Government 2002).

In Finland the number of registered nurses has been rising in the last two decades. In hospital services (all services), registered nurses total 30,811. Registered nurses' mean age is 42.3 years, and the majority (93 %) are female. In addition, a total of 7,129 enrolled nurses are working in Finnish hospitals. One fourth of them have the title 'enrolled mental health nurse'. (Ailasmaa 2015.) This is a qualification not currently provided in Finland (Valvira 2016). In total 1,795 enrolled mental health nurses worked in Finnish hospital services, of whom 57 % are female. Their mean age is 48.4 years (2014). (Ailasmaa 2015.)

2.4 Attributes of the evidence-based methods to prevent and manage patient violence

People with mental illnesses are entitled to receive treatments that are supported by the best available evidence (WHO 2015a). Patients' preferences and wishes about their treatment concerning the prevention and management of their possible violent behavior need to be taken account (NICE 2015). Genuine involvement of patients and their families in care development and delivery should be a standard process (Royal Australian and New Zealand College of Psychiatrists Clinical Practice Guidelines Team for the Treatment of Schizophrenia and Related Disorders 2005) in evidence-based care practices. The need for more efficient methods to prevent and manage patient violence has been widely recognized (Dickens et al. 2013, Edward et al. 2016, Gudde et al. 2015). Continuing education is a pivotal factor in transforming when aiming to create safe environments in psychiatric inpatient care (Kontio et al. 2014a, Kuosmanen et al. 2013, Lahti et al. 2016).

2.4.1 Pharmacological methods

An individualized pharmacological strategy to diminish the risk of violence is recommended by NICE (2015) in the treatment guideline Violence and aggression: short-term management in mental health, health and community settings. Preventive medication may be given routinely and when needed (p.r.n.) to calm, relax,

tranquillise or sedate patients at risk of perpetrating violence. The pharmacological strategy should be employed soon after admission to inpatient care. (NICE 2015.)

It has been stated that antipsychotic medications do not differ in ways of reducing violent behavior (Calver et al. 2015): Covell (2009) found that five different antipsychotic medications were all associated with similar reductions in rate of violence. Controversial findings however, have been reported (Krakowski et al. 2006, Swanson et al. 2008). There may not be a significant difference in efficacy in how medication is administered: oral (tablets or solution) or intramuscular antipsychotics, varying, however, between drugs (Hsu et al. 2010).

Research evidence does not unconditionally support adding benzodiazepines to antipsychotic medication for the treatment of aggressive behavior (Gillies et al. 2013, Powney et al. 2012). However, parenteral haloperidol and lorazepam are the most common medication combination used according to a European level expert survey (Lepping 2013). It has been stated that involuntary medication could reduce use of seclusion in managing patients' violent behavior. Alternative interventions besides medication are still needed to reduce the use of coercive methods. (Georgieva et al. 2013.)

2.4.2 Non-pharmacological methods

Non-pharmacological methods are recommended to prevent and manage patient violence in inpatient psychiatric care (NICE 2015). These methods, tested with experimental design (randomized controlled trial) include a structured violence risk assessment intervention (Abderhalden et al. 2008, van de Sande et al. 2011), coercion prevention methodology 'six core strategies' (Putkonen et al. 2013) and various psychological interventions: the Reasoning and Rehabilitation program (Cullen et al. 2012), cognitive-behavioral therapy (Haddock et al. 2009) and animal-assisted therapy (Nurenberg et al. 2015). In addition, mechanical restraints and seclusion as an intervention to manage patient violence have been tested for patients' experience on coercion (Bergk et al. 2011) and whether patients secluded were able to manage without changing the intervention to mechanical restraints (Huf et al. 2012).

The results of these studies are promising by achieving outcomes of reduction of violent events compared to control conditions (Abderhalden et al. 2008, Haddock et al. 2009, Nurenberg et al. 2015, van de Sande et al. 2011). Use of coercive methods (seclusion and mechanical restraint) (Abderhalden et al. 2008, Putkonen et al. 2013) or duration of coercion used (Putkonen et al. 2013, van de Sande et al. 2011) may decrease as result of these non-pharmacological methods. (see Appendix 2 for further details.)

2.4.2.1 Violence risk assessment

In 1974 the American Psychiatric Association published report entitled “Clinical Aspects of the Violent Individual” (APA 1974). Since then, increased attention can be said to have risen, especially regarding violence risk assessment administered by psychiatrists (Buchanan et al. 2012). The main purpose of risk assessment is the prevention (Allnut et al. 2013) and management of violent behavior (Kumar & Simpson 2005). It is a process of identifying patients who are at high risk of behaving violently (Allnut et al. 2013) to enable monitoring and reducing violence (NICE 2015) and focusing on preventative interventions (Allnut et al. 2013). Violence risk assessment methods can be divided into three groups: 1) actuarial instruments, which provide a plausible estimate of violence risk in a specified time period, 2) structured clinical judgment instruments, which guide taking into consideration the presence or absence of a predetermined set of factors and allow for a professional judgment to be made on risk level (commonly low, moderate, or high) (Fazel et al. 2012), and 3) unstructured risk assessment methods, i.e. clinical opinion (Ægisdóttir et al. 2006). Regardless of the method, patients’ involvement in violence risk assessment is encouraged (Department of Health at the United Kingdom 2007, Kumar & Simpson 2005, NICE 2015).

Treatment guidelines (APA 2010, NICE 2014, NICE 2015) encourage the use of structured violence risk assessment instruments over unstructured methods (NICE 2015). In addition, for example, ‘Standards of Practice of Forensic Mental Health Nursing’ proposes using structured methods to assess risk and develop risk management plans based on risk assessment (Victorian Institute of Forensic Mental Health 2012). A large systematic review (n=959) found that in most (78%) studies where a violence risk assessment method was used, an above-chance prediction of violence was achieved (Whittington et al. 2013). Violence risk assessment methods have most frequently been studied in prison and community settings (Whittington et al. 2013). Research on psychiatric inpatient care (general or forensic) has conducted less frequently (Whittington et al. 2013).

Although structured violence risk assessment interventions are recommended as part of prevention and management efforts in patient violence, the research knowledge available suggests that their use might not be fully integrated into daily clinical practices nationally (Eronen et al. 2007, Gammelgård et al. 2015) or internationally (Clarke et al. 2010, Daffern et al. 2009, Woods 2013). In Finland, research evidence on the use and validity of violence risk assessment interventions is scarce. As far it is known, the long-term predictive validity of the Structured Assessment of Violence Risk in Youth (SAVRY, Borum et al. 2002) has been explored in adolescent mental health care (Gammelgård et al. 2015) and Historical-

Clinical-Risk Management-20 (HCR-20; Webster et al. 1997) in a forensic mental hospital for adults (Michel et al. 2013).

Traditionally the main focus of violence risk assessment has been on the risk of releasing the patient, the risk of increasing freedom to leave restricted psychiatric institutions or the risk of violent behavior within institutions (Buchanan et al. 2012). On the other hand, nurses working in inpatient settings around the clock need methods to deal with patient violence in their daily practice. For use in daily inpatient care, especially in general psychiatric services, traditional methods aiming to predict risk of violence in the long-term tend to be too time-consuming and costly (Viljoen et al. 2010).

For these purposes, methods for short-term prediction (next 24 hours) of violence have been developed and recommended as one of the interventions to reduce seclusion and restraints (Oster et al. 2015). NICE (2015) recommends methods for use in psychiatric inpatient care such as the Brøset Violence Checklist (BVC, Almvik & Woods 1998) and the Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006). Use of these methods potentially controls for variation in nurses' experience and clinical expertise, and standardizes patient observations among nurses (Linaker & Busch-Iversen 1995). They are observation-based instruments, and do not entail interviewing the patient (Ogloff & Daffern 2006). Thus the BVC and DASA are referred to as quick and easy to use (Yao et al. 2014, Ogloff & Daffern 2006).

Both the BVC and DASA have been tested in general and forensic psychiatric inpatient care and found to be more reliable in predicting violent behavior than unaided judgment (BVC, Abderhalden et al. 2008, Hvidhjelm et al. 2014a, Yao et al. 2014; DASA, Chan & Chow 2014, Dumais et al. 2012, Griffith et al. 2013). The BVC is commonly used by nurses two (Yao et al. 2014) or three times per day (Clarke et al. 2010), and DASA once (Vojt et al. 2010) or three times per day (Griffith et al. 2013). Both methods can be classified as structured clinical judgment instruments (Almvik & Woods 1998, Ogloff & Daffern 2006).

The Dynamic Appraisal of Situational Aggression instrument (DASA) was developed in Australia in 2004 (Ogloff & Daffern 2004). The developers' background is in the discipline of psychology. The concept behind the development process of DASA was that previously developed short-term violence risk assessment instrument, the BVC, although the items relate strongly to violence, does not identify targets for intervention by staff. The design process of DASA therefore aimed to identify risk variables that would lead to optimal predictive validity and to the

identification of risk variables that the staff could target for interventions and thereby enable the prevention of violent events. (Ogloff & Daffern 2006.)

The development process included nurses' assessment of patients using items from the Clinical (negative attitudes, lack of insight, active symptoms of major mental illness, unresponsive to treatment, and impulsivity) and Risk (stress) scales of the HCR-20 instrument, all six items from the BVC, and an item measuring recent suicidal behavior. Three items derived from empirical research on inpatient violence previously conducted by the developers were also included. Each of the 16 items assessed was scored as present or absent. The top seven items showing strongest predictive validity for violent behavior were selected to comprise the DASA. (Ogloff & Daffern 2006.)

The current version of the DASA consists of the items negative attitudes and impulsivity (from the HCR-20), irritability and verbal threats (from the BVC), and sensitive to perceived provocation, easily angered when requests are denied, and unwillingness to follow directions (drawn from empirical research conducted) (Ogloff & Daffern 2006). The full original instrument is presented as an appendix (Appendix 3. The Dynamic Appraisal of Situational Aggression [DASA]).

3 AIMS OF THE STUDY

The aim of this study is to promote evidence-based violence risk assessment in inpatient psychiatric care. The Ottawa Model of Research Use (OMRU, Logan & Graham 1998) was used as a theoretical framework. The study consists of three phases and sub-aims in each phase (I-III):

Phase I. Assessment of key elements for the implementation the violence risk assessment intervention in psychiatric inpatient care

1. What are the violence-specific problems in psychiatric inpatient care? (Papers I, II)
2. What are the needs of nursing staff and relatives of a mental health patients related to a new intervention? (Papers I, II, III)
3. What are characteristics of the practice environment for the violence risk assessment intervention? (Paper III)
4. What are the attributes of the violence risk assessment intervention? (Paper III)

Phase II. Monitoring the implementation of the violence risk assessment intervention in psychiatric inpatient care

1. What kind of barriers and facilitators nursing staff describe regarding the implementation of the violence risk assessment intervention? (Paper III)
2. What kind of knowledge translation strategies were used for the implementation of the violence risk assessment intervention? (Paper III)
3. How was the adaptation and use of the violence risk assessment intervention assessed and monitored during the implementation? (Papers III, IV)

Phase III. Evaluation of the outcomes of the violence risk assessment intervention implemented in psychiatric inpatient care

1. What are nursing staff's perceptions of the violence risk assessment intervention? (Paper III)
2. What are patients' perceptions of the violence risk assessment intervention? (Paper IV)
3. Was the violence risk assessment intervention feasible regarding feasibility areas demand, limited efficacy and acceptability? (Paper IV)

The summary of the study phases and sub-aims is described in Figure 1.

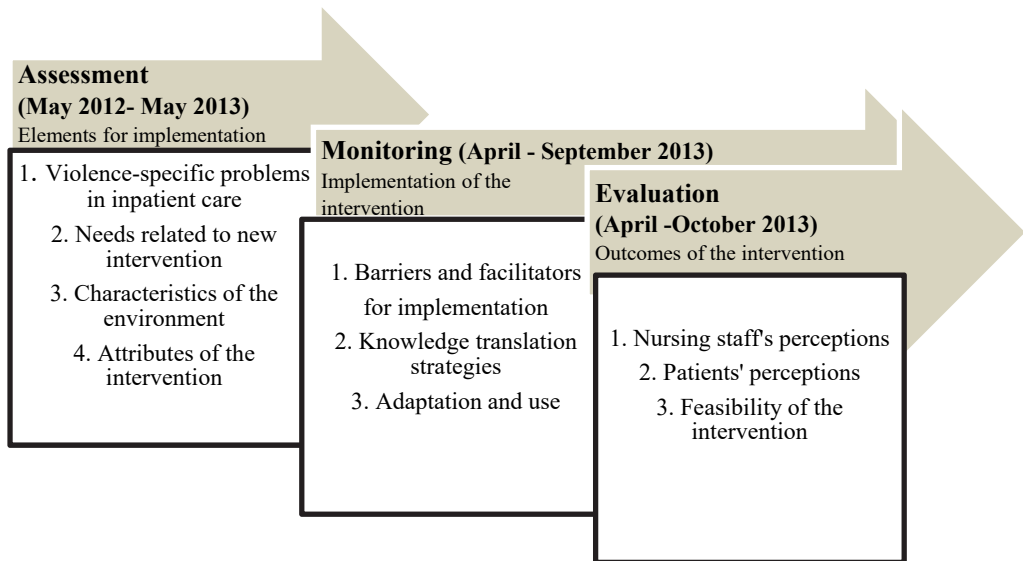


Figure 1. Summary of the study phases and the sub-aims

4 MATERIALS AND METHODS

4.1 Theoretical and methodological approach

The theoretical framework for this study was the Ottawa Model of Research Use (OMRU, Logan & Graham 1998). The framework includes an idea for an innovation which in this study is the violence risk assessment intervention, the use of the Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006) instrument in day-to-day nursing practice.

An integral part of OMRU is the main domains it consists of, namely assessment, monitoring, and evaluation. The purpose of these domains is fourfold: First, to aid identifying possible barriers and facilitators within the practice environment, potential adopters and in the innovation which is to be implemented. Second, to provide guidance for selecting knowledge transfer strategies to overcome the identified barriers and to promote the integration of innovations in practice. Third, to aid monitoring the implementation process of the innovation. And fourth, to guide the evaluation of actual use and outcomes of the innovation. (Logan & Graham 1998.)

The three domains of OMRU are used to form the phases of this study as follows: 1) assessment of key elements for the implementation of the violence risk assessment intervention in psychiatric inpatient care, 2) monitoring the implementation of the violence risk assessment intervention in psychiatric inpatient care and 3) evaluation of outcomes violence risk assessment intervention implemented in psychiatric inpatient care. (Logan & Graham 1998). The specific elements of each phase (domain) are elaborated in Table 1.

Table 1. Theoretical domains, elements, and the papers of the study

Domains of OMRU (Logan & Graham 1998)	Elements	Paper
Assessment (Phase I)	1) exploring the violence-specific problems 2) exploring the needs related to the new intervention 3) assessment characteristics of the practice environment 4) specifying attributes of the new intervention	I, II I, II, III III III
Monitoring (Phase II)	1) exploring the barriers to and facilitators for the implementation of the violence risk assessment intervention 2) identifying the knowledge translation strategies for implementation 3) assessing and monitoring the adaptation and use of the violence risk assessment intervention	III III III, IV
Evaluation (Phase III)	1) exploring nursing staff's perceptions of the violence risk assessment intervention 2) exploring patients' perceptions of the violence risk assessment intervention 3) evaluating the feasibility of the violence risk assessment intervention	III IV IV

The methodological approach used in this study was mixed-methods research. The mixed-methods approach is utilized in four ways. First, both qualitative and quantitative study designs are used to address the aim of this study, at both phase and sub-aim level. It was used in this study because it enables to gain a rich and in-depth picture (Foss & Ellefsen 2002) of the assessment of key elements for implementation (Phase I), of monitoring the implementation (Phase II) and the evaluation of the outcomes of the violence risk assessment intervention implemented (Phase III). Second, multiple data sources and collection methods are used: interviews using different instruments and data collection techniques, assessment of organizational data, a literature review, surveys, and evaluation of the use of the DASA instrument. Views of nursing staff (nurses, ward managers and nurse directors) working in psychiatric inpatient care, mental health inpatients, and relatives were utilized as data sources. Using multiple methods aims to capture the richness and variety of organizational functioning and environment, and the interaction of different parties and how the staff performs their tasks (Phillips et al. 2014). Third, in data analysis different techniques are included and combined to address the study aim: qualitative content analysis techniques, process and outcomes evaluation, and quantitative statistical methods. Triangulation of data was found valuable when comparing findings from different perspectives, avoiding possible limitations of using a single method (Williamson 2005). Fourth, the results of this study are integrated in this summary by using both qualitative and quantitative approaches (Tashakkori & Creswell 2007).

4.2 Design

Mixed methods design was used in all Phases (I-III). The study was qualitative, with quantitative components (O’Cathain et al. 2008).

In **Phase I**, a descriptive qualitative (Kisely & Kendall 2011) design was used to explore violence-specific problems in psychiatric inpatient care and needs related to the intervention. Violence-specific problems and needs were investigated in focus group interviews, from the perspectives of nurses working in psychiatric inpatient care (Paper I) and of relatives of mental health patients (Paper II). In addition, the perspectives of nursing staff (nurses, ward managers and nurse directors) regarding needs for the intervention were explored in small group meetings (Paper III). Descriptive quantitative design (Bettany-Saltikov & Whittaker 2014) was used to assess the characteristics of practice environment (Paper III). A scoping review design (McKinstry et al. 2014) was utilized to specify the attributes of the violence risk assessment intervention selected for this study (Paper III).

In **Phase II**, a descriptive qualitative design (Kisely & Kendall 2011) was utilized to explore barriers to and facilitators for the implementation (Paper III). A scoping review design (McKinstry et al. 2014) was utilized to identify and summarize the research findings available on the knowledge translation strategies for the implementation of DASA (Ogloff & Daffern 2006). (Paper III.) Descriptive qualitative (Kisely & Kendall 2011) and quantitative (Bettany-Saltikov & Whittaker 2014) designs were used to assess and monitor the adaptation and use of DASA (Ogloff & Daffern 2006) (Paper III, IV).

In **Phase III**, descriptive qualitative design (Kisely & Kendall 2011) was used to explore nursing staff’s (Paper III) and patients’ (Paper IV) perceptions of the DASA instrument. The feasibility of DASA was evaluated by focusing on three areas of feasibility (Bowen et al. 2009). Descriptive quantitative design (Bettany-Saltikov & Whittaker 2014) was used to explore demand, limited efficacy, and acceptability of the DASA instrument. (Paper IV.)

4.3 Setting

The study was formed based on two settings: 1) three closed adults’ psychiatric wards (Phases I, II, III) and 2) two associations serving families of mental health patients in Southern and Southwest Finland (Phase I). A summary of the settings of the study is presented in Table 2.

First, the psychiatric wards were located in hospitals in one hospital district in Southern Finland. The hospital district delivers mental health services with a catchment area of more than 1.5 million people. The hospital district represents average care delivery in Finnish specialized psychiatric care. Inpatients in specialized psychiatric care per 1,000 inhabitants was equal in that hospital district to the average in the whole country (2012; 84 per 1,000 inhabitants). Use of coercive measures in care was similar to that in general in Finland. (THL 2014b.) The wards offered specialized psychiatric inpatient care in the following special fields: one acute admission ward, one treatment ward specializing in dangerous assessments, and one acute forensic ward.

Second, the associations for the relatives of mental health patients provide support groups, up-to-date information, and recreational activities for their members. The associations had in total 1,270 members. These are regional associations, which operate under the National Family Association for Promoting Mental Health in Finland. There are altogether 17 family associations across Finland. (FinFami 2016.) The two associations participating in this study were located in Southern and Southwest Finland.

Table 2. Setting of the study in each of the phases and the related papers

Phase	Setting	Paper
I	Three closed psychiatric wards in one hospital district in Southern Finland Two associations for families of mental health patients in Southern and Southwest Finland	I, III II
II	Three closed psychiatric wards in one hospital district in Southern Finland	III, IV
III	Three closed psychiatric wards in one hospital district in Southern Finland	III, IV

4.4 Sampling and participants

Purposeful sampling strategies (Palinkas et al. 2015) were the major sampling strategy in this study (Phase I, II, III). Use of these strategies is applicable in situations where participants with predetermined criterion of importance, in this case experience of violence on psychiatric wards, are to be identified (Palinkas et al. 2015). The strategy was used to select three closed adults' psychiatric wards (Phase I, II, III). The hospital district had, in total, 30 adult inpatient wards. These were all invited to participate. Out of possible units, 20 were willing to participate. The three wards were selected because of their high occurrence of patient violence, frequent

use of coercive measures and at the time of the study they had no other research or development projects ongoing.

In **Phase I**, as a more specific purposeful sampling strategy, homogeneity (Palinkas et al. 2015) enabled us to reach those nurses on the wards and relatives of mental health patients interested and willing to share their perceptions of violence-specific problems and needs (Paper I, II). In addition, convenience sampling strategy (Palinkas et al. 2015) was used to form the sample of nursing staff (nurses, ward managers and nurse directors) working on the study wards and willing to share their needs in small groups (Paper III). Non-probabilistic sampling (Mays & Pope 1995) was used to select two relatives' associations. As part of Phases I and II, a scoping review with criterion-i strategy (Palinkas et al. 2015) was conducted in databases PubMed (Medline), PsychInfo (ProQuest) and Cinahl (Ebsco) (Paper III).

In **Phases II and III**, as a more specific purposeful sampling strategy, convenience sampling (Palinkas et al. 2015) with a total sample was used with nursing staff (registered or enrolled nurses, ward managers and nurse directors), who participated in the DASA implementation process (Papers III, IV). This strategy was further used and all the inpatients treated on the three wards during the period of the study were invited to participate in 1) the implementation process of DASA and 2) part of feasibility evaluation (area 'limited efficacy' [Bowen et al. 2009]) and thus allow their DASA assessments use for study purposes (Papers III, IV).

The participants of this study were nursing staff (registered and enrolled nurses, ward managers, nurse directors) mental health inpatients, and relatives of mental health patients. Settings in each phase, sampling strategies used, participants and sample sizes, and related papers are summarized in Table 3.

Table 3. Sampling strategies, participants of the study, sample sizes and related papers

Phase	Sampling strategies	Participants	Sample size	Paper
I	<i>Organizations:</i> Purposeful sampling	Three closed adult psychiatric wards		
	Non-probabilistic sampling	Two relatives' associations		
	<i>Participants:</i> Homogeneity	Registered and enrolled nurses	n=22	I
		Relatives of mental health patients	n=8	II
	Convenience	Registered and enrolled nurses, ward managers, nurse directors	n=25*	III
II	<i>Organizations:</i> Purposeful sampling	Three closed adult psychiatric wards		
	<i>Participants:</i> Convenience	Registered and enrolled nurses, ward managers, nurse directors	n=94*	III, IV
		Mental health inpatients	n=53*	III, IV
III	<i>Organizations:</i> Purposeful sampling	Three closed adult psychiatric wards		
	<i>Participants:</i> Convenience	Registered and enrolled nurses, ward managers, nurse directors	n=36*	III, IV
		Mental health inpatients	n=72*	III, IV

* The number of participants is presented in total numbers of individuals participating in different parts of the study. Sample sizes may include the same participants several times. Detailed numbers are presented in Paper III (in Figure 1.).

4.5 Instruments

Different instruments were used in this study according to the Ottawa Model of Research Use (OMRU, Logan & Graham 1998). The framework guided the selection of the instruments for purposes of assessment (Phase I), monitoring (Phase II) and evaluation (Phase III).

In **Phase I**, three types of instruments were used. Interview schedules were used to explore nurses' (Paper I) and relatives' perceptions (Paper II) of violence-specific problems and needs for the new intervention. A discussion schedule was used to assess nursing staff's (nurses', ward managers' and nurse directors') needs specific to selecting a new intervention to be implemented (Paper III). Data extraction sheets were used to assess the characteristics of the practice environment and to specify the

attributes of the violence risk assessment intervention (Paper III). The instruments with the content descriptions used within each element are elaborated in Table 4.

Table 4. Assessment: elements, instruments, and their contents in Phase I

Elements	Instrument	Content of the instrument
Assessing the problems (Papers I, II)	Interview schedule*	Perceptions of patient violence (nurses, relatives) Ward atmosphere during violent events (nurses)
Assessing the needs (Papers I, II, III)	Interview schedule*	Suggestions for development of violence prevention (nurses and relatives)
	Discussion schedule*	Solutions of nursing staff to overcome the identified challenges related to patients' violence and ward atmosphere
Characteristics of practice environment (Paper III)	Data extraction sheet for pre-existing organizational statistics on each study ward*	1) beds and occupancy 2) nurses and their gender 3) length of hospital stay 4) age of patients and their gender 5) treatment periods 6) most common diagnoses of patients (ICD-10) 7) seclusion events 8) length of seclusions 9) restraint episodes 10) time in restraints 11) admission information
Attributes of new intervention (Paper III)	Data extraction sheet*	1) author(s) 2) year of publication 3) country 4) design 5) setting 6) population 7) sampling 8) sample 9) aims(s) 10) completer of DASA 11) assessment time 12) use of DASA

* Developed for the study

In **Phase II** three types of instruments were used. Discussion schedules were used to explore barriers to and facilitators for implementation, to identify knowledge translation strategies and to assess and monitor adaptation and use of violence risk assessment intervention. A data extraction sheet was further used to identify knowledge translation strategies from the literature. (Paper III.) The Dynamic Appraisal of Situational Aggression instrument (DASA, Ogloff & Daffern 2006) was

used in Phase II to monitor the realized use of the instrument. The instrument was translated from English into Finnish (with back-translation) for this study and used in paper format (Papers III, IV). Instruments with content descriptions used in this Phase II are described in Table 5.

Table 5. Monitoring: elements, instruments and their contents in Phase II

Elements	Instrument	Content of the instrument
Barriers and facilitators (Paper III)	Discussion schedule *	Possible barriers related to the use of DASA on the wards Ideas to overcome identified barriers
Knowledge transfer strategies (Paper III)	A data extraction sheet * based on OMRU knowledge translation strategies (Logan & Graham 1998)	Knowledge translation strategies used in earlier DASA studies: strategies related to practice environment, potential adopters and the innovation
	Discussion schedule *	Forthcoming DASA use on the wards Ideas about recommended interventions after DASA assessment
Assessing and monitoring (Papers III, IV)	Discussion schedule *	DASA use on the wards The challenges and advantages of the use
	Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006)	Realized use of DASA instrument

*Developed for the study

In **Phase III**, three types of instruments were used. Feedback questionnaires in paper-pencil format were used to explore nurses' (Paper III) and patients' (Paper IV) perceptions of the violence risk assessment intervention. Discussion schedules were further used to explore their perceptions of the outcomes of the implemented violence risk assessment intervention (Papers III, IV). Information produced with DASA (Ogloff & Daffern 2006) was used to evaluate the feasibility of the violence risk assessment intervention (Paper IV). Each of the DASA items is scored for presence (one) or absence (zero) in the 24 h prior to assessment based on both nurses' knowledge of the patient and his/her perceptions of the patient's behavior. Well-known patients who show increases in the behavior are scored as one, whereas habitual behavior, while non-violent, is scored as zero. The sum of scores is then added up. (Ogloff & Daffern 2004.) A score of 0 reflects a very low risk of violence. Scores one, two or three suggest that the risk of violence is moderate and preventive measures should be taken. Scores of four

or five indicate that the risk of violence is high, and scores of six or seven indicate a very high risk of imminent aggression. (Ogloff & Daffern 2006.)

Additional information combined with the feasibility evaluation was the number of patients treated on the wards during the study period. Instruments used in Phase III with content descriptions are presented in Table 6.

Table 6. Evaluation: elements, instruments, and their contents in Phase III

Elements	Instrument	Content of the instrument
Nursing staff's perceptions (Paper III)	Feedback questionnaire (1 structured and 5 open ended questions)*	1) respondent's working ward 2) feedback on achieving the project goals 3) feedback on working methods used in the project (components of the implementation process)
	Discussion schedule with questionnaire topics*	4) successful elements during the project 5) unsuccessful elements during the project 6) development ideas for future projects
Patients' perceptions (Paper IV)	Discussion schedule *	Forthcoming DASA use on the wards Ideas about recommended interventions after DASA assessment
	Discussion schedule *	DASA use on the wards The challenges and advantages of use
	Feedback questionnaire (2 structured and 3 open ended questions)*	1) respondent's ward 2) respondent's familiarity with the project 3) successful elements during the project 4) unsuccessful elements during the project
	Discussion schedule with questionnaire topics*	5) development ideas for future projects
Feasibility (Paper IV)	Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006)	1) items (behavioral forms of patient') is scored for presence ('1') or absence ('0') in the 24 h prior to assessment by a nurse <ol style="list-style-type: none"> 1. negative attitudes 2. impulsivity 3. irritability 4. verbal threats 5. sensitive to perceived provocation 6. easily angered when requests are denied 7. unwillingness to follow directions <ul style="list-style-type: none"> • Assessment is based both on nurse's knowledge of the patient and his/her perceptions of the patient's behavior 2) final risk status (low, medium, high) is formed 3) violent events against other people or objects are recorded (physical or verbal) perpetrated during previous 24 hours

*Developed for the study

4.6 Data collection

In **Phase I**, data collection was realized between August 2012 and December 2013. It was four-part. First, to explore nurses' perceptions in focus group interviews data collection was realized between August and September 2012. The ward managers on three psychiatric inpatient wards acted as contact persons of the study, and recruited nurses to participate. Five focus group interviews were held (n=22, range of participants 3 –7) on hospital premises (Paper I.) Second, to explore relatives' perceptions in focus group interviews data collection was realized in September 2012. The executive directors of both relatives' associations acted as contact persons of the study. They recruited relatives to participate. Two focus group interviews (n=8) were held on the premises of the relatives' associations. All the interviews were conducted (apart from one) by two researchers. Interviews were tape-recorded with participants' permission, and they all gave written consent in order to participate (Finnish Advisory Board on Research Integrity [TENK] 2012). A more detailed description of the data collection related to interviews is given in Papers I and II.

Third, solutions to overcome the challenges identified related to patients' violence and ward atmosphere were investigated in a workshop in October 2012. Nursing staff (registered and enrolled nurses, ward managers and nurse directors) were first given a lecture on evidence-based methods to prevent and manage patient violence. After this, small group discussions were set up and written responses were collated; equivalent seminars were organized on the wards (one per ward) for nursing staff who were unable to participate in the workshop. (Paper III.)

Fourth, to assess the characteristics of the practice environment pre-existing organizational statistics were collected from each study ward between May and November 2012 (2011 statistics) and January and March 2013 (2012 statistics). The nurse managers retrieved information from official electronic databases of the hospital district. In addition, the hospital districts' violence and threat incidence reports (n=221, 2008-2011) were collected from each ward (September - October 2012). Occupational safety representatives retrieved information from the organization's quality assurance documentation. (Paper III.)

Fifth, a literature search was conducted in May and updated in December 2013 to assess the attributes for the violence risk assessment intervention. The search term "The Dynamic Appraisal of Situational Aggression" was used. Altogether 28 articles were identified electronically (n=25) and by manual search (n=3). Finally, 10 studies met the inclusion criteria. (Paper III.)

In **Phase II**, data collection regarding monitoring implementation of the violence risk assessment intervention (use of the DASA) was realized between April 2013 and

October 2013. Assessment of potential barriers and facilitators took place in research meetings. Knowledge transfer strategies were identified through a literature search (elaborated in Phase I), and specified during outreach visits and a training workshop. Assessing and monitoring took place during outreach visits, in a research meeting and using email connections.

Recruitment of nursing staff and patients for outreach visits, a training workshop, and a research meeting for nursing staff took place via emails and leaflets. Appointed contact person/s (either a ward manager, registered or enrolled nurse) for each ward received a leaflet to be shared with other nurses and patients approximately one week before each outreach visit and training workshop, where oral feedback was collected. Oral feedback was converted into written memo format simultaneously after each visit or meeting from notes taken by the researcher. Patients' participation in the researchers' outreach was voluntary. For nursing staff, participation for visits and training workshop was also voluntary, but recommended. Invitations to research meetings were sent about one week before to all the nominated persons (ward managers, nurse directors and contact persons from the wards). The data collection procedure in within each element is described in Table 7.

Table 7. Data collection procedure in Phase II

Elements	Instrument	Data collection procedure
Barriers and facilitators (Paper III)	<ul style="list-style-type: none"> • Discussion schedule 	<ul style="list-style-type: none"> • Potential barriers and facilitators to the implementation of the DASA were assessed in two research meetings in April and May 2013. Discussion with two themes was instructed and written responses were collated.
Knowledge transfer strategies (Paper III)	<ul style="list-style-type: none"> • Data extraction sheet • Discussion schedule 	<ul style="list-style-type: none"> • Literature identified in Phase II was utilized. Data regarding the knowledge translation strategies used for the implementation of DASA was extracted to the extraction sheet developed. • Forthcoming DASA use and ideas about recommended interventions after the DASA assessment were investigated on the outreach visit to each ward in April and August 2013, and in a training workshop related to use of DASA
Assessing and monitoring (Papers III, IV)	<ul style="list-style-type: none"> • Discussion schedule • Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006) 	<ul style="list-style-type: none"> • During a 1-month pilot study, DASA was used on the three wards in September 2013. • DASA use was monitored by outreach visits to each ward, in a research meeting and email connection to the wards. Realized DASA instrument use (completed forms) was collected on the last outreach visit in October 2013 (n=716 assessments).

In **Phase III**, data collection for evaluating the outcomes of the violence risk assessment intervention was realized between April and October 2013. It was threefold. First, recruitment of nursing staff for outreach visits and a research meeting took place via emails and leaflets (elaborated in detail in Phase II). After the DASA implementation, the option to give written feedback was given and questionnaires were delivered to the wards for the nursing staff who were not willing or able to give oral feedback during outreach visits or in research meetings in October 2013. Oral feedback with questionnaire topics was collected during the outreach visit to each ward and in a research meeting. (Paper III.)

Second, recruitment of patients for outreach visits took place via leaflets (elaborated in Phase II). Oral feedback was collected on patients' perceptions of the violence risk assessment intervention at three time points: before (April and August 2013) and during the violence risk assessment intervention implementation (September 2013). After the implementation the option to give written feedback was given and questionnaires were delivered to the wards for the patients who were not willing or able to give oral feedback during outreach visits in October 2013. Oral feedback with questionnaire topics was collected in meetings organized for patients on the wards (in total three per ward). (Paper IV.)

Third, all registered or enrolled nurses working on the three wards who were participating in direct patient care used the violence risk assessment intervention as part of their normal working duties. Thus they participated in evaluating the feasibility of the implemented the violence risk assessment intervention. The nurses were recruited by the researchers through information meetings or ward managers on the study wards. Patients' capacity to participate was based on clinical assessment by the nurses and/or the researchers. Written informed consent forms of participating patients' (TENK 2012), and the information on the total number of patients treated on the wards were collected from the wards after the pilot study. (Paper IV.)

4.7 Data analyses

In **Phase I**, inductive content analysis was used to analyze focus group data (Hsieh & Shannon 2005). The analysis method was used because it has been found to be suitable for studies aiming to achieve a broad and condensed description of the phenomenon (Elo & Kyngäs 2008) and in situations when the existing literature on the phenomenon is limited (Hsieh & Shannon 2005). The analysis processes in both papers were divided into six phases: 1) transcribing, 2) forming an overall picture, 3) reading through the text again and making preliminary notes, 4) reduction of the data by picking out meaning units, 5) condensing meaning units to codes and grouping them, and 6) forming sub-categories and categories. Detailed descriptions of the

analysis processes of the focus group data are provided in Papers I and II. In addition, directed content analysis techniques (Hsieh & Shannon 2005) were utilized to analyze data produced by the discussion schedule (Paper III).

Pre-existing organizational statistics collected from each study ward were analyzed with descriptive statistics. To analyze articles included in the literature review, a data extraction sheet was used for describing the attributes of DASA. (Paper III.)

In **Phase II**, directed content analysis techniques (Hsieh & Shannon 2005) were used to assess barriers and facilitators. Knowledge transfer strategies were identified using a data extraction sheet and analyzed with descriptive qualitative analysis, and assessed with directed content analysis (Paper III.) In assessing and monitoring the use of the violence risk assessment intervention both directed content analysis and descriptive quantitative analysis was used (Papers III, IV). The data analysis procedure in each element is presented in Table 8.

Table 8. Data analysis procedure in Phase II

Element	Instrument	Data analysis
Barriers and facilitators (Paper III)	Discussion schedule	Directed content analysis
Knowledge transfer strategies (Paper III)	Data extraction sheet	Descriptive qualitative analysis <ul style="list-style-type: none"> • Knowledge translation strategies used in the articles included in the literature review were classified into strategies related to the practice environment, potential adopters and the innovation (OMRU, Logan & Graham 1998)
	Discussion schedule	Directed content analysis
Assessing and monitoring (Papers III, IV)	Discussion schedule	Directed content analysis
	Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006)	Descriptive quantitative analysis

In **Phase III**, outcome evaluation (Shek 2014) with three steps was used. First, nurses' oral feedback were written as notes and combined to written questionnaire feedback given. The data was analyzed using directed content analysis (Hsieh & Shannon 2005). (Paper III.) Second, patients' oral feedback was handled with similar procedure above. (Paper IV.)

Third, data related to the feasibility of DASA was analyzed in three ways statistically (SPSS software for Windows 21.0). First, descriptive statistics was used to evaluate demand, as means of realized use of DASA instrument during pilot study period. Second, receiver operating characteristic (ROC) and the area under curve values (AUC) were calculated to evaluate limited efficacy, as means of the predictive validity of DASA. This was done by making an analysis of the results of both the DASA total scores and nurses' judgment on final risk rating and recorded aggression incidents in the following 24 hours (Lewis & Webster 2004). Only data from DASA assessments completed by consenting patients were used in data analysis related to content of assessments. Third, descriptive statistics was used to evaluate acceptability as means of patients' recruitment ratio. (Paper IV.)

Criteria for assessing feasibility were based on the existing literature and set as follows:

- Demand: $\geq 65.6\%$ of possible DASA assessments are completed (Berry et al. 2015, Griffith et al. 2013, Hvidhjelm et al. 2014b)
- Limited efficacy: predictive validity is $\geq .70$ (Fisher et al. 2003, Hosmer & Lemeshow 2000)
- Acceptability: by patients' recruitment ratio is $\geq 51.2\%$ (Trivedi et al. 2013)

4.8 Ethical considerations

Violence in patient care as a research topic is regarded as a sensitive area (Jordan et al. 2007). Ethical considerations were therefore emphasized throughout the whole research process and responsible conduct of research as outlined by the Finnish Advisory Board on Research Integrity (TENK 2012) was followed at every phase of the study.

In **Phases I, II, and III**, permission to undertake the study was obtained from the chief psychiatrists of two regions of the hospital district (Papers I, III, IV). In Paper II, the executive directors of relatives' association gave permission for the study. Regarding the focus group interviews conducted and presented in Papers I and II, the ethics committee of the University of Turku carried out an ethical assessment of the study. The ethics committee of the hospital district reviewed and approved the sub-studies involving participants from the psychiatric inpatient wards (Papers I, III, IV). In addition, permission to use the DASA instrument for research purposes was granted by the copyright holders (James Ogloff and Michael Daffern).

In **Phase I**, focus group interviews were conducted for nurses and relatives of mental health patients (Paper I, II). Oral and written information was offered to each

participant, and written informed consent obtained in order to participate (TENK 2012). The voluntary nature of participation was emphasized. Anonymity of individual participants was ensured by representing the results with ID codes, so participants could not be identified from written data or study reports.

In **Phases II** and **III**, the implementation and use of the DASA instrument occurred as part of normal working duties of registered and enrolled nurses, ward managers and/or nurse directors (Papers III, IV). As a special ethical consideration related to violence risk assessment, it is extremely important that the method used can discriminate true positives (high risk for violent behavior) from false positives (Mossman 2013). A false positive result may lead to unnecessary use of patient restrictions (Abderhalden et al. 2004, Yao et al. 2014) and failure to treat those assessed as falsely negative (Large et al. 2011). The choice of the intervention to be implemented in the present study was made with caution. Earlier research where the predictive validity of DASA was established was gone through to make a valid decision. Moreover, when training nursing staff to use DASA, it was stressed that the result of DASA is one part of risk management (Hartvig et al. 2006), and that the least restrictive intervention should always be used if the patient is assessed as having medium or high risk for violent behavior in the next 24 hours (NICE 2015).

The patients were invited to participate in various discussion meetings organized by the researchers (Papers III, IV), and the feasibility evaluation of the DASA by allowing use of their DASA assessments for research purposes (Paper IV). Participation was, however, entirely voluntary. The patients were advised that the DASA assessment was part of the normal treatment procedure during the pilot study, but written informed consent was requested to hand their assessments over to the researchers for research purposes. (Paper IV). Oral and written information was offered to each patient (TENK 2012), and only the consenting patients' DASA assessments were included in the data analysis. The voluntary nature of participation and the option to discontinue participation were underlined, and it was likewise stressed that either participation or refusal would not affect the patients' treatment (FINLEX 488/1999). Patients' right to self-determination in making a non-coerced, informed decision (Vaz & Srinivasan 2014) about participating in the present study was valued and emphasized when training the nursing staff to recruit patients. Phases II and III involved patient groups considered vulnerable, especially forensic mental health inpatients (Munthe et al. 2010). As vulnerable groups have been declared to be in specific need of protection when participating in research (World Medical Association 2013), anonymity of participants was taken into special consideration. Thus, to ensure participants' privacy and due to the sensitive research topic and to ensure a trusting relationship with the researcher, no demographic information on patients was collected in any part of this study (Lee 1995).

5 RESULTS

5.1 Description of study participants

In **Phase I**, participants were registered or enrolled nurses (n=22) and relatives of a mental health patients (n=8). The majority of the nurses were female (73%). They worked on an acute admission ward (41%), on an acute forensic ward (27%), and on a treatment ward specializing in dangerous assessments (32%). (Paper I.) The relatives were mostly female (75%). They were members of two associations for the relatives of mental health patients, and either a patient's parent, child, or spouse. The relatives were all carers of people with a long treatment history of severe mental illness, mainly chronic schizophrenia. (Paper II.) In addition, ward managers and nurse directors (n=6) of the wards described ahead participated in this phase. (Paper III.)

In **Phases II and III**, participants were registered and enrolled nurses, ward managers and nurse directors (n=67, the total number of nursing staff) working as staff nurses or in managerial duties on one acute admission ward, on one acute forensic ward, and on one treatment ward specializing in dangerous assessments. Mental health inpatients (n=72) treated on these study wards were also participants in these phases. (Paper III, IV.)

5.2 Assessment of key elements for implementing the violence risk assessment intervention

Violence-specific problems related to the practice environment in psychiatric inpatient care

The participants of this study described violence-specific problems from different time-related perspectives: 1) problems perceived before a violent event, 2) when caring for patients behaving violently in psychiatric inpatient care, and 3) after a violent event. First, the nurses described the problems perceived before a violent event by identifying high-risk situations. These situations were linked to patient restrictions on the wards. The nurses also perceived a variety of warning signs indicating violent behavior by patients, for example certain gestures and facial expressions. On the wards arguments between patients also caused tensions and might lead to violent events. In home environments, the relatives of mental health patients described high-risk situations they had faced. These situations were linked to difficulties in getting help for the patient. At home the relatives described how they monitored warning signs of violence: changes in daily habits and decline in the patient's mental health.

Second, the nurses described problems when caring for patients behaving violently in psychiatric inpatient care. They reported physical injuries and damage to ward property as a result of patient violence. Nurses reported many types of responsive actions they tried to use to manage the situation. However, the solutions might lead to continued violence on the part of the patient, use of restrictive interventions and/or injuries to all parties involved. Fellow patients' actions in these events were described, sometimes complicating management of the event. The ward atmosphere when caring for patients behaving violently was portrayed as overloaded with workload, emotions, and inducing cynicism. These factors were reported to potentially impair the mental well-being of the nurses. For the relatives who had visited psychiatric inpatient wards, use of restrictive interventions on the wards caused a sense of helplessness. They felt fearful of the ward atmosphere and the environment in general. Relatives and professionals had divergent expectations of patient care.

Third, the nurses described problems after a violent event. The impaired atmosphere on the ward continued, and restrictions on violent patients caused extra work. For example, using the seclusion room as an intervention to deal with patient violence tied the nursing staff and they did not have time to take care of other patients. A decrease in nurses' mental well-being was also reported after such events. The events lingered in the nurses' minds during their free-time. The relatives reported that nurses were hard to reach on the wards. They did not know how they could help the patient after these violent events. The wards appeared restless. The patients' fears were transferred to the relatives when the patients told about scary situations and experiences on the wards.

Common problems and perceptions identified by both nurses and relatives of mental health patients were observing warning signs of violence and preparing for high-risk situations, negative causes of violence, and divergent actions and expectations in caring for patients. (Paper I, II.)

Needs related to the new intervention

The nurses and the relatives of mental health patients proposed a set of needs related to improving violence prevention and management. Nurses' ideas included more in-service training, more enhanced interaction (interprofessional, and between staff and patients), being present for patients and improvements in ward security. Relatives' suggestions were related to making patient care more humane, greater empathy on the part of the staff in interaction with patients and relatives, ensuring that there was a person in charge of the patients' treatment, meaningful activities for patients on the wards, information sharing and enabling relatives' participation. Needs common to

both nurses and relatives were comprehensive interaction and nurses being present for patients. (Paper I, II.)

Solutions to overcome the challenges identified and related to patients' violence and ward atmosphere were proposed by nursing staff (nurses, ward managers, and nurse directors). These solutions were already targeted at choosing the new intervention to be implemented. The needs identified for the new intervention were more individual treatment of patients behaving violently, quick risk assessments after patient admission and more efficient information sharing related to patients' treatment. (Paper III.) Figure 2 presents the process of choosing the intervention to be implemented on the basis of the findings in Phase I.

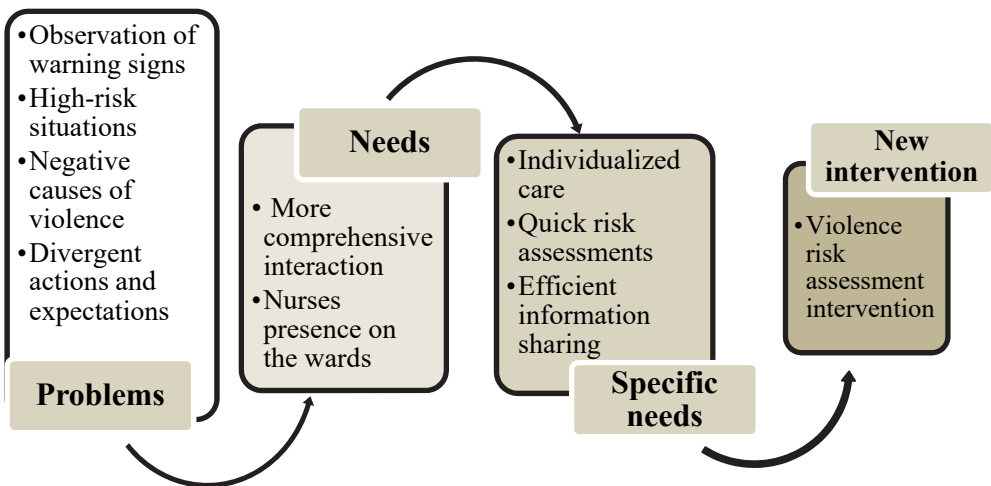


Figure 2. The process of choosing the intervention to be implemented (Paper I, II, III)

Characteristics of the practice environment for the violence risk assessment intervention

The practice environment for the violence risk assessment intervention was three psychiatric inpatient wards. They were located in three different hospitals in one hospital district. The wards differed from each in size (from 12 to 18 beds), length of patient treatment periods (from 9 to 97 days) and the type of treatment offered. One ward received unplanned admissions, whereas the other two wards mostly took admissions planned in advance. The common characteristics were number of nurses employed (from 20 to 22) and high patient occupancy (from 89 % to 101 %) All

wards treated patients with the most common psychiatric diagnosis of ‘schizophrenic disorder’ (42%-64%) (ICD-10, WHO 2016b).

On the three wards, violent and threat events were related to patient restrictions. This emerged from analyses of violence and threat incidence reports over a four-year time period. Events most typically occurred in seclusion rooms with or without mechanical restraints (40% of all events). Typical times for violent and threat events were mornings 10-11 am (17%) or during the evening shift, 4-5pm (19%).

The differences in the characteristics of the practice environment assessed in Phase I were estimated not to have a major impact on the choice of intervention to be implemented. The characteristics of the practice environment are described in more detail in Paper III.

Attributes of the violence risk assessment intervention

The new intervention selected to be implemented in this study was the violence risk assessment intervention, use of the Dynamic Appraisal of Situational Aggression (DASA, Ogloff & Daffern 2006) in day-to-day nursing practice. Developed for aiding assessment of risk for imminent aggression (Ogloff & Daffern 2006), this intervention was proposed to help the nurses to 1) identify patients at risk of behaving violently and 2) use the information produced by the risk assessment to target interventions to prevent violent events, 3) increase interaction by sharing the DASA assessment results interprofessionally and with the patient.

Studies on using the DASA instrument (n=10) were published 2006-2013. They were mostly validation studies. About half had been conducted in Australia. DASA had been used in both forensic psychiatric care and on general psychiatric wards. Patient sample sizes varied from eight to 100. DASA had been used in previous studies by qualified nursing staff. The assessment of a patient had been done either on every shift or once per day, at 1pm or later on the evening shift. In addition to completing the DASA form, the nurses recorded possible violent events (verbal, physical, against objects) from the preceding 24 hours. More detailed information about previous studies is presented in Paper III (in Tables 1 and 2).

This specific intervention was chosen to be implemented for the following reasons: as distinct from other methods (BVC, Almvik & Woods 1998) recommended in the international guidelines (NICE 2015), DASA was deemed applicable for use once a day. This was important, because the intervention needed to be quick to use as identified in the nurses’ needs for a new intervention. Most importantly, it was thought to respond to most of the needs identified by the nursing staff and the relatives of mental health patients. Further, the hospital district had

already expressed an interest in DASA. By choosing this particular method, the present study was intended produce valuable knowledge about DASA use for stakeholders in the hospital district, and also for the scientific community.

5.3 Monitoring implementation of the violence risk assessment intervention

Barriers and facilitators for implementation of the violence risk assessment intervention

After a collaborative decision about intervention to be implemented, barriers and facilitators in the implementation of the DASA were identified by nurse managers, nurse directors and contact persons from the participating wards (nurses). The major barriers were related to the threat of one ward closing soon after implementation process due to organizational changes. As facilitators administrative support and integrating DASA use as an integral part of daily practice were deemed essential. (Paper III.) Table 9 presents the barriers and facilitators in the implementation of DASA.

Table 9. Barriers and facilitators for implementation of DASA (Paper III)

Barriers related to DASA use	Facilitators related to DASA use
<ul style="list-style-type: none"> • Possibility arose of one study ward closing <ul style="list-style-type: none"> ➢ Difficult to motivate the nursing staff ➢ Unmotivated staff might use DASA carelessly and have limited commitment to the study • Nurses not filling out DASA daily • Uncertainty what activities should be prompted by DASA scores 	<ul style="list-style-type: none"> • On the study ward closing <ul style="list-style-type: none"> ➢ Nurses encouraged to familiarize themselves with DASA for the future ➢ Support from managers at all levels • Use of a checklist to ensure regular use of DASA and its utilization • Forming a list of recommended interventions after the DASA assessment • Assessment results to be used as part of the nursing care summary

Knowledge translation strategies used for the implementation of the violence risk assessment intervention

The existing studies using DASA were reviewed to aid the selection of knowledge translation strategies. The strategies used were related to both the innovation (violence risk assessment intervention) itself, but also to potential adopters and the practice environment. More specifically, strategies included information delivered prior to the DASA implementation, training provided for nursing staff, and support provided to DASA users (visits to wards, ongoing support).

This study utilized the knowledge translation strategies identified from earlier research. (Paper III.) Targets of the knowledge translation and specific contents of strategies are described in Table 10.

Table 10. Targets of knowledge translation and strategies used for implementation (Paper III)

Targets of knowledge translation	Specific content of strategy
Practice environment	<i>Social:</i> Collaborative choice to implement DASA
Potential adopters	<i>Awareness:</i> <ul style="list-style-type: none"> • A workshop (II) organized for nursing staff (a lecture on short-term risk assessment and brief introduction to DASA) • Outreach visits: introduction of DASA (patients and nursing staff) and information about forthcoming pilot study • Patients and nursing staff shared their suggestions about recommended interventions after DASA assessment <i>Knowledge and skills:</i> <ul style="list-style-type: none"> • Training (workshop III) in using DASA was provided for nursing staff • 2-page unit guide (developed by Ogloff & Daffern, translated into Finnish) was provided to support the use of DASA • Interventions recommended were listed for use (Paper III, in Table 4.) • Ongoing support provided to the wards
Innovation	<i>Knowledge translation process:</i> <ul style="list-style-type: none"> • Use of DASA was agreed with nursing staff after appropriate skills training <ul style="list-style-type: none"> - 1 pm, for each patient every day, by morning shift primary nurse - Assessment to be shared and discussed with 1) evening shift and 2) the patient - DASA scores and related interventions to be entered into the electronic patient files

Adaptation and use of the violence risk assessment intervention

Adaptation and use of DASA were evaluated during outreach visits to the study wards. While the nurses had been using DASA for 1-2 weeks, they had noticed that nursing notes had already become more precise. This was because they needed information to enable assessment of patient behavior during the past 24 hours. Therefore observations of the patients' behavior needed to be described in more detail in the electronic patient files. Some had discussed the DASA assessment with the patient. This working method was portrayed as a new and affirmative method of collaborative work. (Paper III.)

During the pilot study, only a few violent events had occurred on the wards. Thus the assessments results were in most cases '0', indicating low risk for violent behavior. It was agreed that DASA would be completed once a day at 1 pm. However, some nurses noted that they had already assessed their patient's risk level (without DASA) and intervened to prevent violence. Therefore some felt afternoon assessment unnecessary. No other major problems occurred while monitoring the implementation. (Paper III.)

To evaluate the adaptation (actual use of the DASA instrument), all DASA forms completed during the pilot study was collected after one month (n=716 assessments completed). On basis of the adaptation of DASA, the need for the violence risk assessment intervention was evaluated in Phase III. (Paper IV.)

5.4 Evaluation of outcomes of the implementation of the violence risk assessment intervention

Nursing staff's perceptions of the violence risk assessment intervention

Nursing staff's perceptions of the violence risk assessment intervention were investigated following the implementation of DASA. Oral and written feedback from the nursing staff was divided into positive and negative perceptions. As a positive perception, they reported that implementation of the DASA had increased interaction interprofessionally and with the patient on issues of violence risk. Using DASA was not time-consuming and some perceived it to be a particularly helpful method for inexperienced nurses. It was thought to be suitable for quick admission assessments, in addition to monitoring patients' behavior over longer time periods. Moreover, as a positive outcome, written nursing notes were reported to have become more precise. (Paper III.)

As negative perceptions, reluctance towards implementing the violence risk assessment intervention was reported. Preference for clinical intuition and not using a structured instrument was reported. The timing of the assessment was deemed frustrating, and some felt that the DASA was not helpful in identifying patients at risk of behaving violently. Information produced by the risk assessment was deemed hard to link to interventions to prevent violent events. Scoring and content were questioned by some, likewise the need for routine risk assessment. More training was deemed necessary. Familiarizing themselves with written nursing notes from the previous shift in order to assess patients' behavior over the previous 24 hours was time-consuming. Nurses also raised concerns as to whether the treatment relationship would affect the assessment. (Paper III.)

Patients' perceptions of the violence risk assessment intervention

Patients' perceptions of the violence risk assessment intervention were investigated before, during, and after the implementation of DASA. Oral and written feedback from the patients was divided into positive and negative perceptions (strengths and weaknesses of DASA and violence risk assessment in general). As positive perceptions, patients reported increased communicativeness related to issues of violence risk. They were interested in the instrument (content, scoring, and development of DASA) and expressed satisfaction that patients were assessed equally with a structured instrument. Patients thought it was positive that the instrument was introduced to them and implemented on the wards. Openness in treatment had increased from patients' perspectives. (Paper IV.)

As negative perceptions, patients questioned the assessment focusing only on negative things and whether the DASA items were personal characteristics, not signs of violence. They reported concern about nurses' objectiveness in the DASA assessments. Patients were worried if the violence risk assessment intervention would decrease the time that nurses were present and available on the wards. Some felt that they did not have enough opportunities discuss their DASA assessments results with nurses and more information was needed on how the assessment affected their own treatment. (Paper IV.)

A summary of nurses' and patients' perceptions regarding the outcomes of the implemented violence risk assessment intervention is presented in Figure 3.

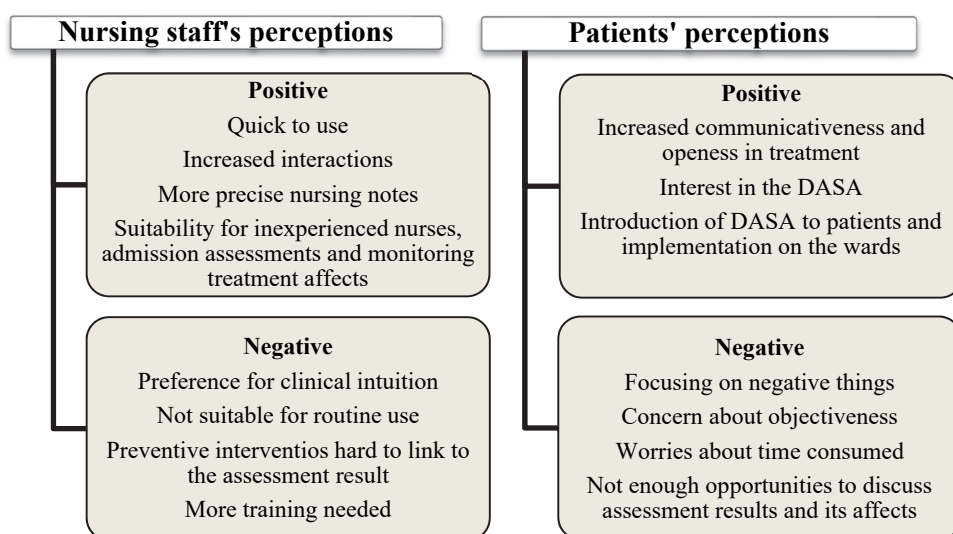


Figure 3. Nursing staff's and patients' perceptions on the violence risk assessment intervention (Papers III, IV)

Feasibility of the violence risk assessment intervention

The feasibility of the violence risk assessment intervention, DASA, was investigated in terms of three feasibility areas: demand, limited efficacy and acceptability. Feasibility criteria for each area was set and evaluated after the implementation of DASA. The feasibility evaluation resulted as criteria partially achieved. Demand, as means of realized DASA use, varied between study wards. On average, it partially met the criteria set. Limited efficacy, as a means of predictive validity, was evaluated as good to excellent, depending on the form of aggression and assessment mode (numerical scores or nurses final risk rating). Acceptability, as a means of patients' recruitment ratio, did not achieve the criteria set, being low. However, there were major differences between study wards in achieving the criteria. (Paper IV.) Results of this feasibility evaluation are described in details in Table 11.

Table 11. Feasibility evaluation of DASA (Paper IV)

Feasibility area	Feasibility criteria	Result	Criteria achieved
<i>Demand</i> Realized DASA use	≥65.6 % of possible DASA assessments completed	64 % (range 14.7 % and 88.5 % between three wards)	Partially achieved
<i>Limited efficacy</i> Predictive validity	Predictive validity ≥.70	.93*/.84**/.78***/.75****	Yes
<i>Acceptability</i> Patient recruitment ratio	Patients' recruitment ratio ≥51.2 %	17 % (range 4.3 % and 100 % between three wards)	No

AUC values: * physical aggression against others; ** verbal aggression against others; *** nurse's final risk rating, physical aggression against others; **** nurse's final risk rating, verbal aggression against others

6 DISCUSSION

6.1 Validity and reliability of the study

This study used mixed-methods methodology with the emphasis on qualitative research. Morse's (2015) terminology and criteria for validity and reliability questions were adopted as strategies for establishing rigor. To summarize the validity and reliability of the study, this section of the study are assessed in its entirety based on criteria proposed by Morse (2015): 1) prolonged engagement and persistent observation, 2) thick, rich description, 3) negative case analysis, 4) peer review, 5) development of coding system, 6) researcher bias, 7) member checking, 8) external audits, and 9) triangulation of research methods.

First, prolonged engagement and persistent observation refers to spending more time in a certain setting. This relates to validity questions and the aim is to reduce "observer effect". Prolonged engagement has been thought to make the data collected richer. (Morse 2015.) In this study, contact with nursing staff began and continued throughout the implementation process, in Phases I, II, and III. A trusting relationship can be estimated to have been achieved with participants, because the nursing staffs were actively involved throughout the whole study process, for more than a year. They shared their positive, but also negative feedback during the process of implementation of violence risk assessment intervention. Prolonged engagement was also partly achieved with the patient participants: some of the patients were receiving long-term care on the study wards. Thus the researchers met them several times during the study. On the other hand, it can be argued that the study partly failed to create trust among participants. This argument can be evinced in light of of the feasibility evaluation (Phase III). The acceptability of the implemented intervention was low as measured by the patient recruitment ratio. Demand for the new intervention, measured by use of the violence risk assessment intervention likewise did not fully achieve the feasibility criteria set. However, the results of the feasibility evaluation may be due to the intervention itself. How researchers' prolonged engagement influenced these results cannot be completely judged from this study. A clear limitation of this study is that pre-post evaluations of actual changes (individuals or ward-level) in practices (Hogan & Logan 2004) were not carried out.

Second, thick, rich description concerning validity questions refers to sample size and appropriateness of the data. For reliability questions, thick description is related to internal validity; plentiful, overlapping data reveals replication. (Morse 2015.) In this study, purposeful sampling strategies were used to reach participants with experience of the research topic. Further, the study wards were chosen because they were estimated to be in need of new methods to deal with patient-violence. Using

this sampling approach was intended to ensure the appropriateness of the data. However, sample size was small, particularly in the focus groups conducted with the relatives of patients with mental illness (Phase I) and in the feasibility evaluation regarding the limited efficacy of the intervention (Phase III). The appropriateness of the data may also be questioned in some parts of the study. Concerning Phase I, the familiarity of the participants with each other may have caused validity problems. Familiarity may have inhibited some from sharing their experiences and ideas freely (Sim 1998). On the other hand, this may have positively affected participants by creating a trusting atmosphere during data collection (Kitzinger 1995). Despite the relatively small sample size in this study, it can be claimed that a thick and rich dataset was achieved. Participants all had experience of the research topic and saturation of qualitative data was deemed to have been achieved. In the feasibility evaluation of the violence risk assessment intervention it can be estimated that the majority of challenges related to the intervention were covered with the sample size achieved (Faulkner 2003). On the whole, in implementation research, the depth of the data is deemed more important than the size of the participant population (Werner 2004).

Third, negative case analysis means that these cases are not ignored during the analysis but are analyzed as carefully as more common cases to add validity (Morse 2015). In this study, this was ensured in the analyses by treating all the data as equal and by representing results as avoiding just raising up norms. The aim was to present the data as entirely as possible in order to enable the reader to justify the differences found. For example, quotes from qualitative findings (Phase I, III) were selected so as to represent a variety of views described by the participants. Opposite perceptions were also sought in data collection, for example, for outcomes the implementation of the violence risk assessment intervention.

Fourth, peer review related to validity questions aims to prevent bias and promote the conceptual development of the study (Morse 2015). In this study, this recommendation was followed by using two or more researchers in data collection and analysis throughout the study (Phases I, II, III).

Fifth, development of a coding system is recommended for semi-structured interviews to add to the validity and reliability of data analysis (Morse 2015). In this study interviews with participants were used in every phase (Phases I, II, III). A coding system was developed and used in Phases II and III. In these phases interviews were standardized by using the same discussion schedules in each study ward. Thus the analyses focused on discussion topics, for example positive and negative outcomes of the violence risk assessment intervention (Phase III). Whereas in Phase I no coding system was established related to the focus groups because of

the nature of interviews (topic guide with open-ended questions), and because the analysis method was inductive content analysis.

Sixth, researcher bias is defined as two of types related to validity questions: bias due to researcher's tendency to see what is anticipated and bias due to the nature of qualitative research (non-random sampling, small and complex data) (Morse 2015). Bias due to the researcher's working background in psychiatric nursing may have influenced data collection, analysis, and the interpretation of the results. For example, focus groups may have emphasized topics the researcher found more important, by asking follow-up questions particularly when a participant described something that the researcher found valuable. On the other hand, previous occupational history may also be a facilitating characteristic when the researcher understands the topic and environment of the study. In addition, approaching the data always includes some degree of interpretation (Graneheim & Lundman 2004). Interpretations of study findings were made in the present study by multiple authors (Papers I-IV), thereby decreasing the researcher bias. Personal biases are reported in focus group reports (Papers I, II) as suggested by the 'Consolidated criteria for reporting qualitative studies' by Tong et al. (COREQ, 2007).

Bias due to the nature of qualitative research may have also influenced the study results. Because random sampling was not used, the participants of the study may have represented those people with particularly positive or negative perceptions of the study topic. (Morse 2015.) For example, it is possible that those study participants who were relatives of patients with mental illness do not represent average relatives in these relatives' associations. In addition, as the study wards represented those wards in the hospital district with high occurrence of violent events and use of coercive methods the results may not be generalizable to all inpatient wards. The main target in this study was ward-level change in practices. The change in practice was done by implementing a violence risk assessment instrument intervention. Thus the participants were groups (nursing staff on psychiatric wards, relatives of mental health patients and mental health inpatients treated). At the level of the individual study participants, detailed demographic data was not collected. The aim was to report possible biases truthfully, and limitations are discussed (Papers I-IV). Characteristics of participants and settings are described in as much detail as possible, but with respect for individual participants' privacy. A relevant reporting guideline was used when applicable (COREQ, Tong et al. 2007; Papers I, II). Additionally, an attempt was made to reduce possible biases by following the Ottawa Model for Research Use (OMRU, Logan & Graham 1998) as a guiding theoretical framework. The feasibility evaluation of the violence risk assessment intervention was constructed on the basis of the methodological recommendations by Bowen et al. (2009) and Thabane et al. (2010).

Seventh, member checking to add reliability is a matter of researcher understanding and interpreting participants correctly (Morse 2015). This reliability question was addressed by presenting preliminary results and progress of the study to nursing staff and patients regularly in monthly meetings. The active participation and feedback of these individuals (Damschroder et al. 2009) promoted understanding and interpretation of the results. For example, the results of phase I, assessment of key elements for implementation, were all communicated to participants of the implementation process in study wards. On the basis of these results, a shared decision was made about the violence risk assessment intervention to be implemented. In addition, to interpret participants correctly, all taped interviews were transcribed verbatim (Kitzinger 1995). Concerning the qualitative data collected in Phases I, II, and III, only manifest contents were analyzed to avoid possible subjective interpretations of latent contents (Kondracki et al. 2002).

Eighth, external audits for adding validity can be described as a process of exploring the researcher's process of conceptualizing and re-examining the conclusions drawn (Morse 2015). In this study, three types of external auditing can be recognized. The study is part of a larger research project "Safer working management" (111298), led by the University of Turku, Finland. As part of this project, the preliminary results of this study were reported to the main funder, the Finnish Work Environment Fund. Additionally, as part of the assessment of the larger project, a group of trained mental health service user auditors evaluated the project material (Välimäki et al. 2013). Last, all the papers (I-IV) where the study results are reported, were peer-reviewed by reviewers of international scientific journals. The latter form of auditing promoted critical appraisal of the study results, interpretation and conclusion drawn based on the results.

Ninth, triangulation of research methods may add to the validity of the results and expand the understanding of the study topic. To establish validity, triangulation commonly refers to the use of two or more data sets or methods (multi-method approach) to answer one question. (Morse 2015.) The methodological approach of this study was mixed-methods research. The study consists of three phases, each with its own goal. Through these goals, the overall aim of the study was addressed. It is debatable whether a single data collection method could have been used in each of the phases. Potentially this could have brought more in-depth knowledge, for example by using only interviews for evaluating the violence risk assessment intervention (Phase III). This could be a valid argument because the quantitative data sets in this study are small, and thus generalization of the results is limited. Further, most of the instruments used in this study have not been validated and were developed for the purposes of the work at hand. By choosing more cohesive and reliable data collection strategies, the validity of the results and reliability of the

study might have been stronger. However, the nature of the study being implementation focused imposes certain limitations on data collection. Implementation research typically requires a great deal and variety of data to be collected in a relatively short time period. Compromises in the type, quality, and amount of data are therefore often needed. (Werner 2004.) These were part of this study, and are a clear weakness in the present study. Thus, triangulation to achieve the overall aim and the aims of the each phase represents and attempt to reduce these shortcomings in the individual data sets. Triangulation of the research methods also helps to stay true to the theoretical approach of the study. The Ottawa Model of Research Use (OMRU, Logan & Graham 1998) guides the use of multi-methods, supported also by the ‘Consolidated Framework for Implementation Research’ (CFIR, Damschroder et al. 2009).

6.2 Discussion of the results

The main results are discussed in this section based on the three phases of which the study is composed.

Assessment of key elements for implementation of the violence risk assessment intervention

The findings of this study revealed the complexity of the clinical reality related to violence-specific problems. This result was shown in the focus groups conducted with nurses working in psychiatric inpatient care and relatives of mental health patients, and in the analysis of the practice environment. When assessing key elements for implementation, the novel finding was the multidimensional nature of violent events described by both nurses and relatives. Factors related to these events were linked in time; before, during, and after the violence. The real complexity exists in the violent events including interactions between several actors, modes of action and divergent expectations.

A significant finding was that violence problems were typically a result of restrictive practices, like forbidding the patient to exit the ward and use of coercive methods. This observation is not new, but was reported already over a decade ago (Ilkiw-Lawalle & Grenyer 2003, Omérov et al. 2004). The result is important, because it shows that despite wide initiatives to change traditional restrictive practices in psychiatric inpatient care (THL 2014a, Steinert et al. 2010, Vruwink et al. 2012), no shift to new practices was apparent in the qualitative descriptions about state of practices.

On the other hand, this finding related to restrictive practices may be due to the nature of the study wards which the nurses represented. They treated patients with

challenging behavior, and tried their best to manage patient violence without causing extra damage to any parties. The nurses realized that the use of restrictive interventions may intrinsically lead to violent events, but controversially these are still used as part of prevention and management efforts. The literature has identified reasons for using restrictive practices as promoting the patient's best interest and well-being (Hem et al. 2016) and the strong belief in patient restrictions (Duxbury & Whittington 2005, Pulsford et al. 2013). Furthermore, working under threat of violence and difficulties to understand the causes of patient violence may motivate nurses to use restrictive intervention for managing patient violence (Foster et al. 2007). However, alternatives to restrictive practices have been explored, reported and implemented (e.g. Gaskin et al. 2007, Jungfer et al. 2014, Kontio et al. 2010), but for some reasons practices do not change as rapidly as would be expected (Happel & Koehn 2010). Traditions of psychiatric care, based on own knowledge, experiences (Zauszniewski et al. 2012) and intuition (Olsson & Schön 2016), and the surrounding shared nursing culture and practices (Kontio et al. 2010) are rooted firmly in psychiatric inpatient care, and this study confirmed that result.

The findings of this study produced new knowledge about the ward atmosphere related to violent events. The ward atmosphere was reported to be impaired as a result of violent events on the wards. Relatives of the patients also sensed this poor climate: they described fear of the closed wards and were somewhat traumatized by having to witness, for example, screaming from the patient seclusion room. In contrast to relatives visiting the wards, nurses were reluctant to describe their feelings as fear. Further, they stated that a nurse cannot work in psychiatric inpatient care if she/he feels fear. This is quite opposite finding compared to previous research on the field. For instance Benson et al. (2003), Needham et al. (2005) and Tema et al. (2011) have reported violent events causing feelings of fear among nurses. Nurses in the study by Camuccio et al. (2012) even reported a lack of trust in a colleague who refuses to show or accept fear in psychiatric care (Camuccio et al. 2012).

The results of this study related to nurses' fear may be due to a ward atmosphere that induces cynicism. They are so used to it that they do not always recognize violence and it is simply part of the job (Allen 2013, Stevenson et al. 2015). Working for a long time where there is a constant threat of violence may change the nurses' behavior. Previous studies have reported also possible effects of exposure to violence: impairing morale (Kindy et al. 2005, Moran et al. 2009, Totman et al. 2011), causing inability to provide empathetic care (Drach-Zahavy et al. 2012), emotionally "hardened-up" (Moran et al. 2009), and bringing out the dark side of the nurse (Hellzen et al. 1999). Nurses' well-being without new, feasible methods to deal with patient violence is at stake and the consequences may be many.

This study identified a set of needs related to the development of violence prevention and management. Novel here was combining the ideas of nurses and relatives of mental health patients, and secondly that it was possible to identify common needs in these two groups. Relatives' needs specifically related to violent prevention have rarely been studied. It can be said that their needs were more general than those of nurses, relating to patients and their treatment. For example, they required for patient having a primary nurse: a surprising finding in modern psychiatric care, a concept of primary nursing in psychiatric inpatient care established in the literature at least since the 1970's (Rieve 1974). Still, the relatives struggle with similar challenges. However, it can be argued that relatives' needs do not always represent what is best for the patient. Bowers et al. (2010) found, for example, that relatives and friends of the patient perceive some of the coercive practices more positively. Kjellin et al. (1993) stated that sometimes relatives' needs override the needs of the patient, and are somewhat different from the patient's preferences (Goodwin & Happel 2008). In this study, nevertheless, the broad content of needs was very similar to what patients have proposed (Gudde et al. 2015, Kontio et al. 2014b). The results of this study suggest that in psychiatric inpatient care, there is still a need to pay attention to patient and family involvement in care, to ensure that the needs of all parties are met when new practices are developed and implemented (Klein & Knight 2005).

The needs that nurses presented were something identified by nurses in earlier research in this field: more continuing education for nurses (Kontio et al. 2009), security improvements to working environments (Bowers et al. 2006, McPhaul et al. 2008) and more enhanced interaction between professionals and patients (Dickens et al. 2013, Pulsford et al. 2013). This assessment of needs shows that these suggestions in earlier studies have not changed practices enough, let alone the utilization of treatment guidelines (NICE 2015). As stated, the best possible evidence is not implemented in practice-level action (Grimshaw et al. 2004, Grol 2001) spontaneously, but more systematic methods to translate research evidence to practice are needed (Grol & Grimshaw 2003).

Monitoring implementation of the violence risk assessment intervention

This study describes the selection of knowledge translation strategies for implementation. A novel approach and finding in this study was that the patients were also seen and integrated as potential adopters and their awareness of the intervention was deemed essential for successful implementation. This is an important, as for example the WHO (2015a) has outlined that mental health patients should be acknowledged as an important part of the implementation of new clinical practices.

The results on monitoring adaptation and use of the violence risk assessment intervention provide some important findings. In this study, a decision was made that the agreed ways to use the violence risk assessment intervention would not be changed during the one-month pilot period. A similar protocol is also described in Vojt et al. (2010) when implementing a violence risk assessment intervention. Challenges in the early stage of the intervention might have caused negative attitudes towards it. Revising the agreed ways for using the intervention might have led to higher realization rates of the intervention. On the other hand, positive outcomes of implemented intervention were noticed after just a few weeks of use. Sharing positive perceptions and receiving enhancement to one's performance may facilitate the adoption of a new practice (Grimshaw et al. 2004). This is important because adoption is a critical pathway to rooting the innovation in daily practice (Klein & Sorra 1996): whether a new practice is superior to traditional practice. Thus, a pilot period may demonstrate whether implementation is worth supporting in the long run (Vojt et al. 2011). Small-scale testing of an implementation is one way to give the users a message that after experience of use has been gained; revisions can be made to the protocol (The United States Department of Health and Human Services 2011).

Evaluation of the outcomes of implementation the violence risk assessment intervention

This study was the first, as far as is known, to explore patients' perceptions of a short-term violence risk assessment intervention. The results of this study gave new insights, especially into patients' perceptions of the violence risk assessment intervention. Outcomes were evaluated from both the nurses' and patients' viewpoints, and related quantitatively to the feasibility of the intervention. Both positive and negative outcomes of the implementation the violence risk assessment intervention were identified. A novel positive outcome identified by nurses was that DASA use promoted not only communication interprofessionally but also between professionals and patients. This is a valuable finding because risk of violence may be a difficult topic for mental health professionals to discuss with the patient (Langan & Vivien 2004, Rask & Brunt 2006). Further, the finding is important for this kind of observation-based instrument (Faay et al. 2013): using the intervention does not necessarily alienate the nurse and the patient. On the contrary, involvement of patients in a short-term violence risk assessment intervention is possible from the nurses' point of view and may lead to positive outcomes, as indicated by the Department of Health at the United Kingdom (2007) in Best practice in managing risks.

Importantly, as another positive outcome, patients felt that in general they wanted to be involved in the violence risk assessment intervention using the DASA

instrument. These results can be considered promising, as patients' involvement in assessing risk of violence is recommended (Department of Health at the United Kingdom 2007, Kumar & Simpson 2005, NICE 2015). Patient involvement in interventions aiming to prevent or manage violent behavior, however, has rarely been studied from the patients' perspectives. Patient participation in violence risk management interventions are reported to be disregarded especially in forensic mental health services (Eidhammer et al. 2014). However, according, for example, to the systematic review by Gudde et al. (2015), patients want to be involved in violence prevention. Nurses also consider this important, although perceiving patient participation as a challenge for involuntarily treated patients (Olsson & Schön 2016). In the present study patients emphasized that they wanted know how the risk assessment might affect their care. While DASA was developed for professionals' use not requiring patient involvement, the developers recommend cooperation with the patient (Ogloff & Daffern 2006). Despite the scarcity of empirical evidence in this area (Eidhammer et al. 2014), research on interventions such as the Early Recognition Method by Fluttert et al. (2010) has shown that it is possible to involve mental health inpatients (in this case in a forensic setting) in the management of violence risk.

It may, however, be that the positive results of this study were not entirely due to the intervention implemented, but because patients had in the first place been given a chance to participate more actively in their care and in research. It has been noted that the patients may be the most neglected part in implementing evidence-based innovations in clinical practice (Kross & Karlin 2014). In mental health care, it has been discovered that sometimes patients have difficulties in being able to involved in their own care despite their desire (Tanenbaum 2008), to get their voices heard (Laitila et al. 2011), or to get treatment-related information in accessible ways (Bialevitz et al. 2011, Kross & Karlin 2014). Against this background, the result that patients wanted to be involved in the violence risk assessment intervention implemented in this study need to be interpreted in light of this latter, alternative explanation.

Negative outcomes of DASA use in daily practice were identified. Some nurses did not find this intervention relevant to clinical practice and DASA was deemed just another form to be completed, similarly to the findings presented by Daffern et al. (2009) and Dumais et al. (2012). Although this intervention is described as quick and easy to use (Griffith et al. 2013, Vojt et al. 2010), its use to its full potential demands careful training and understanding of the rationale of structured violence risk assessment, preferably both in basic nursing education and in continuing education (Faay et al. 2013). In addition, at national level, there is a lack of treatment guidelines highlighting the importance of the use of structured violence risk

assessment interventions over unaided methods (NICE 2015, Victorian Institute of Forensic Mental Health 2012). The lack of consistent guidelines may be one explanation why evidence-based interventions such as violence risk assessment are not favored by some.

According to the outcome evaluation conducted in this study, the procedure for involving patients in the violence risk assessment intervention executed with DASA needs more systematic approaches to doing it in practice and regarding the possible benefits. In that way it would be possible to encounter some of the negative outcomes reported by the nurses (e.g. difficulty linking preventive interventions to risk assessment) and the patients (e.g. concern about the objectivity, not enough opportunities to be involved). Although violence risk assessment interventions, such as use of DASA, are only a small part of psychiatric care, and although the majority of patients receiving inpatient care does not behave violently, may it have untapped value to support person-centered care (Duodecim 2015).

The findings of the study regarding the feasibility of the violence risk assessment intervention revealed some noteworthy limitations to be considered in future research. The real challenge established in this study was patient recruitment for a violence risk assessment intervention study with the requirement for written informed consent. The challenge of recruiting patients is also identified, for example, in the systematic review by Soininen et al. (2014). They explored challenges in recruiting patients for studies where perceptions of coercion were sought. Similar to this study, Soininen et al. (2014) identified seeking patients' informed consent as challenging, likewise recruiting large samples. In this study, patients showed eagerness to participate in group meetings where they could share their perceptions of the intervention anonymously. However, they found their individual violence risk assessment results too sensitive to be used for research purposes.

From an ethical point of view, this finding is important. The results of this study indicate that future research in the field of violence risk assessment may not override the informed consent procedure; especially in cases where participants represent vulnerable population specifically needing protection in research (Munthe et al. 2010, Vojt et al. 2011, World Medical Association 2013). New methods to support and enable patient involvement in research in these inpatient settings may be needed. These may include, for example, service user involvement in planning and executing recruitment as part of the research team (Jørgensen et al. 2014, Woodall et al. 2011) and novel multimedia consent procedures (Jeste et al. 2009). In violence risk assessment research, it could be valuable to consult patients about research outcome measures to address their priorities (Trivedi & Wykes 2002).

This study gives preliminary results on the predictive validity of DASA in Finnish psychiatric inpatient care. AUC values, as a criterion for level of discrimination, were in this study between acceptable ($>.7$) and outstanding ($>.9$), depending on the target of violence. Research with larger sample sizes has found the predictive validity of the DASA to be at similar levels (Chan & Chow 2014, Chu et al. 2013a, Dumais et al. 2012). Because the present study used very limited sample size, firm conclusions on the psychometric properties of this instrument cannot be drawn. Prevalence of violence was also very low during the short pilot study, thus the use of DASA in the present study does not necessarily reflect the clinical reality as a whole. On the other hand, in the qualitative findings of this study nurses indicated that DASA might be more suitable for monitoring treatment affects over longer time periods than in routine use on a daily basis. This perception may be supported by the findings of Chu et al. (2013b), who demonstrated that using the past week's mean or peak DASA scores could be a more accurate way to predict patients' violent behavior.

The feasibility evaluation exposed shortcomings in violence risk assessment intervention use in daily practice. The intervention use in this study was 64%. Only few studies have reported implementation processes of violence risk assessment interventions (Vincent et al. 2012). With similar instruments use has been even lower than in the present study. For instance, in the juvenile justice system risk assessment was realized in 55% of cases (Young et al. 2006), and the same realization rate was reported Hvidhjelm et al. (2014b) with an aggressive incidents reporting instrument in psychiatric inpatient care. Inconsistent intervention use may arise because nurses were not ready for change in their practices as a group, but change happened only at the level of some individual nurses (MacRobert 2008). Yet, in order to provide patients with treatment of consistent quality, practices should be coherent between professionals (Coombs et al. 2013). Moreover, these realization rates might also indicate in general that changes in staff's behavior and adopting new working styles are time-consuming (Klein & Sorra 1996) and require better leadership (MacRobert 2008). Support for patiently maintaining implementation efforts (Repenning & Serman 2002) has been reported by Vojt et al. 2011, who described an increase in the realization of violence risk assessment rates in a forensic mental health setting from approximately 40% to 90% in a four-years' time frame. It might be that the outcome evaluation conducted in this study tells more about weaknesses in study design, more specific lack of follow-up in the intervention use, than about actual persistent challenges.

Two randomized controlled trials have shown a reduction in violent events (Abderhalden et al. 2008, van de Sande et al. 2011) and use of coercive methods (Abderhalden et al. 2008) as a result of a short-term violence risk assessment

intervention. However, many of the studies exploring violence risk assessment interventions have involved strong and frequent support from research teams, such as weekly (Ogloff & Daffern 2006) or even twice a day visits to the research wards (van de Sande et al. 2011). The clinical reality may be very different (Faay et al. 2013, Vojt et al. 2011) and changes in practices difficult to achieve (Michie et al. 2007). This study showed the complexity of the clinical reality when implementing a violence risk assessment intervention in psychiatric inpatient care. In order to gain the full utility and implement such interventions successfully, numerous aspects need to be taken into account. Likely some of the aspects are presented in this present study, and some are yet to be explored.

6.3 Impact of the study

Societal impact

Understanding

The information gained through this study can be used when patient-centered violence prevention and management initiatives are considered for use in inpatient psychiatric care. By developing a greater understanding of the experiences of violence and needs for clinical practice development of both nurses and relatives of mental health patients, it is possible improve the care of violent patients both at home and in hospital. Understanding patients' perceptions of this violence risk assessment intervention has increased as an outcome of this study.

Professionals in clinical practice need readiness to involve patients in violence prevention and training provided in this area. Courage to open the treatment practices for those it concerns can be recommended in light of the findings. Understanding treatment methods used is not only of interest to professionals, but also to patients in inpatient psychiatric care and their relatives.

Education

In order to offer high-quality and humane care psychiatric inpatient care, with limited use of coercive measures, the emphasis in nursing education needs to be on preventive methods. Changes in traditional practices in psychiatric inpatient care are often difficult to achieve. Thus, the emphasizes needs to be on continuing education, and other forms of dissemination, to root new practices in professionals' daily work. Violence risk assessment intervention is one method which can aid nurses in their violence prevention efforts. Although this intervention is described as quick and easy to use, its use to its full potential demands careful training. In addition, skills and

knowledge to involve mental health patients and their relatives in efforts of reducing violence need to be enhanced in nursing basic education and in continuing education.

Academic impact

Knowledge

This study produced new knowledge about the implementation of a violence risk assessment intervention in psychiatric inpatient care. As far as is known, this study gives the first description of using the Ottawa Model of Research Use (OMRU, Logan & Graham 1998) as a guiding theoretical framework in the field of mental health. The perspectives of nurses, mental health inpatients and their relatives were combined with evidence-based knowledge for promoting the implementation of the new intervention. These elements afforded diverse perspectives on inpatient psychiatric care regarding violence risk assessment.

Method and application

A detailed description of the implementation framework use with multiple data collection methods provides novel approaches for staff, patient, and family involvement in both research and translation of research findings into clinical practice. The need for national guidelines on violence risk prevention and management in general and forensic psychiatric inpatient care must be acknowledged.

Economic impact

Innovations

For clinical nursing specialists, nurse managers and directors of health professionals this study gives new knowledge on using a specific implementation framework in psychiatric inpatient care. Resources and managerial support are evidently needed in addition to a structured framework guiding the implementation. Assessment of problems and needs for new intervention, exploring the practice environment for implementation, and specifying the attributes of the intervention or any new working method to be implemented are important in planning a successful implementation process. Resources for identifying possible barriers and facilitators, targeting knowledge translation strategies to overcome the barriers and promoting the facilitators, and monitoring carefully the implementation process with ongoing support need to be ensured. Managerial patience is needed to evaluate the outcomes of the implementation in the long run and to revise the implementation plan if needed. The findings of this study also revealed the complexity of translating the research findings into clinical practice: interventions found to be well-functioning

and recommended in treatment guidelines do not always integrate into daily work as fluently as supposed.

Competitiveness

Professionals in psychiatric inpatient care are exposed to violence in their work, which is detrimental to their well-being. In order to respond to the turnover of health professionals and shortage in workforces in the coming years, violence prevention as an occupational hazard needs to be considered more efficiently, thereby ensuring one aspect of the competitiveness of health organizations as employers.

6.4 Suggestions for exploitation of the results

From the perspective of nursing science and in light of the results of this study, suggestions for the exploitation of the results are linked to more person-centered ways to execute and implement violence risk assessment interventions. The suggestions are as follows:

1. Designing and testing a systematic protocol for patient involvement in short-term violence risk assessment intervention.
2. Exploring the feasibility of patient involvement in actual risk assessment, in addition to sharing the assessment results with patients as in the present study.
3. Exploring more active utilization of mental health patients' expertise in the implementation process of a violence risk assessment intervention, to enable, for example, more effective patient recruitment for larger-scale studies where patients' informed consent to participate is required.
4. Exploring the long-term effects of violence risk assessment interventions involving patients in outcomes such as cost-effectiveness of care, patient health outcomes and satisfaction with care.

7 CONCLUSIONS

This study revealed and confirmed the complexity of patient violence in psychiatric inpatient care. When aiming to implement novel methods to prevent and manage patient violence, seeking for the experiences of those the phenomena specifically concerns are valuable. That way, combined with the best available research evidence, suitable interventions can be selected for implementation. The Dynamic Appraisal of Situational Aggression (DASA) implemented in the present study partially fulfilled the expectations set beforehand for its implementation. Obstacles to using it as reported in earlier research were found, both from the nursing staff's and patients' perspectives. However, novel areas for using this violence risk assessment intervention were also found. Patient involvement in short-term violence risk assessment may be the key to integrating the intervention into daily practice and using it to its full potential.

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APPENDICES

APPENDIX 1 Literature search

In order to review evidence-based methods to prevent and manage patient violence in inpatient psychiatric care, a literature search was conducted. The search included the following databases: the Cochrane Controlled Trials Register, the Cochrane Schizophrenia Group Register, Cinahl, Embase and Medline (May 2012, updated August 2015). The following search terms were used: *Aggress*, *Agitat*, *Impuls*, *Violen*, *Risk*, *Seclu*, *Tranquili*, *Crisis*, *Early Intervention*, *Involunt*, *Mechanical* *Restrict*, *Physical* *Restrict*, *Restrain*, *Secur*. The search was carried out by Trials Search Coordinator Farhad Shokraneh (the Cochrane Schizophrenia Group, University of Nottingham, the United Kingdom). The search resulted in total 624 references (August 2015).

To review relevant methods for this thesis, the following inclusion criteria were set: non-pharmacological method tested with randomized or quasi-randomized design, adult psychiatric (general or forensic) inpatient care (majority of patients having inpatient care or the largest group in the sample), patients' primary diagnosis psychotic disorder (majority of the patients or the largest group in the sample), and article available in English. Most of the studies identified concerned pharmacological methods. Pharmacological methods for preventing and managing patient violence are described briefly in this dissertation. In total eight studies met inclusion criteria and are elaborated in Appendix 2.

Additional literature searches were conducted in order to understand the main concepts of this thesis: people with severe mental illnesses, mental health hospital services and workforce, evidence-based methods to prevent and manage patient violence in inpatient psychiatric care, and implementation of innovations in psychiatric inpatient care. Searches were conducted in PubMed (Medline) database and in the Internet by using the Google search engine. Web-pages of relevant organizations were reviewed: the Finnish Ministry of Social Affairs and Health, the National Institute for Health and Welfare, the World Health Organization, the American Psychiatric Association and National Institute of Health and Care Excellence (UK). Manual searching was done from the reference lists of the publications identified.

APPENDIX 2 Description of the RCT studies on preventing and managing patient violence in psychiatric inpatient care

Author Year Country	Setting	Population (patients)	Intervention	Outcomes	Key findings
Abderhalden et al. 2008 Switzerland	Acute wards	Psychotic disorder ~ 32 %	Structured risk assessment (BVC) <i>Intervention:</i> n=4 wards <i>Control:</i> n=5 wards 3 months	Incidence rates of severe aggressive events, coercive measures	41% reduction in incidents and 27% in coercive measures. The severity of incidents did not decrease.
Bergk et al. 2011 Germany	Admission wards	Psychotic disorder ~68 %	<i>Seclusion</i> (n=12) or <i>mechanical restraint</i> (n=14) Follow-up 4 weeks	Restrictions of human rights, patients' point of view (Coercion Experience Scale)	No difference between in experiences score after seclusion or mechanical restraint.
Cullen et al. 2012 United Kingdom	Medium secure forensic hospital	Offenders Psychotic disorder, history of violence	Reasoning & Rehabilitation program <i>Intervention:</i> n=44 <i>Control:</i> n=40 36 two-hour sessions	Incidents of violence, antisocial behavior	Verbal aggression and leave violations reduced. Half of patients did not complete the program.
Huf et al. 2012 Brazil	Emergency psychiatric wards	Psychotic disorder ~80 %	<i>Mechanical restraint</i> (n=51), <i>seclusion room</i> (n=54) Follow-up 14 days	Compliance with procedure, not re-restrained or secluded by 4 h, time restrained, additional episodes, adverse events, satisfaction with care	Majority of secluded patients could be managed in this way. Starting with seclusion does not increase overall time in restriction. Patients more satisfied with care in the seclusion room.

Author Year Country	Setting	Population (patients)	Intervention	Outcomes	Key findings
Nurenberg et al. 2015 USA	State-run hospital	Psychotic disorder 76%, recent violent behavior	Animal-assisted therapy: <i>equine</i> (n=24) or <i>canine</i> (n=25), <i>active</i> (n=23) and <i>standard</i> (n=18) control group 5 months, 1 session/week	Violence, seclusion or restraints used, clinical and functional measures	Equine-assisted associated with reduced violence. The need for clinical observation reduced by equine and canine. No differences for seclusion and restraint.
Putkonen et al. 2013 Finland	State-run hospital	Psychotic disorder, history of severe violence	Six core strategies to prevent seclusion and restraint <i>Intervention:</i> n=2 wards <i>Control:</i> n=2 wards 6 months	Duration of seclusion and restraint, patient-days with seclusion, restraint, or room observation, physical violence	Patient-days with seclusion, restraint, and room observation declined, time of seclusion and restraint decreased. Incidence of violence decreased.
van de Sande 2011 Nether- lands	Acute wards	Psychotic disorders ~ 57 %	Structured risk assessment (Crisis Monitor) <i>Intervention:</i> n=207 <i>Control:</i> n=251 30 weeks	Aggression incidents, aggressive patients, seclusion incidents, secluded patients, seclusion duration	Aggressive incidents, patients engaging in aggression and seclusion duration decreased. Number of seclusions or number secluded patients did not decrease.
Haddock et al. 2009 United Kingdom	Mental health services	In-patients and out- patients Psychotic disorder, history of violence	Cognitive- behavioural therapy (CBT) <i>Intervention:</i> n=38 <i>Control:</i> social activity therapy n=39 25 sessions, 6 months	Aggression, violence, anger, psychotic symptoms, risk of violence (HCR-20)	Significant benefits were for CBT on violence, delusions and risk management.

APPENDIX 3 The Dynamic Appraisal of Situational Aggression



DYNAMIC APPRAISAL OF SITUATIONAL AGGRESSION



Centre for Forensic Behavioural Science

Name: _____

Week beginning: ____ / ____ / ____

	Monday <i>(Circle One)</i>	Tuesday <i>(Circle One)</i>	Wednesday <i>(Circle One)</i>	Thursday <i>(Circle One)</i>	Friday <i>(Circle One)</i>	Saturday <i>(Circle One)</i>	Sunday <i>(Circle One)</i>
The following ratings are based on your knowledge and observations of the patient during the PREVIOUS 24 HOURS. Well-known patients are scored a 1 for an increase in the behaviour described, the patient's usual behaviour while being non-violent is scored as 0.							
Irritability The patient is easily annoyed or angered. The patient is unable to tolerate the presence of others.	0 1	0 1	0 1	0 1	0 1	0 1	0 1
Impulsivity The patient displays behavioural and affective instability (i.e., dramatic fluctuations in mood, or general demeanour, inability to remain composed and directed).	0 1	0 1	0 1	0 1	0 1	0 1	0 1
Unwillingness to Follow Directions The patient tends to become angry or aggressive when they are asked to adhere to treatment or to the ward's routine.	0 1	0 1	0 1	0 1	0 1	0 1	0 1
Sensitivity to Perceived Provocation The patient tends to see other people's actions as deliberate and harmful; they may misinterpret other people's behaviour or respond with anger in a disproportionate manner to the extent of provocation.	0 1	0 1	0 1	0 1	0 1	0 1	0 1
Easily Angered When Requests are Denied The patient tends to be intolerant, or is easily angered when they make a request that is denied or when they are asked to wait.	0 1	0 1	0 1	0 1	0 1	0 1	0 1
Negative Attitudes The patient displays antisocial and negative attitudes and beliefs which may relate to violence and aggression.	0 1	0 1	0 1	0 1	0 1	0 1	0 1
Verbal Threats The patient displayed a verbal outburst, which is more than just a raised voice, and where there is a definite intent to intimidate or threaten another person.	0 1	0 1	0 1	0 1	0 1	0 1	0 1
Total	17	17	17	17	17	17	17
Final risk rating Based on the DASA score and clinical assessment rate (H) high, (M) medium or (L) low risk for the next 24 hours.							
Record of aggression During the previous 24 hours has the patient behaved aggressively in any of the following ways? (Please mark with a cross in the appropriate box)							
Physical Aggression against OBJECTS Slams door, throws objects down, kicks furniture, breaks objects, smashes windows, sets fires, throws objects.							
Verbal Aggression against OTHER PEOPLE Shouts angrily, insults, curses viciously, uses foul language in anger, or makes clear threats of violence to others.							
Physical Aggression against OTHER PEOPLE Makes threatening gesture, swings at people, grabs at clothes, strikes, kicks, pushes, pulls hair, or attacks others.							