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Safety hazards in patient seclusion events in psychiatric care: A video observation study

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ETHICAL STATEMENT

This study was approved by the Ethics Committee of Helsinki and Uusimaa Hospital District (12/13/03/2016). Written informed consent was acquired from the participants. Confidentiality was maintained throughout the entire study.

DATA AVAILABILITY STATEMENT

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

CONFLICT OF INTEREST

The authors JV, MV, TL, JB and ML declare no conflict of interest. Author PS works at the organization where the data collection was conducted. Therefore, PS did not participate in the data analysis.

STATEMENT OF CONTRIBUTION

All authors meet the authorship criteria set by the International Committee of Medical Journal Editors. MV, JB, and ML designed the study, JV, JB, ML and PS collected the data.

JV and TL analysed the data. All authors contributed to the drafting of the manuscript. All authors are in agreement with the submission of this manuscript.

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ABSTRACT

Introduction

Seclusion is used to maintain safety in psychiatric care. There is still a lack of knowledge on potential safety hazards related to seclusion practices.

Aim

To identify safety hazards that might jeopardize the safety of patients and staff in seclusion events in psychiatric hospital care.

Method

A descriptive design with non-participant video observation was used. The data consisted of 36 video recordings, analysed with inductive thematic analysis.

Results

Safety hazards were related to patient and staff actions. Patient actions included aggressive behaviour, precarious movements, escaping, falling, contamination, and preventing visibility. Staff actions included leaving hazardous items in a seclusion room, unsafe administration of medication, unsecured use of restraints, and precarious movements and postures.

Discussion

This is the first observational study to identify safety hazards in seclusion, which may jeopardize the safety of patients and staff. These hazards were related to the actions of patients and staff.

Implications for Practice

Being better aware of possible safety hazards could help prevent adverse events during patient seclusion events. It is therefore necessary that nursing staff are aware of how their actions might impact their safety and the safety of the patients. Video observation is a useful method for identifying safety hazards. However, its use requires effort to safeguard the privacy and confidentiality of those included in the videos.

Keywords: Psychiatric Emergency Nursing, Coercion, Safety and Security

ACCESSIBLE SUMMARY

What is known on the subject:

- Coercive measures such as seclusion are used to maintain the safety of patients and others in psychiatric care.
- The use of coercive measures can lead to harm among patients and staff.

What the paper adds to existing knowledge:

- This study is the first of its kind to rely on video observation to expose safety hazards in seclusion events that have not been reported previously in the literature.
- The actions that both patients and staff take during seclusion events can result in various safety hazards.

Implications for practice:

- Constant monitoring of patients during seclusion is important for identifying safety hazards and intervening to prevent harm.
- Nursing staff who use seclusion need to be aware of how their actions can contribute to safety hazards and how they can minimize their potential for harm.

RELEVANCE STATEMENT

This study provides new information on safety hazards in seclusion events in psychiatric care. The findings show that the actions of patients and staff can contribute to safety hazards during seclusion. Staff need to be aware of how their actions can contribute to safety hazards and how they can minimize their potential for harm. Monitoring secluded patients is important for identifying safety hazards and preventing harm. Video observation of seclusion events raises ethical issues regarding the confidentiality and occurrence of incidents and distress. In the future, more detailed standards are needed to ensure high quality care for secluded patients.

INTRODUCTION

Patient safety in seclusion practices is a challenging issue in psychiatric care (Shields, Stewart, & Delaney, 2018). Patient seclusion, which is often used along with physical and/or mechanical restraint, is used to maintain patient safety in events such as patient aggression (Gerace, & Muir-Cochrane, 2019). However, seclusion and restraints can be hazardous and result in harm (Knox, & Holloman, 2012; Mohr, Petti, & Mohr, 2003). For patients, these harms may include cardiac and vascular injuries (Kersting, Hirsch, & Steinert, 2019; Mohr et al., 2003), respiratory injuries (Barnett, Stirling, & Pandyan, 2012; Kersting et al., 2019; Mohr et al., 2003), and blunt trauma (Mohr et al., 2003), falls, self-harm (Kersting et al., 2019). Further, seclusion and restraints can potentially be experienced as traumatic events by patients, which diminishes their psychological safety (Larue et al., 2013). This can further cause psychological distress and posttraumatic stress disorder (Chieze, Hurst, Kaiser, & Sentissi, 2019; Kersting et al., 2019). Involvement in seclusion or restraint events may cause staff to incur, for instance, strains, sprains, fractures, bruises, and concussions (Renwick et al., 2016). In addition, staff experience anxiety and stress when they administer seclusion and restraints (Sequeira, & Halstead, 2004).

Identifying safety hazards is the prerequisite of preventing adverse events (Patient Safety Network, 2019). A *safety hazard* is defined as any source of potential harm, whereas *risk* is defined as the probability of an individual to be harmed (Canadian Centre for Occupational Health and Safety, 2020; Department of Health, 2000). An *adverse event* is defined as any harm resulting from [medical] care (Patient Safety Network, 2019). In the context of seclusion, a safety hazard can be any potential source of harm to a patient or staff member, for example, a slippery floor that causes patients or staff to fall and injure themselves. Various methods have been used to identify safety hazards in healthcare. Medical record reviews can be performed to search for triggers, scenarios or other significant incidents from a patient's medical history (Rafter et al., 2015). Incident reporting systems are also commonly used to identify safety hazards in healthcare environments (Pronovost, Cleeman, Wright, & Srinivasan, 2016). Both of these methods have their limitations in identifying hazards that do not cause harm as they

rely on voluntary reporting by staff who tend to underreport unclear cases, which might lead to an underestimation of the magnitude of the problem (Battles & Lilford, 2003; Pham, Girard, & Pronovost, 2013).

Observation methods are suggested to complement other methods in the identification of hazards (Battles, & Lilford, 2003; Michel, 2003). Video observation is a promising method for identifying safety hazards (Andrews et al., 1997; Battles, & Lilford, 2003) in high-risk environments (Yanes et al., 2016). The advantage of indirect video observation over direct in-person observation is that video observation does not require the physical presence of a researcher. In-person observation only captures those aspects that the observer experiences and makes notes of, while a video can record aspects that might otherwise go unnoticed or undocumented. Further, video can be revisited as many times as necessary, which can improve the identification of subtle aspects of safety hazards (Yanes et al., 2016). We identified some previous studies where video observation had been used for patient safety research. These studies were conducted mostly in surgical settings (Bazzi, et al., 2019; Kolodzey, Trbovich, Kashfi, & Grantcharov 2019; Korkiakangas 2017; Rowland et al., 2014; Rydenfält, Johansson, Odenrick, Åkerman, & Larsson, 2013). Most of these studies focused on factors that can affect patient safety, like how well safety measures are followed. Only two of the studies specifically investigated safety hazards or risks to patient safety, i.e., transfer-related falls in long-term care (Vieria, et al., 2014) and system factors that threaten patient safety in laparoscopic surgery (Kolodzey et al., 2019). None of the studies used video observation to identify safety hazards for patients or staff, and none of the studies were conducted in psychiatric settings.

To date, research on safety hazards and patient safety in events of seclusion and restraints in psychiatric care has focused on narrow aspects of safety and specific hazards or adverse events (Kersting et al., 2019; Rakhmatullina, Taub, & Jacob, 2013). Qualitative research has identified patients feeling vulnerable to staff abuse, self-harm and human rights violations (Askew, Fisher, & Beazley, 2019). Staff experiences include risk of injury from using seclusion and restraint (Vedana et al., 2018). Research on the use of mechanical restraints has focused on the physiological aspects, risk of thromboembolism (Barnhorst, & Xiong, 2014; Brendan, Dickinson, & Pollanen, 2009; Stefanovic, Kuzmanovic, & Stefanovic, 2013) and deep vein thrombosis due to prolonged immobilization (Ishida et al., 2014; Lauersen, Jensen, Bolwig, & Olsen, 2005; Wilkowska, Kujawska-Danecka, & Hajduk, 2018). Research related to safety hazards in seclusion events is very limited. Presumably, only one study has included data on seclusion-related risks. James, Stewart, Wright, and Bowers (2012) studied self-harm in adult

inpatient psychiatric care and identified that a small amount ($n = 16$, 3.6%) of self-harm occurred during seclusion. Therefore, research with new methods, such as video observation, is needed to identify the safety hazards present in seclusion events that previous studies may not have identified (Kersting, et al., 2019).

The movement to end the use of seclusion and restraint has been made evident in research (Goulet, Larue, & Dumais, 2017) and practice (Vruwink et al., 2012). Aspirations to reduce these interventions are supported by international recommendations (Council of Europe, 2019; United Nations, 2008). The negative effects and risk of harm from physical restraint (Kersting et al., 2019) have led to the development of risk assessment models for risk of injury to the patient from physical restraint (Hollins, 2010). However, a model to be used to predict safety hazards in patient seclusion has not yet been developed. Still, safety hazards that might jeopardize patient and staff safety during seclusion events need to be identified to manage the risk and improve safety in these situations. It has been shown that seclusion may be harmful to patients (Barnett et al., 2012; Chieze et al., 2019; Kersting et al., 2019), but the safety hazards for these negative outcomes are not known (Kersting et al., 2019). Despite the negative consequences and unfavourable outcomes of seclusion, the use of these interventions has not yet been eliminated. According to nursing staff, seclusion is necessary even if alternatives exist (Gerace, & Muir-Cochrane, 2019), despite nurses feeling frustration and regret when they resort to using seclusion (Happell & Koehn, 2010). The use of seclusion may be firmly rooted in clinical traditions, policies and societal attitudes (Raboch et al., 2010; Hotzy et al., 2019). Regardless of the efforts to reduce seclusion, as long as these practices are still being used, it is important to assess their impact on patient and staff safety. Using video observation data, we aimed to identify all safety hazards that might jeopardize patient and staff safety during seclusion events. The knowledge produced by the current study can be used to develop safer practices and help minimize harm in seclusion practices.

METHODS

Design

A descriptive observation design was chosen because the study aimed to provide a straightforward description of the phenomenon: what safety hazards occur during patient seclusion events. Minimal interpretation is used in descriptive designs, which allows for more

accurate data (Neergaard, Olesen, Andersen, & Sondergaard, 2009). This can describe the phenomenon in an actual setting, free of bias from the accounts of the individuals involved (nurses, patients) (Mays, & Pope, 1995). The non-participant video-based observation approach was chosen because, due to ethical and practical reasons, external observers are not allowed access to seclusion events (Bezemer et al., 2017). The study is reported based on the Standards for Reporting Qualitative Research (SRQR), which offers trustworthiness and thorough documentation of the study (O'Brien, Harris, Beckman, Reed, & Cook, 2014).

Setting

The study was conducted in one psychiatric hospital in Southern Finland with a catchment area of approximately one million inhabitants. The hospital provides care especially to forensic patients and patients difficult to treat due to symptom severity. The data were collected in six closed psychiatric wards: one psychogeriatric ward, two forensic psychiatric wards, two acute psychiatric wards, and one psychosis rehabilitation ward. These wards were included in the study as they use seclusion and restraint to manage patient aggressive behaviour, and they already used automatic video recording systems in seclusion rooms in regular practice. According to Finnish legislation (Mental Health Act 1116/1990), a patient can be secluded during involuntary admission to ensure the safety of the patient, staff, and other patients. In seclusion, the patient is placed in a room designed for this purpose. If deemed necessary, the patient can also be restrained chemically, physically, or mechanically to a bed with belts and straps. This type of restraint bed may be used when transferring a patient to a seclusion room or a different room designed for use of mechanical restraints only. In the latter case, the bed is usually bolted to the floor. The decision to use seclusion and restraints is made by a physician. However, in situations where there is no time to consult a physician (e.g., an immediate violent outburst that cannot be handled with de-escalation or another less restrictive practice), the nursing staff may implement seclusion and restraints, with a physician being informed immediately afterwards (Mental Health Act 1116/1990, 22§ 21.12.2001/1423).

Sampling and recruitment

The study sample consisted of video recordings (video without audio) of seclusion rooms, where patients were secluded or restrained and/or healthcare staff were visible in the seclusion

room. In this study, the term *staff* can refer to nurses, physicians, laboratory personnel (e.g., lab nurse, phlebotomist, biomedical laboratory scientist taking samples and tests), or other healthcare professionals, as identifying specific professions in the recordings was not always possible.

For recruitment purposes, information sessions were organized for staff on 24 and 25 October 2016. The information sessions were held by ML and JB. Staff were given oral and written information about the study and the opportunity to ask questions. Informed consent from staff was acquired after the information sessions. After seclusion, the staff first filled out a form for each patient indicating whether the patient had been secluded and the reason for and duration of the intervention. Later, during a standard debriefing on seclusion, patients were given written and oral information about the study and what it would mean to participate. Staff evaluated whether the patients fulfilled inclusion criteria (age ≥ 18 , able to provide written informed consent). Patients were excluded if they were under the age of 18 or if they were on the study ward only for seclusion. Patients who were determined to be unable to provide informed consent due to impaired cognitive function or negative or positive symptoms were also excluded (Sugawara, Yasui-Furukori, & Sumiyoshi, 2019).

Data collection

The data were collected between 6 November 2016 and 30 March 2017. The data collection method was indirect non-participant video-based observation. A “bird’s eye” perspective was possible with ceiling mounted cameras, which offered a video picture of the whole seclusion room. Video recording captures events without the researcher’s presence (Booth, Davidson, Winstanley, & Waters, 2001). It offers rich, objective data (Latvala, Vuokila-Oikkonen, & Janhonen, 2001) with non-intrusive methods (Asan & Montauge, 2014). Videos can also capture aspects that could otherwise go unnoticed in systematic observation (Garcez, Duarte, & Eisenberg, 2011). Further, as events of seclusion do not occur at specified times and their durations vary, video-based observation is suitable for data collection as it allows for continuous collection of data.

Each hospital ward had a contact person (a nurse) to monitor and inform about the eligibility of each video recording to be included in the data. These persons participated in a one-day training session, which consisted of the basics of conducting research (e.g., informed consent

procedure, ethical aspects, monitoring data collection). The nurses also received a booklet of the research to guide them through each phase of the study. The wards were contacted via phone every week, whether there had been new seclusion events or not. To attain suitable video recordings, the hospital's technical staff were informed to extract specific video segments and save them on an external hard drive. The researchers (JB and ML) picked up the hard drives from the hospital monthly.

Data analysis

Thematic analysis was used. It is a flexible method for analysing various types of qualitative data (Nowell, Norris, White, & Moules, 2017). Thematic analysis has been successfully used in video observation studies to describe actions in different treatment settings (e.g., nursing interventions in adolescent psychiatry [Beukers et al., 2015] and recognition and treatment of out-of-hospital cardiac arrest [Linderoth et al., 2015]). An inductive approach was selected so that themes could be identified from the data without the constraints of existing theory or frameworks (Thomas, 2006). Inductive approaches are rarely used without acknowledging prior research, concepts and theory (Morse, & Mitcham, 2002). Regarding this study, we acknowledged the prior research on adverse effects of restraints (Kersting et al., 2019). However, the codes and themes emerged from the data, and they were not guided by prior findings. As the data was limited to videos without audio, rendering the analysis of latent content impossible, only manifest content was analysed.

The data comprised video recordings ($n = 36$) of seclusion events. To describe what happened in the events, the videos were transcribed into text format. A deductive approach was used for transcription; only pre-defined aspects of the video recordings were transcribed (Bailey, 2008). The transcribing was conducted by three researchers (JV, JB and ML). Video recordings were watched with specific software (TruVision Navigator Player 5.0). They were transcribed using the framing of the following questions: “what is happening?”, “who is present in the video?”, “where and how are they located?”, and “what are they doing?”, and any other detail that was considered important with regards to the research questions was included. The transcription process resulted in a total of 400 pages (range 2–79) of text (Times New Roman, font size 12, spacing 1).

A coding guide is suggested when analysing observational studies (Asan & Montauge, 2014). Therefore, a codebook was developed as described by Ando, Cousins, and Young (2014); Fonteyn, Vettese, Lancaster, and Bauer-Wu (2008); and DeCuir-Gunby, Marshall and McCulloch (2011). The codebook provides a tool for operationalising codes and improving the consistency of the coding process (DeCuir-Gunby et al., 2011). Electronic software Nvivo 12 (QSR international 2017) was used to facilitate codebook development.

First, transcripts of three video recordings were randomly chosen and coded inductively for safety hazards to patients or staff (Fontey et al., 2008). Time stamped events were used as units of analysis (Syed, & Nelson, 2015) (for example, 04:32:22 “*the patient stands up, massages his knees and go to the toilet, takes and puts his jacket on, stands in front of the toilet*” 04.33.20). The coding was separately conducted by two researchers (JV and TL). Codes were generated loosely at this point, so that meaningful information was not lost (Ando et al., 2014). After coding, each coding decision was discussed. This initial step towards the creation of the codebook was to ensure the reliability of the codebook (McAlister et al., 2017).

Second, another three randomly chosen recordings were coded as before. This was to identify codes that previous video recordings did not include, and thus to improve the reliability of the codebook. All coding decisions were then discussed. Each code was given a definition, meaning, inclusion and exclusion criteria and example from the data to form the initial codebook (Fonteyn et al., 2008). An example of the codebook is presented in Table 1, and the entire thematization table is presented in Appendix 1.

Table 1. Codebook example

Code	Code definition	Meaning of code	Inclusion and exclusion criteria	Example of data
Striking a hard object	Striking a hard object with part of the body	There is a risk of injury when striking a hard object	incl. The patient or staff strikes the wall, steel bed, door, etc. with any part of his body excl. The patient or staff punches or kicks the air or a soft object, such as a mattress	“ <i>The patient walks to the door, kicks and punches it with both of his hands and legs</i> ”

Third, the codebook was used to code another three randomly chosen video recordings (Fonteyn et al. 2008) by two coders independently. After coding, the reliability of the codebook was assessed with two methods. The Percent Agreement (Miles, & Huberman, 1994) was calculated by dividing the number of agreements by the number of agreements and

disagreements. This resulted in a agreement of 95.5%. Cohen's Kappa was also used because it considers chance agreement (Cohen 1960). A score of 0.80 or higher is acceptable in most studies (Lombard, Snyder-Duch, & Bracken, 2002). The Kappa value was 0.808. The codebook was further refined.

Fourth, the refined codebook was used to code another three randomly chosen video recordings. The reliability was assessed again, with the same methods (Percent Agreement and Cohen's Kappa). This resulted in a agreement of 97.7% and a Cohen's Kappa of 0.948, which can be regarded as almost perfect (Lombard et al., 2002). Next, the remaining video recordings ($n = 24$) were coded by two coders using the codebook. At this point, new codes still emerged. New codes were discussed, and the codebook was updated accordingly.

Fifth, themes were formed using visual representation (mind maps) to combine codes, form themes and consider the relationships between codes and themes (Nowell et al., 2017). The names of the codes were refined at this point to represent the data. The thematization is presented in Figure 2.

Ethical considerations

The research proposal was assessed by the ethical committee. The Regional State Administrative Agency and the Office of The Data Protection Ombudsman also evaluated the study protocol and practical arrangements regarding the video recording of seclusion events. A steering committee was organised, which consisted of members of the research organisations to oversee that the study was conducted with high ethical standards and according to the hospital rules. In addition, a representative of a nursing association (Tehy: The Union of Health and Social Care Professionals in Finland) was present in the project group meetings during the data collection to ensure that the rights of the staff were respected and protected during the study.

Individuals with psychiatric disorders who are secluded in inpatient care are a vulnerable population as they have diminished capacity to make decisions (Bond Sutton, Erlen, Glad, & Siminoff, 2003). Therefore, specific efforts were made to ensure that their rights were protected. As patients were not competent to give their informed consent during seclusion periods (Bond Sutton et al., 2003; Richards, & Schwartz, 2002), their consent was acquired retrospectively; retrospective procedure of acquiring informed consent has been published in

previous studies (Bergk, Einsiedler, Flammer, & Steinert 2015; Dib et al. 2021). Patients' capacity to provide informed consent was assessed by a physician during the standard debriefing of the seclusion event. The data were excluded from the analysis if patients' informed consent was not obtained.

Before the data collection, informed consent was acquired from all staff members who were working on the study wards or might be included in the video recordings of the seclusion events. This included temporary staff, staff from neighbouring wards and physicians on duty. This was done because it was not possible to anticipate which staff members would be included in each video recording. Another reason was that researchers were not available on study wards during the data collection. In cases where informed consent was not obtained from a staff member, the data were excluded from the analysis.

Incidents and patient distress were identified in the video recordings. Due to the nature of seclusion, video monitoring and recording were standard safety procedures on our study wards. In our study protocol, we stated that if any incident occurred involving unethical actions towards patients, it would be officially reported to hospital executives responsible for patient care. As researchers did not observe the recordings immediately after the seclusion events, the delay between recording of the video and the data analysis varied between three and six months, and any possible incidents would be identified months after their occurrence. During the data analysis, one event was reported to the director of nursing and the chief physician of the hospital. Incidents were not reported outside of the study organisation as according to the Finnish National Board on Research Integrity (TENK) reporting of incidents is only mandatory if researchers identify the planning of a serious offence that can be prevented (TENK, 2019). In addition, The Criminal Code of Finland (563/1998) describes that researchers are not obliged to report offences that have already occurred.

To ensure data security and to safeguard the privacy of participants included in the video recordings, the video recordings were processed by the technical staff of the study organization to remove all patient information before transferring them to separate hard drives. Only video recordings for which participants had given informed consent were extracted. The hard drives were only given to the lead researcher (ML). Two computers were reserved for watching the video recordings, these computers were only used for this purpose, and they did not have an internet connection. The computers and hard drives were stored in a locker behind locked doors. Only the researchers who watched the video recordings (JV, JB, ML) had access to the

computers. The data were stored according to the study organisation's data management requirements. The video recordings were destroyed by the study organization after the data analysis.

RESULTS

Characteristics of the data

During the data collection period, 247 seclusion events occurred. Out of these 247 video recordings, seven were missed due to human error and two due to technical issues. Further, 11 video recordings were excluded because the patients involved were from a different ward. For 101 video recordings, a physician evaluated that patients were not able to provide informed consent for their data to be used in the study, and 90 events were excluded due to refusal (57 patients, 25 staff, 8 both). Thus, our data consisted of 36 video recordings (Figure 1).

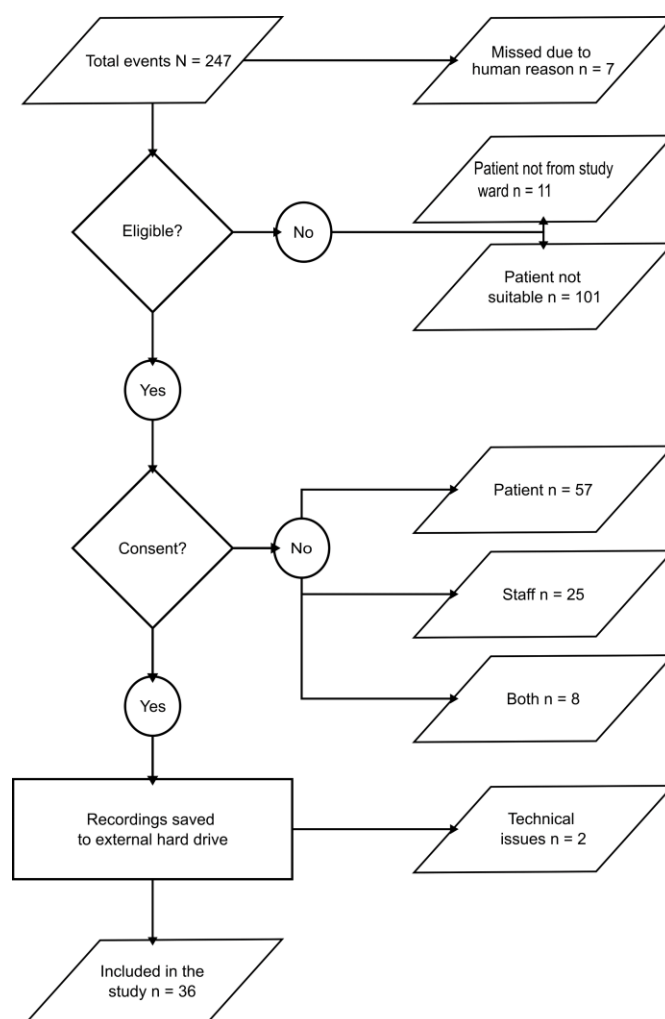


Figure 1. Flow chart of data formation

Description of the data

The most common reasons for seclusion included patients harming others ($n = 14$, 39%) and self-harm ($n = 11$, 31%). About two-thirds of the events ($n = 21$, 58%) lasted between 11 and 24 hours. The shortest duration of video recording was 2 hours and 25 minutes, while the longest recording lasted for 462 hours (Table 2).

Table 2. Characteristics of data ($N = 36$)

Characteristics	<i>N</i>	(%)	Mean	(SD)	Range
Reason for coercive measure ($N = 36$)					
Harm to others	14	(38.89)			
Self-harm	11	(30.56)			
Encumbering treatment of others	9	(25)			
Self-endangerment	2	(5.56)			
Duration in hours ($N = 36$)					
0–10	5	(13.89)	5.78	(3.39)	2.42–10.17
11–24	21	(58.33)	15.71	(3.87)	11–23.83
25–48	3	(8.33)	32.75	(6.50)	26.33–39.33
48 <	7	(19.44)	180.74	(139.66)	53.33–462.00

Safety hazards for patients and staff during seclusion

Two major themes were identified: patient actions and staff actions can lead to safety hazards. The occurrence of codes in each of the video recordings is presented in Appendix 2 and Appendix 3.

Patient actions

Six sub-themes were formed to describe safety hazards for patients and staff during seclusion and mechanical restraint: aggression, precarious movements, breaking free, falling, contamination, and preventing visibility.

Aggression

Aggression can lead to safety hazards for patients and staff. Patients expressed aggression towards the staff by assaulting or attempting to assault them by punching, pushing or throwing items. *“The patient becomes agitated and starts yank and push the nurses.”* Patients also grabbed staff as the staff were leaving the seclusion room. In addition, patients sometimes directed aggression towards themselves. They hit hard objects, such as doors, walls, a sink, a toilet, cameras, and windows. The patients also hit themselves, scratched themselves, kept objects in their mouth and risked suffocation. On one occasion a patient was strangling himself. Another serious behaviour involved hitting one’s head against the wall, sometimes for a long period, causing harm to the patient. *“The patient goes to the window and starts hitting his head against the window.”*

Precarious movements

Various movements that can contribute to hazards were identified during the seclusion events. There were examples in the data of these movements causing harm to patients. These movements consisted of hand standing, jumping over objects, and climbing. *“The patient looks to the ceiling and tries to climb to the window board holding on to the window frames.”* They can be dangerous in seclusion situations if patients are self-destructive, or heavily medicated. Patients also rolled on the floor, even for hours, which led to visible injuries on their limbs. Furthermore, the patients also twitched with seizure-like movements whilst laying on the floor; sometimes purposefully, sometimes involuntarily.

Escaping

Patients attempted to escape the seclusion room. Patients tried or managed to escape when staff were leaving the room, for example, by putting their fingers in the doorway in an attempt to pry the door open. When staff were closing the door, sometimes patients tried to pull it open against the staff. Furthermore, staff are exposed to injury when holding a patient who is forcefully resisting physical restraint. *“The patient is moving his upper body, and grabs a hold of the nurse’s pants who is laying over his legs.”*

Patients attempted and managed to escape from mechanical restraint straps by forcefully moving up and down, side to side, and reaching out while being restrained with mechanical restraint straps in an attempt to break free, causing tension in their limbs, joints and skin. *“The patient moves and is able to get his right hand free from mechanical restraint straps and attempts to pull his other arm out too.”* Patients trying to break free of mechanical restraints

ended up in dangerous positions, like hanging with their head down from the bed, while still being partly mechanically restrained.

Falling

Patients were at risk of falling during seclusion. Falls and instances that could have caused falls were identified as events that led to harm. Patients visibly lost balance on many occasions. This was highlighted in situations where they had received medication *“The patient attempts to get up, but is wavering, he gets up and knocks on the door. The patient wavers back and forth and backs in the centre of the room.”* Patients also stumbled on things, such as a mattress, bedding or other objects in the seclusion room. Furthermore, patients slipped on the floor when it was slippery from food, drink or bodily fluids.

Contamination

Patients spread contaminants to the floor, either intentionally or unintentionally, by splashing liquids or spreading food. They were observed urinating on the floor, masturbating, throwing drinks, and splashing water from the sink and toilet. *“The patient throws the pillow over the food and starts to roll on the floor, swinging his arms, the mattress falls to the floor and the patient is rolling over the food.”* Furthermore, patients exposed themselves to contaminants by eating food from the floor, being close to faeces or urine, sniffing or licking the toilet and floors, and drinking toilet water.

Preventing visibility

Patients prevented or attempted to prevent visibility to the seclusion room. For example, patients hid behind the door when staff entered the room. Patients also blocked visibility by covering the camera with food, liquids, paper plates or toilet paper. *“The patient walks to the camera and, with his hand, puts porridge on the camera lens.”* In addition, patients attempted to remove the camera, which would hinder staff’s visual connection to the seclusion room. Patients also blocked the door with their mattresses, so that staff could not enter the seclusion room swiftly.

Staff actions

For nurses, four sub-themes (leaving hazardous items out, unsafe administration of medication, unsecured use of restraints, precarious movements and postures) were formed to describe staff actions that can contribute to safety hazards for patients and staff.

Failing to put away hazardous items

Sometimes, the environment would be made potentially dangerous for staff and patients when hazardous items were not properly put away and came into the possession of patients. These items included cleaning equipment, such as washing liquids, hard-plastic food trays, and clothing items, such as belts and bras; such can be used for self-harm or weapons against staff. *“The nurse leaves the food tray on the soft-cube.”*

Unsafe administration of medication

Safety hazards were identified in the administration of medication to patients. Staff performed injections without disinfecting the patient’s skin (against the guidelines of the study organization), potentially increasing the infection risk. Staff gave a patient medication that had been dropped on the floor and was thus contaminated. *“Medication falls on the floor and the nurse picks it up and puts it in the patient’s mouth.”* Sticking hazards occurred when a staff member stuck a syringe into a patient’s eye. Staff gave oral medication to an unresponsive patient. Staff also left unresponsive patients to sleep on their back.

Unsecured restraints

Restraints were sometimes used in unsecured ways. Staff were observed using unsafe physical restraint techniques. In these situations, the staff roughly handled patients, causing unnecessary strain to their bodies. Physical restraining was performed when the patient was in supine or prone position, which can be dangerous, especially if pressure is applied. *“Two nurses hold a patient’s arms, one nurse lays on the patient’s back, and a fourth nurse holds the patient’s legs.”* During physical restraining, there were sometimes either too few or too many staff members present. Staff had difficulties applying mechanical restraint straps to the patient, leading to unsafe situations. Some of the staff often operated mechanical restraint straps alone, without the presence of another staff member.

Precarious movements and postures

Interaction between staff and patients became precarious when staff positioned themselves close to the patient during a seclusion or restraint event. Staff members were frequently alone

with a patient in the seclusion room. *The nurse opens the door and goes next to the patient and talks to him...*” Sometimes they positioned themselves so that their exit was blocked by the patient. Staff would sometimes kneel close to or lean over a patient lying on the mattress which made the staff vulnerable to assault. On occasion, staff would touch a sleeping patient which would startle them. This can be dangerous if the patient is aggressive. During seclusion and mechanical restraint events, staff would sometimes ignore possible patient aggression or maintain contact with a patient who had shown signs of aggression. Furthermore, some staff would lift a patient or a mattress with a patient lying on it in an unergonomic manner or with too few staff members, which can be hazardous. *“Nurses 1 and 2 lift the patient in the air by his armpits.”*

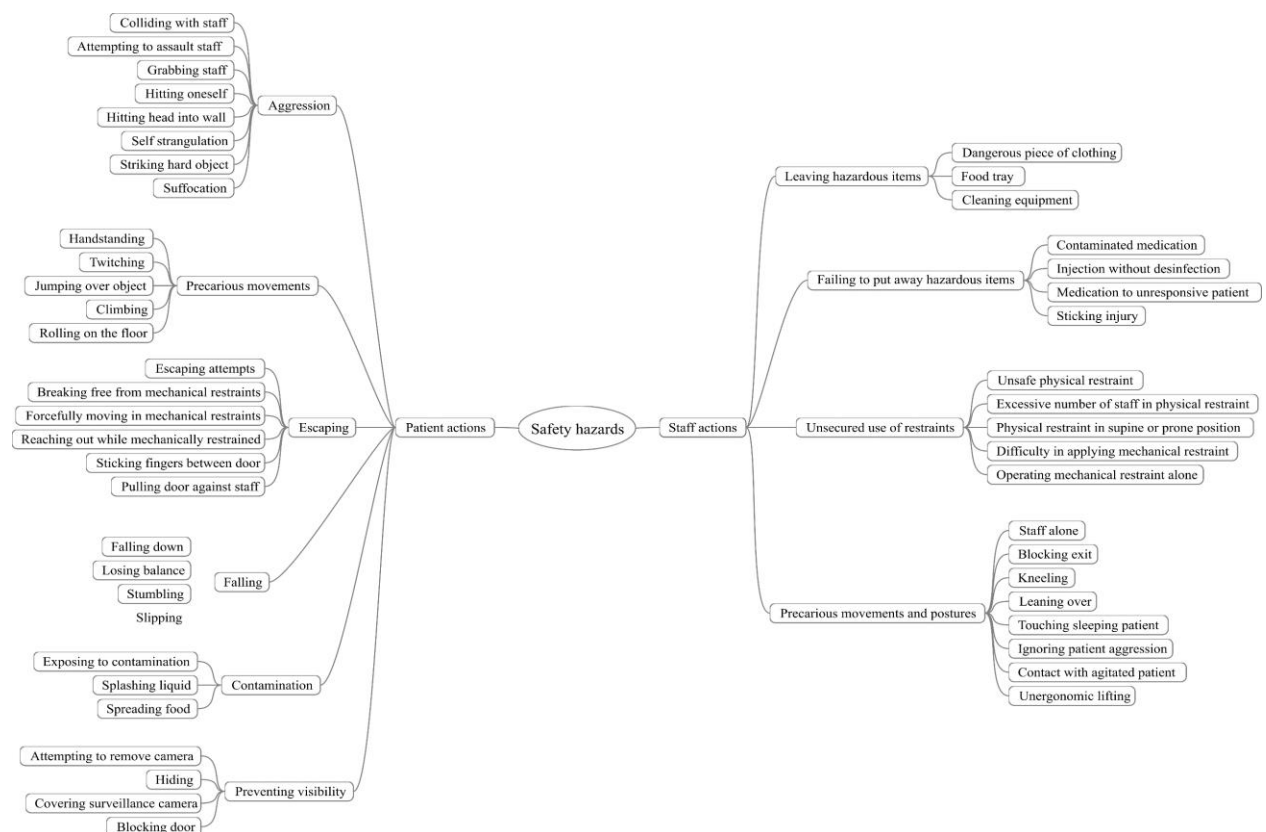


Figure 2. Thematic map of safety hazards

DISCUSSION

Previous studies have identified that the use of seclusion and restraints can result in physical and psychological harm to patients (Chieze et al., 2019; Kersting et al., 2019) and staff

(Renwick et al., 2016). However, especially regarding seclusion, existing evidence on adverse events is limited (Kersting et al., 2019), and knowledge of the safety hazards that can lead to these adverse events is even more limited. Presumably, our study is the first observational study of safety hazards during patient seclusion events in psychiatric hospital care. Based on our video analysis, we were able to identify various safety hazards, many of which have not been previously identified in the existing literature.

We identified worrying safety hazards, which can jeopardize nurses' and patients' safety during seclusion periods. We can only speculate on the reasons for this finding. Reason (2008) presented in his work that nurses and other healthcare professionals may have dangerous illusions of control, invulnerability, and superiority, which may lead them not to follow safety rules. In this study, it appeared as if some of the nurses acted as if they would be safe in seclusion. They used precarious movements and postures, as well as leaving items that could be used as weapons towards them in the seclusion room. Other reasons may include high workloads, working conditions, and organizational or socio-psychological conditions affecting compliance to safety (Eklöf, Törner, & Pousette, 2014). It has been proposed that enhancing safety climate is one way to improve safety compliance (Lin, Lin, & Lou, 2017; Vogus, 2016). Isaak et al. (2016) found, in their intervention study aiming to improve safety climate, that a 3-day training programme for staff in closed psychiatric hospital wards significantly improved communication about safety issues, decreased aggressive incidents, and improved the sense of safety.

We also identified errors in the administration of medication during patient seclusion events. Previous studies related to patient safety in mental health settings have also identified medication errors as one cause for harm to patients (Thibaut et al., 2019). The reason behind staff errors in the administration of medication was explored in a qualitative research. These errors, which manifested as mistakes by the staff, had their origin in system-level failures (Keers et al., 2018). Patient Safety Leadership WalkRounds could be one way to address the safety hazards regarding the use of seclusion, including errors in the administration of medication. They have been demonstrated to improve safety climate in various healthcare settings (Schwendimann et al., 2013; Sexton et al., 2014; Sexton et al., 2018), including psychiatric care (Ashton, 2014). Evidently, the phenomenon of errors in seclusion requires additional attention from the managerial level.

Aggression and violence are the major reasons that lead staff to use seclusion and restraints (Gerace, & Muir-Cochrane, 2019). In our study, patients were hitting and kicking the walls, doors and other hard surfaces. Some patients hit themselves, even their head, against a wall for hours in some cases. This finding is worrying because seclusion and restraints are used in response to patients' self-aggression in an attempt to keep them and others safe (Haugom, Ruud, & Hynnekleiv, 2019;). The questions of whether seclusion and restraints are suitable for patients who self-harm and how these interventions that aim to keep patients safe can still result in self-harm should be more carefully considered (Gerace, & Muir-Cochrane, 2019). Our observation identified various ways patients can harm themselves while in seclusion. Therefore, our study showed that more vigilant observation is needed during the patient seclusion period (Janofsky, 2009). Less intrusive interventions to reduce self-harm have also been endorsed by patients and staff. These methods, such as harm-reduction and therapeutic interventions should be considered before the use of seclusion and restraints (Hosie, & Dickens, 2018).

Precarious patient movement and behaviour were identified in this study. This behaviour was not regarded as aggressive or self-destructive by nature but had the potential for harm to the patient. These movements might have been symptom related. This kind of challenging behaviour is often considered to be abnormal behaviour with such intensity, frequency or duration that the physical safety of the patient and others are compromised (Emerson, 1995). The behaviour can be unrelated to psychiatric disorders but can also be the manifestation of one (Xeniditis, Russell, & Murphy, 2001). As the approach of nursing staff to challenging behaviour is often biomedical, challenging behaviour is believed to stem from the mental illness of the patient and is addressed with restraints and medication (Mellow, Tickle, Gresswell, & Jakobsen, 2018). Other therapeutic and behavioural approaches can be effective in reducing challenging behaviour, such as anger management and mindfulness programmes or staff training programmes for disruptive behaviour (Tolland, et al., 2019). It is important to observe patients' precarious movements during seclusion and intervene whenever safety is compromised.

Unsecured use of restraints during seclusion events was identified in the study. This involved, for example, physically restraining patients in prone position with abdominal compression. It has been previously concluded that physical restraining in the prone position can lead to adverse physiological effects (Barnett et al., 2012). However, conflicting results also exists, in which no association between physical restraining positions and patient and staff injury has

been found (Lancaster, Whittington, Lane, Riley, & Meehan, 2008). An excessive number of staff were involved in some of the restraining situations in this study. This can cause unnecessary pressure on the patient's body and make it difficult to notice subtle changes in the patient's physical state. In addition, in a previous study, patients expressed concern about the high level of force used by multiple staff members (Brophy, Roper, Hamilton, Tellez, & McSherry, 2016). A study by Southcott and Howard (2007) found no significant difference in staff safety between physical restraint events involving more than and less than three staff members. The NICE (2015) guideline *Violence and aggression: short-term management in mental health, health and community settings* states that there needs to be an adequate number of staff to overwhelm the patient safely. The guideline also proposes that all staff receive training on using seclusion and restraints. However, in reality, staff may not be sufficiently trained to use mechanical restraints (Barton-Gooden, Dawkins, & Bennett, 2015). This should be addressed since the improper use of mechanical restraints can result in death (Berzlanovich, Schöpfer, & Keil, 2012).

The identification of safety hazards in clinical practice is important because they can lead to adverse events and harm (Patient Safety Network, 2019). The consequences of such events are significant in terms of costs (Kjellberg et al., 2017), lives lost, disabilities (Kersting et al., 2019) and psychological trauma (Kable, Kelly, & Adams, 2018). Given the various safety hazards identified in this study, the harm reported in previous studies (Kersting et al., 2019), and the questionable effectiveness of seclusion and restraints (Chieze et al., 2019; Nelstrop et al., 2006; Sailas, & Fenton, 2000), a focus in clinical practice should be on reducing the use of these coercive measures (Bowers 2014; Gerace, & Muir-Cochrane, 2019). Reducing the use of coercive measures has not been reported to increase patient or staff injury (Putkonen et al., 2013; Smith, Ashbridge, Davis, & Steinmetz, 2015). These measures should be used only as a last resort (NICE 2015) and always followed with a post-seclusion and post-restraint review (Goulet, Larue, & Lemieux, 2018).

There is a strong will to reduce and eliminate the use of seclusion and restraints, and advancements have been achieved with interventions such as Safewards (Dickens, Tabvuma, & Frost, 2020) and Six Core Strategies (Duxbury et al., 2019). As long as seclusion is still used, the safety of patients and staff need to be considered. In this study, safety hazards in the use of seclusion were identified using video observation, a method that has not previously been used in safety research in a psychiatric setting. Video observation is a promising method for assessing clinical processes and identifying subtle safety hazards (Yanes et al, 2016). However,

data collected with video observation is limited by the degree to which patients and staff consent. It is possible that distress, adverse events and safety hazards can occur in the video recordings for which patient or staff consent has not been acquired. Different strategies could be used to increase the degree of consent from patients and staff. In this study, we gave patients and staff the opportunity to view the video recording they were in by request. No patient or staff member requested to see their video. It is worth considering whether patients and staff would be keener to consent if they view the video recording in which they appear.

Video observation could be used as the basis of simulation education of staff (Asan & Montague, 2014). Furthermore, video observation-based interventions could be implemented to prevent adverse events. A study by Davis and Carter-Templeton (2020) implemented a video observation intervention with two-way communication to prevent falls in an orthopaedic unit with a 100% decrease in falls. Similar interventions could be implemented in seclusion rooms of psychiatric hospitals.

What the study adds to existing research

This study provides new evidence by identifying safety hazards that occur during patient seclusion in psychiatric hospital care using video recordings. The origins of these hazards were found to be the actions of both patients and staff. Nursing staff who use seclusion need to be aware of the hazards that can occur during patient seclusion. Further training of staff should involve critically assessing one's actions using reflection techniques, and one's own contribution to safety hazards. Staff need also to be aware of patients' actions that can contribute to safety hazards and, based on this awareness, try to minimize the potential for harm. Video monitors must be followed constantly during patient seclusion to ensure patient safety.

LIMITATIONS

The major limitation of this study is that the video recordings included no audio track, which limited the interpretation of the data. The use of video recordings allowed for the identification of visible physical actions. However, it was not possible to identify the psychological factors or psychological effects of the actions. The interpretation of facial expressions was limited to

the quality of the video recording and was especially difficult during night hours. The transcription process of the video recordings can only provide a partial and selective representation of the video recordings, which can be subject to the interpretation of the transcribing researcher (Paulus, Lester, & Depster, 2014). Both researchers (JV and TL) who analysed the data had experience in implementing seclusion in psychiatric hospital care and were thus aware of the general procedures and safety guidelines in Finland. This allowed the in-depth identification of safety hazards. However, their experience is also a limitation as it could have influenced the way the data were interpreted (Graneheim, & Lundman, 2004). Selection bias might have occurred in the data collection, as for 25 video recordings out of 247, all recorded staff members had refused to participate in the study. Safety hazards in this study were identified inductively; therefore, evidence regarding each of the hazard's potential for harm is not addressed. Injection without disinfection was identified as a safety hazard because it is against the current guidelines for injections in Finland. However, international evidence suggests that injection without disinfection is not a safety hazard if the skin is clean (Wong et al., 2019). From our data, we could not be sure if the skin was clean or not.

Some of the identified safety hazards could have led to adverse events and harm. However, this study focused on safety hazards and not their consequences. Furthermore, because the study consisted of video recordings, it was not possible to assess the consequences of these possible adverse events on patients and staff (Kohn, Corrigan, & Donaldson, 2000). In this study, incidents and distress were identified when observing standard practice. Researchers are not obliged to report these. This is in contrast to studies in which patients are subjects of interventions where researchers are required to report adverse events (World Medical Association 2001). If all incidents and distress would be reported, staff might not be willing to participate in research (Gelbart, Barfield, & Watkins, 2009), and thus the identification of safety hazards in standard practice could be hindered. In our study, no intervention was conducted. All data were based on routine care in the study unit. One adverse incident was still reported according to the study protocol. Furthermore, only the manifest content was analysed; latent content was not analysed because we were limited to video without audio. Patient documents or notes from nurses or physicians could have supplemented the data with the consequences of the hazards that occurred. Organizational factors such as staffing levels, staff training and experience, patient-to-staff ratio, and staff relationships (Reason, 2008) can influence safety hazards but were not taken into consideration in this study.

CONCLUSION

This qualitative study provides new information on safety hazards in seclusion events in psychiatric hospital care. These safety hazards have not been previously identified in the existing literature. The identification of these safety hazards is important because seclusion is used to maintain the safety of patients and staff (Gerace, & Muir-Cochrane, 2019). Yet, seclusion itself can be hazardous to patients and staff in many ways and can lead to adverse events and harm. Therefore, more detailed nursing standards should be developed to ensure safe, high-quality care for secluded patients.

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