

## RESEARCH ARTICLE

# Camera-assisted nursing observation of restless patients in an acute care setting, a multi-method feasibility study

Mette Geil Kollerup<sup>1,2</sup>  | Gitte Tolstrup<sup>3</sup> | Birgitte Schantz Laursen<sup>2,4</sup>

<sup>1</sup>Clinic for Internal and Emergency Medicine, Aalborg University Hospital, Aalborg, Denmark

<sup>2</sup>Clinical Nursing Research Unit, Aalborg University Hospital, Aalborg, Denmark

<sup>3</sup>Acute Medical Ward, Clinic for Internal and Emergency Medicine, Aalborg University Hospital, Aalborg, Denmark

<sup>4</sup>Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

**Correspondence**

Mette Geil Kollerup, Clinic for Internal and Emergency Medicine, Clinical Nursing Research Unit, Aalborg University Hospital, Søndre Skovvej 5, 9000 Aalborg, Denmark. Email: mgk@rn.dk

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**Abstract**

**Aim:** To evaluate the implementation, practicality and acceptability of camera-assisted observation of restless patients in the acute care ward.

**Design:** A multi-method feasibility study.

**Methods:** Data consisted of nurses' written records, a brief survey among all nurses and individual interviews with eight nurses. Data analysis encompassed numerical analyses as well as descriptive content analysis.

**Findings:** Camera-assisted observation was implemented by 44 patients from 60–95 years old, for 6 months. The practicality was enhanced by equipment that was easy to operate but the nurses were hampered by carrying the institutional mobile phone while caring for other patients. The intervention's acceptability depended on its potential for improved patient safety and the ability to adjust nursing care to meet the patients' needs as this could enhance feelings of confidence and control.

**KEYWORDS**

acute care, individual interviews, nursing care, nursing observation, technology

## 1 | BACKGROUND

Caring for restless patients in acute care settings is challenging for nurses, especially when the patient's restlessness is caused by dementia, delirium or cognitive impairment (Harmon et al., 2019; Redley & Baker, 2019). Ensuring that the restless patient does not fall out of bed nor remove catheters or drips can shift the focus away from more fundamental care needs such as pain, incontinence or constipation (Harmon et al., 2019; Parke & Hunter, 2014; Redley & Baker, 2019). Poor management of these basic care needs may lead to deterioration in the older person's health (Parke & Hunter, 2014), even giving rise to acute delirium. Patients with acute delirium may experience confusion, restlessness, apathy and psychotic symptoms such as hallucinations (Danish Health Authority, 2016), while

unrecognized acute delirium can increase the risk of brain damage or even death (Han et al., 2010). Serious complications can occur in the care trajectories of older people in the acute care ward, potentially resulting in the need for prolonged care. This poses special challenges in care settings that are characterized by efficiency and valuing of patients' autonomy (Rushton & Edvardsson, 2020; Rushton et al., 2016).

The importance of the care setting for performance of nursing care are raised by nursing theorists through decades (Henderson, 2006; Nightingale & Ottley, 1952). Recently, the fundamentals of care framework also stressed the "context of care" as equally important as the "relationship" between the nurse and the patient and as the "integration of care," in which the nurse and the patient collaborate in maintaining the patient's physical, psychosocial

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and relational needs (Kitson, 2018; Kitson et al., 2014). A context of care which is characterized by accelerated hospital treatment plans and demands for efficiency (Rushton & Edvardsson, 2020; Rushton et al., 2016) result in intensified patient flows in acute care wards. In these settings, appropriate care and treatment plans as well as the patient's transition to another hospital ward or home must be determined within few hours. Nursing observation contributes to the patient's care and treatment plan and is essential in ensuring the patient's comfort and avoiding unnecessary suffering and complications (Redley & Baker, 2019).

Nursing observations may follow standardized methods, such as the Early Warning Score (Wood et al., 2019) or the Confusion Assessment method (Han et al., 2013; Wood et al., 2019). Between these structured observations, the nurses and nursing assistants observe and assess patients' health status while assisting a patient with personal hygiene, nutrition or mobility and engaging with the patient and relatives in adjusting and improving the patient's health situation (Kitson, 2018). With restless or confused patients who are unable to call for help, the nurse checks the patient's well-being regularly by going into their room.

Camera-assisted observation of restless patients has been tested in care facilities for older persons suffering from dementia or intellectual disability (Mulvenna et al., 2017; Niemeijer et al., 2013, 2014; Zwijsen et al., 2011). In these settings, technology-assisted observation has been found to contribute to patients' autonomy provided it is tailored to their specific care needs (Niemeijer et al., 2013). However, it can also pose problems such as unintended alarms or complicated individualized modifications (Niemeijer et al., 2013). This means that while camera-assisted observation can be perceived as a gain, it also requires consideration relating to patient autonomy, patient safety and legal issues (Niemeijer et al., 2010, 2014). In hospitals, camera-assisted nursing observation has been found to reduce patient falls in medical, surgical and rehabilitation units (Hardin et al., 2013; Sand-Jecklin et al., 2016). Camera-assisted observation has also been used as an observation tool with neurological patients and as a diagnostic tool with epileptic patients (McBride et al., 2002). However, restlessness was not an inclusion criterion for participation in previous studies. In some studies, technology assistants or relatives have been responsible for the monitoring (Hardin et al., 2013; Mulvenna et al., 2017), which means that the people observing were not directly involved in patient care and raises questions concerning responsibility.

In summary, restless patients in the acute care ward require constant nursing observation to ensure their safety, to meet their needs and to accelerate care and treatment plans. Therefore, improved observation methods are needed and must be tested. Testing camera-assisted observation of restless patients as displayed on nurses' institutional mobile phones would add to existing evidence for technology-assisted nursing observation. The aim of this study was to evaluate the implementation, practicality and acceptability of camera-assisted nursing observation for restless patients at the acute care ward.

## 2 | DESIGN AND METHODS

A multi-method feasibility study was conducted to evaluate the implementation, practicality and acceptability of camera-assisted nursing observation of restless patients in the acute care ward. The implementation determined the extent, likelihood and manner in which the intervention could be utilized. The practicality considered the extent of the implementation that was possible according to the resources, time and commitment of those involved. The acceptability explored how the targeted recipients (the restless patients) and those involved in the implementation (the nurses) responded. The method chosen was a small-scale evaluation in a clinical context (Bowen et al., 2009). This method is suitable to inform future studies.

### 2.1 | Setting

The setting was an acute care ward with 36 beds in a Danish University Hospital. Patients are admitted to this ward from the emergency department in order to determine their care and treatment plans. This must be done within a few hours and it means that the patient flow is very high. Seventy healthcare professionals are employed in this ward, most as registered nurses and a few as nurse assistants. Both male and female nurses are employed while the term "the nurse" is used instead of "he" or "she." In each shift, a coordinating nurse allocates patients to specific beds and divides the work among the nurses. A project group consisting of a project coordinator (the researcher), the nurse manager and two nurses planned the testing of the camera-assisted observation. Before the testing, information material, lists for written recordings and webcam-signs were prepared, and the entire nursing staff of the ward were introduced to the camera-assisted observation.

### 2.2 | The intervention

The intervention consisted of a webcam placed in a box on the wall behind the patient-bed. Four patient-beds in two patient rooms near the nurses' office were prepared for supplemental camera observation. By opening the little "door" on the front of the box, the monitoring system was connected to an institutional mobile phone carried by the nurse during the shift. The monitoring system displayed real-time visual observations of the patient on the mobile phone. It enabled the nurse to check on the patient from a distance. Camera-assisted observation of the patient was initiated when the nurse evaluated there was a need for additional observation. This could be due to a patient's physical restlessness, which might include reduced consciousness induced by illness or medication. Patients with a psychiatric diagnosis, who were suicidal or in need of a sitter were not included in the study.

## 2.3 | Participants

Eight registered nurses were chosen by the head nurse to be responsible for initiating camera-assisted observation by patients and for fulfilling written records. These nurses were asked to participate in individual interviews and all of them accepted. All registered nurses and nursing assistants ( $n = 70$ ) at the ward were invited to the brief survey.

## 2.4 | Data collection

During the 6 months of testing, the implementation and practicality (Bowen et al., 2009) were evaluated from documents such as the nurses' written recordings on the use of camera-assisted observation. They included dates, the participating patient's age, the reason for initiating supplemental observation. Nurse's notes on the patient's and/or relatives' expressed reactions to the camera-assisted observations aimed to illuminate patients' and relatives' acceptability of the intervention.

After the testing, the health professionals' acceptability (Bowen et al., 2009) was evaluated by a brief survey among all nurses on the ward and through individual interviews (Kvale & Brinkmann, 2009) with eight registered nurses. The brief survey provided information about the nurses' education, duration of clinical experience and their experience with the use of camera-assisted observation. The last question concerned their general attitude towards camera-assisted observation in the acute care ward. This question was: Please state your level of agreement with the statement: "I want camera-assisted observation implemented as a permanent option in the acute care ward." The answer options were "fully agree," "partly agree," "partly disagree" and "fully disagree."

The acceptability was further evaluated by individual semi-structured interviews with eight nurses. The questions in the interview guide were based on a review of literature and concerned the nurses' general experience with camera-assisted observation. The first questions involved the nurses' professional experience and illuminated their professional judgement regarding the appropriateness of camera-assisted observation of patients' in the acute care ward. This first part of the interview included questions regarding the nurses' experiences of patients' and relatives' reactions to illuminate their acceptability. The next questions concerned the nurses' attitudes towards camera-assisted observations, and aimed to illuminate the ethical aspects. At last questions regarding the nurses' practical experience of camera-assisted observation were intended to illuminate the practicality (Bowen et al., 2009) of implementing the intervention. The interviews were performed in an office near the ward and were conducted by a project nurse from the ward or by the researcher, who was not directly involved in the ward. The interviews were audio-recorded and lasted from 30–60 min each. They were transcribed verbatim by the researchers.

## 2.5 | Data analysis

The nurses' written recordings and the surveys were analysed through numerical analyses in order to explore the extent of the use of camera-assisted observation and the attitudes towards it among registered nurses and nursing assistants at the ward.

Transcripts from the semi-structured interviews with the eight nurses were analysed by content analysis at a descriptive level by three members of the research group (Graneheim & Lundman, 2004; Sandelowski, 2000). First, the data material was read and coded by the three researchers, working independently. The codes thus represented what the informants "said" (Graneheim & Lundman, 2004). Next, the researchers discussed the coding and grouped the codes into sub-categories, which represented what the informants "talked about" (Graneheim & Lundman, 2004). The sub-categories included "patient safety," "patient-directed nursing care," "working conditions," "technical issues" and "ethical issues." Because there is no description without interpretation (Sandelowski, 2000), this phase required the researchers' careful attention to individual preferences and prejudgements (Sandelowski, 2000). The sub-categories were then processed further into categories (Table 1), which are presented as the findings (Graneheim & Lundman, 2004). During the analysis process, it was assessed that data saturation was reached and further interviews were not necessary.

## 2.6 | Ethical considerations

Although external funding was obtained from an independent public funder for purchasing and installing the cameras, it did not include any obligation to buy specific products. The project group consisted of the nurse manager, the medical manager, two project nurses and a nurse researcher. The project group collaborated with the IT department in the hospital to choose a technological solution that fulfilled ethical requirements regarding the protection of privacy and autonomy and not causing harm (World Medical Association, 2012). Real-time monitoring from the nurses' mobile phones ensured that no storing, saving or sharing occurred. The patients' privacy was protected by the positioning of the cameras, by installing the cameras in boxes that could be closed during care activities and by choosing not to use monitors in the office. Relatives' privacy was protected by placing a camera sign outside the patient's room and by the possibility of closing the camera box during the relatives' visits.

To protect the patients from any harm, the project nurse provided written and oral information to the patient and/or relatives and ensured that they had agreed before the camera-assisted observation was initiated. The informed consent was generally obtained from the relatives. The expected advantage for the patients was that the camera-assisted observation could decrease the number of unintended adverse events. Importantly, the technology-assisted observation was supplemental and was not intended to replace the nurses' care for the patients' physical, psychosocial and relational needs. The study was registered at the Regional list of research projects (ID-number 2017-124).

TABLE 1 Extracts from data analysis showing data, codes, sub-categories and categories

Data	Codes	Sub-categories	Categories
She removed her peripheral venous catheter and the antibiotics flew out onto the floor. She got her medication more quickly as I was able to re-establish the IV connection and she did not lie half an hour without treatment (Nurse 6)	Risk of delayed treatment	Prevention of adverse events	Camera-assisted observation as a potential tool for improved patient safety
He (the patient) would remove the oxygen catheter. If oxygen is prescribed, it is a life-saving treatment, then it is good to know that the patient receives this treatment (Nurse 1)	Risk of low oxygen levels		
that he should not get out of the bed and risk a collum femoris fracture (Nurse 8)	Risk of collum femoris fracture		
Every time he (the patient) sat up in the bed, I found out, it meant that he needed to go to the toilet (Nurse 17)	Knowledge of patients' needs	Nursing care adjusted to the patient's needs	
Maybe this patient calmed down because there were no disturbances in the room.... She needed to rest without disturbance (Nurse 5)			
I feel I can be confident in the sense that I have control over the patient's situation. It is good nursing care to know that your patient is safe (Nurse 4)	Nurses' feelings of Confidence and Control	Providing nurses with peace of mind	Camera-assisted observation as affecting nurses' working conditions
If this patient was stuck at the edge of the bed, beside the bed rail, it would be very difficult to ease her out (Nurse 6)	Uncomfortable situations	Reducing uncomfortable situations and feelings	
I can reach the patient before I hear the "bump" (the sound of someone falling) (Nurse 7)			
I feel I am to blame if the patient falls when I am not present	Uncomfortable feelings		
I feel stressed if I do not check on a restless patient regularly			
Where do I place the phone while caring for another patient? (Nurse 6)	Caring and watching a mobile phone at the same time	Protection of patients' privacy	Camera-assisted observation as requiring ethical considerations
I bring the phone to a patient and tell him that it is not a personal phone, but that I am keeping an eye on another patient (Nurse 8)			
If the camera was placed on the opposite wall, patient and relatives would be visible on the nurse's mobile phone (Nurse 6)	Exposure of patient's face and relatives		
I haven't felt any distance between me and the patient due to the camera (Nurse 5)	Distance	Maintaining the nurse-patient relationship	
The camera cannot replace a person's presence (Nurse 4)	Personal relationship		
It's important for the relatives to know 'your mother is not cared for by a robot' (Nurse 5)			

Due to the small number of nursing informants, it was decided to protect their anonymity through a general description of their ages and clinical experience rather than displaying this information in a table.

### 3 | FINDINGS

The camera-assisted observation was tested with 44 patients aged from 60–95 years. In 39/44 participants, the informed consent was provided by a relative.

The results of the survey reflect the general attitude among the staff towards the use of a camera as a supplemental observation tool. Half of the staff (34/70) completed the survey. Of these, 22/34 fully agreed that camera-assisted observation should be a possibility in the acute care ward, while 10/34 partly agreed. A positive attitude was not related to the duration of the nurses' clinical experience (Table 2) nor to the number of times that they had used camera-assisted observation (Table 3). Although the survey did not enable statistical calculations, there was a slight tendency for the less experienced nurses to be more sceptical about the possibility of using camera-assisted observation.

The nurses' experiences with the camera-assisted observations are presented under three themes: (1) Camera-assisted observation as a potential tool for improved patient safety, (2) Camera-assisted observation as affecting nurses' working conditions and (3) Camera-assisted observation as requiring ethical consideration.

### 3.1 | Camera-assisted observation as a potential tool for improved patient safety

Camera-assisted observation was perceived as a potential tool for improved patient safety in terms of preventing adverse events and adjusting nursing care to match the patients' needs.

The preventable adverse events could be patients' falls and their removing of peripheral venous catheters, oxygen catheters or urinary tract catheters. As a nurse explained:

It was an older woman, very delirious, she continuously tried to get out of the bed, she was not able to stand or walk. She repeatedly sat in the corner of the bed beside the bed rail and fiddled with her peripheral venous catheter, then she removed it before I reached her, but anyway, maybe I managed to stop a few incidents.

(Nurse 6)

The consequences of potential removal of a peripheral venous catheter on the patient's safety were elaborated in the following quote:

She removed her peripheral venous catheter and the antibiotics flew out onto the floor. She got her medication more quickly as I was able to re-establish the IV connection and she did not lie for half an hour without treatment.

(Nurse 6)

Avoiding a delay in treatment will improve a patient's health and promote a smooth trajectory. Other potential adverse events that could be prevented were low oxygen levels or collum femoris fractures. Either of these could cause serious deterioration of the patient's health.

Removal of IV lines and catheters can result from physical restlessness and also from semi-conscious patients moving away from their beds without taking the IV lines or catheters with them due to their unfamiliarity with the equipment. A nurse explained:

...this patient was in detoxification. Every time he sat up in the bed, I found out that it actually meant that he needed to go to the toilet. Then I had the possibility to assist him, otherwise I would not have observed that he was restless.

(Nurse 7)

This shows that camera-assisted observation enabled the nursing care to be adjusted to the patient's needs, which the nurse would not have been aware of if the patient had not been observed by the camera. A nurse explained, *"It (the camera observation) enables me to reach the patient and catch something instead of reaching him randomly"* (Nurse 4). As the nursing care was adjusted to the patient's needs, it meant that the nurse could attend to the patient either more or less frequently. A nurse explained one such situation:

Maybe this patient calmed down because there were no disturbances in the room. Even though it was daytime the patient was sleeping. This could be both good and bad, but since she was an old nursing home resident who had not slept all night, she needed to rest without disturbance.

(Nurse 5)

This quote shows an additional advantage of the camera-assisted observation in that the nurse did not need to disturb the patient while she was sleeping. Without the possibility of supplemental observation, the nurse would have had to repeatedly check on the patient. Therefore, properly working cameras can guide the nurses regarding when to act. A possible reduction in unnecessary disturbances could improve patients' sleep and thereby, patient safety.

### 3.2 | Camera-assisted observation as affecting nurses' working conditions

The use of camera-assisted observation affected the nurses' working conditions, for instance by affecting their feelings. Providing safety for the patients was described as an important function that could give the nurses peace of mind. A nurse explained:

I can... I can probably be calmer (have steady nerves). I think .... Instead of having to go in and

TABLE 2 Nurses' attitudes towards camera-assisted observation sorted by their clinical experience

Attitude/Clinical experience	0-2 years 8/34 nurses	2-5 years 9/34 nurses	5-10 years 4/34 nurses	>10 years 13/34 nurses
Fully disagree	0/8	0/9	0/4	1/13
Partly disagree	1/8	0/9	0/4	0/13
Partly agree	2/8	3/9	1/4	4/13
Fully agree	5/8	6/9	3/4	8/13

Attitude/Use of technology	1-5 times 26/34 nurses	6-10 times 5/34 nurses	More than 10 times 3/34 nurses
Fully disagree	1/26	0/5	0/3
Partly disagree	1/26	0/5	0/3
Partly agree	8/26	1/5	1/3
Fully agree	16/26	4/5	2/3

TABLE 3 Nurses' attitudes towards camera-assisted observation sorted by their use of the technology

look at the patient all the time, I feel, I can be confident in the sense that I have control of the patient's situation.

(Nurse 4)

Another nurse added, "I think it is good nursing care to know that your patient is safe" (Nurse 1). These feelings of confidence and being in control were contrasted with uncomfortable feelings related to caring for restless and unconscious patients:

If this patient was stuck at the edge of the bed, beside the bed rail, it would be very difficult to ease her out, so I avoided an escalated situation which might have been hard to de-escalate.

(Nurse 6)

This described the risk of reaching a situation too late, which was also mentioned by others: "I can reach the patient before I hear the 'bump' (the sound of someone falling) from the room, which is a very uncomfortable situation" (Nurse 7). Other uncomfortable feelings mentioned were the feeling of being to blame if a patient fell without the nurse being present and a feeling of stress if the patient was not checked on regularly.

### 3.3 | Camera-assisted observation as requiring ethical considerations

Implementation of camera-assisted observation revealed the nurses' ethical considerations as related to the protection of the patients' privacy and the nurse-patient relationship.

Protection of patients' privacy became a problem when the nurses had to carry their phone in their hand while providing care for other patients. A nurse stated this as follows:

Where do I place the phone while caring for another patient? How do I protect the privacy of the patient on camera observation? If I lay the phone on the table by the other patient, I can turn the screen down, but then I am not able to see anything.

(Nurse 6)

Another nurse added:

If I receive a patient A and bring the phone with camera observation of another patient B, I place the phone in the window by patient A and tell him that it is not a personal phone but that I am keeping an eye on another patient.

(Nurse 8)

In addition to issues relating to the protection of patients' privacy, the nurses also expressed concerns about dividing their attention between several patients at the same time. It was anticipated that a nurse's carrying and looking at a mobile phone would affect patients negatively.

The placing of the camera was also considered in relation to the protection of the patients' privacy:

It can be difficult to see the patient; if the patient's head is elevated, I can only see the patient from the abdomen to the feet – it would be better if the camera was placed on the opposite wall.

(Nurse 1)

The placing of the camera on the opposite wall was mentioned by others, "If the patient's face was visible, I would be able to observe if he suddenly got angry or sad" (Nurse 2). However, comments were also made against this possibility: "If the camera was placed on the opposite wall, patients and relatives would be visible on the nurse's screen (phone)" (Nurse 6). Regarding the protection of the patients' privacy, the nurses generally appreciated the placing of a camera sign outside the room and the possibility of closing the camera during care activities.

Considerations regarding how camera observation influenced the nurse-patient relationship were also presented. A nurse said:

First, I was against camera-assisted observation. I thought 'No, this is too easy, do we now leave the patients without health professionals?' I did not like the distance, but during the testing I haven't felt any distance between me and the patient due to the camera.

(Nurse 5)



Other nurses elaborated on the personal relationship: *"Sometimes we allocate a sitter to be present by the patient. Maybe they hold each other's hands because that is what the patient needs; this is not possible for the camera"* (Nurse 6), and *"The camera cannot replace a person's presence, the camera just documents how restless the patient is without someone taking care of the patient"* (Nurse 4). These quotes expressed the feeling that a camera could not replace the presence of a person with the patient, which a nurse mentioned as being important knowledge for the relatives: *"It is important for them to know, 'your mother who is suffering from dementia is not cared for by a robot'"* (Nurse 5). However, the nurse–patient relationship could also be improved by the possibility of catching adverse events in advance before the situations escalated and uncomfortable feelings were generated.

Scepticism was expressed about the process of obtaining informed consent for participation because the group of patients eligible for camera observation were generally unable to provide informed consent themselves. Despite the nurses' sceptical expectations, the reactions of relatives were reported as positive. For example, *"This woman, a daughter I think, found that it was a very good idea, it gave her a sense of security"* (Nurse 6); and, *"They were very positive and surprised"* (Nurse 7); *"They were relieved and happy"* (Nurse 8). One nurse reflected on the relatives' situation and said, *"Sometimes the relatives are afraid to leave the patient because they fear that the nurse will not catch it if something happens to the patient"* (Nurse 1). These quotes indicate a generally positive attitude among relatives towards camera-assisted observation.

## 4 | DISCUSSION OF FINDINGS

Camera-assisted observation of restless patients could be implemented in acute care wards provided careful consideration is given to the protection of patients' privacy. The practicality was enhanced by having equipment that was easy to operate although it was hampered by having to carry a mobile phone. Nurses' acceptance of the intervention was enhanced by its potential for improving patient safety and this gave them confidence and a sense of being in control.

The acceptability of the intervention depended on its potential for improving patient safety by reducing the risk of falls and the removal of IV lines and catheters and by the possibility of adjusting nursing care to patient needs. A reduction in fall rates due to camera-assisted observation is supported by other research (Cournan et al., 2018; Hardin et al., 2013; Sand-Jecklin et al., 2016), although a direct connection between the camera and the nurses' mobile phones has not been tested previously. In another situation, up to 16 cameras were connected to monitors, which were watched by technicians in a separate room. If a monitored patient needed help, a technician called the nurse (Sand-Jecklin et al., 2016). This continuous observation of screens could improve patient safety because of the enhanced possibility of catching a potentially risky situation in advance, provided the technician was successful in redirecting a nurse to the patient. However, the nurses in this study were interrupted by calls from the technician and had to be ready to leave their current activities. In the present study, the practicality was

reduced by the requirement that the nurses should simultaneously provide nursing care to patients while observing vulnerable patients on their mobile phones. This carries the danger of overlooking a potentially risky situation. In future implementation of camera-assisted observation, it would be important to communicate the potential improved patient safety, which could enhance the nurses' motivation for applying the intervention.

The implementation requires careful ethical consideration regarding the protection of patients' privacy. For instance the involvement of technicians not directly involved in the care of the patients (Hardin et al., 2013), could infringe on patient privacy. Placing the camera on the wall behind the bed enhanced acceptability because it supported the protection of privacy. In contrast, when cameras are positioned towards the patient's face (Hardin et al., 2013), there is no possibility of anonymizing the patient. In the present study, the positioning of the camera and the direct connection from the camera to the nurse's mobile phone served to protect the patient's privacy; however, it also limited the nurse's possibility of observing the patient's face, which might result in overlooking their reactions and attempts to communicate. This all highlights the importance of ethical considerations in the application of technology in nursing care (Niemeijer et al., 2010). The provision of nursing care implies the establishment of a trusting relationship between the nurse and patient (Kitson et al., 2014), but this relationship could be negatively affected by nurses having to carry a mobile phone while providing nursing care to several patients. It might hamper the nurse's ability to give a patient her full and undivided attention, which is a prerequisite in establishing a trusting relationship and helping the patient to feel safe (Kitson, 2018). The importance of this trusting relationship was supported by the nurses' comments that the camera could not replace the physical presence of a nurse because a patient's needs for nutrition, hydration and mobilization were equally important. The nurses' acceptance of the intervention was enhanced by the possibility of adjusting their nursing care to match patient needs. For example the camera could inform the nurse that a restless patient needed assistance in going to the bathroom. Meeting the patient's physical, relational and psychosocial needs is essential in providing person-centred care and is executed through the nurse's attention to the patient's dependence and independence (Kitson et al., 2014). According to the present study, the camera-assisted observation could enhance the nurse's knowledge of the patient's dependency. The nurse's actions in caring for a patient's fundamental needs are shown to influence the patient's experience of respect, dignity and comfort (Kitson, 2018). This draws attention to the risk of patients feeling ignored if the nurse is not physically present, which may induce distress (Kitson, 2018). In future implementation of camera-assisted observation, it would be important to discuss how patients' privacy are protected and that cameras are not intended to replace physical presence.

The nurses' acceptance of the intervention was enhanced by their experience that specific situations of potential harm were reduced. However, feelings of anxiety, fear or stress could be induced if the nurse was unable to act on a critical situation observed on

their mobile phone while caring for another patient. This reason for the acceptability of the intervention corroborates McDonnell's finding that nurses experience a subjective burden when caring for patients suffering from delirium (Mc Donnell & Timmins, 2012). Patients, who appear uncooperative, who pull at tubes, dressings and catheters, and who try to get out of bed inappropriately or appear restless are experienced as posing the greatest burden (Mc Donnell & Timmins, 2012). This highlights the need for the development of observation methods for caring for restless patients in acute care wards. The development of delirium can be prevented by providing patients with quiet surroundings and by avoiding disturbing their sleep (Danish Health Authority, 2016). Being able to monitor a patient with delirium from outside the room could reduce the noise and disturbance. The nurses' uncomfortable feelings were related to unintended adverse patient events and were not related to caring for older people in general. This contrasts with Higgins' (Higgins et al., 2007) finding that older patients feel marginalized and stigmatized by nurses. However, these feelings could have arisen due to a mismatch between the older patients' needs and the hospital requirement for accelerated care trajectories (Ministry of Health, 2011). This again highlights how the context of care influences person-centred nursing care (Kitson, 2018), which have been raised in nursing theories through decades (Henderson, 2006; Nightingale & Ottley, 1952). In future implementation of camera-assisted observation, the potential for reducing uncomfortable feelings and situations could motivate registered nurses to apply the intervention.

The implementation of the intervention was feasible despite its use with a vulnerable patient group who were unable to provide informed consent. Despite the nurses' initial reservations concerning the practicality of collecting informed consent, it was achieved without difficulty. The provision of informed consent meant that the patient or relatives were confident in the nurse's competence to manage the situation. This might depend on the prior establishment of a trusting relationship (Kitson, 2018). In other studies of video monitoring for fall prevention, the collection of informed consent was not mandatory because the intervention was viewed as a part of the hospital's patient safety programme and was therefore covered by the patient's general consent to treatment. However, in evaluating a video monitoring programme, Sand-Jecklin found that patients and relatives wanted further information about the intervention (Sand-Jecklin et al., 2016), whereas in the present study, information was provided when the informed consent was collected. Sand-Jecklin also found that the health professionals failed to meet clinical standards for the application and discontinuation of the cameras. In the present study, these decisions were based on the nurses' clinical judgement rather than on strict clinical standards. This might explain the tendency for the less experienced nurses to be more sceptical towards the camera-assisted observation than the nurses who were more experienced in clinical decision making. This tendency for less experienced nurses to be more sceptical about camera-assisted observation is supported by Okumoto (Okumoto et al., 2020), who suggests that this attitude might result from recent education in ethics

and physical restraint (Okumoto et al., 2020). In future implementation of camera assisted observation, information and informed consent can be collected by the patients' relatives.

## 5 | LIMITATIONS

A limitation in this study was that patients' and relatives' acceptability was explored indirectly by the nurses' notes and experiences of their reactions toward the intervention. The use of individual interviews was intended to reveal in-depth reflections unaffected by group opinions; nonetheless, an overall positive attitude towards camera-assisted observation was expressed in all interviews. A possible reason might be that two of the three interviewers were also employed in the ward, which could have influenced participants' answers positively. To evaluate this further, supplemental data were collected by a brief survey among the entire nursing staff of the ward. The survey contradicted any suggestion that either the younger or the more experienced nurses might be more positive towards camera-assisted observation.

## 6 | CONCLUSION

Camera-assisted observation of restless patients could be implemented in the acute care ward with careful consideration for the protection of patients' privacy. The practicality was enhanced by equipment that was easy to operate, although it was challenged by the need to carry a mobile phone, which could potentially, affect the establishment of a trusting nurse-patient relationship. The nurses' acceptance of camera-assisted observation was enhanced by the possibility of the improved integration of care due to improved patient safety and the ability to adjust nursing care to patients' needs. This provided the nurses with feelings of confidence and being in control. This feasibility study provides a basis for planning a comparative study to determine whether camera-assisted nursing observation in an acute care ward can improve the safety of restless patients.

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## CONFLICT OF INTEREST

The authors have no conflict of Interest to disclose.

## AUTHOR CONTRIBUTIONS

**Mette Geil Kollerup:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Original draft, Writing, Review & editing. **Gitte**



**Tolstrup:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Original draft, Writing. **Birgitte Schantz Laursen:** Conceptualization, Formal analysis, Investigation, Methodology, Writing, Review & editing.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, [MGK], upon reasonable request.

## ORCID

Mette Geil Kollerup  <https://orcid.org/0000-0003-0415-8617>

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