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RIKKE RISHØJ MØLGAARD

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AALBORG UNIVERSITY
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CV

Rikke Rishøj Mølgaard graduated as a registered nurse in 2001 from the nursing program in Aalborg. In 2003, Rikke completed a mandated year with supplementary education to qualify to pursue a dream of earning a Master of Nursing Science degree. While working in an intensive care unit on reduced hours, Rikke achieved the aforementioned degree in 2007 from Aarhus University. In the same year, Rikke obtained a position as a nurse lecturer in the nursing program in the Hjørring department, which is now a part of University College of Northern Denmark (UCN). In her position as a nurse lecturer at UCN, Rikke has been teaching diverse topics within nursing and has maintained a strong interest in the clinical nursing practice and engagement in educating nurses with comprehensive clinical competencies that reflect the needs in clinical nursing practice. Rikke enrolled as a PhD candidate in 2018 at The Doctoral School in Medicine, Biomedical Science and Technology at Aalborg University to pursue qualifications to conduct research in nurses' use of the early warning score.

ENGLISH SUMMARY

Background

The early warning score (EWS) is widely used to aid early detection, timely, and competent response, and referral of deteriorating hospitalised patients. In addition, the EWS provides protocolled support to clinicians' decisions about responding to patients' signs of clinical deterioration and potential critical illness. The EWS encompasses tracking vital parameters such as respiratory rate, oxygen saturation, systolic blood pressure, pulse rate, temperature, and level of consciousness. Deviating vital parameters trigger a protocolled response as part of early detection of clinical deterioration. Nurses are involved in recognizing early signs of patient deterioration and in protocolled responses such as initiation of optimized care initiatives and/or summoning of a physician. However, nurses' use of the EWS has been challenged. The challenges mainly centre on adhering to the protocolled responses and on the collaboration with physicians on how to use the EWS. This underpins the need for research exploring nurses' perceptions and practices for using the EWS.

Aim

The overall aim of this PhD project was to investigate nurses' use of the EWS and to explore nurses' and physicians' ideas on initiatives that can support nurses' use of the EWS. Further, to investigate how participatory design methods can enable or impede genuine participation in a participatory design process with nurses and physicians.

Methods

This PhD project was grounded in pragmatism and consisted of two studies. Study 1 applied a methodology of focused ethnography using participant observation of nurses and ethnographic interviews with nurses and physicians to describe and explore the influences in nurses' use of the EWS to support clinical decisions in a hospital setting. Study 2 applied a methodology of participatory design and comprised of study 2a and study 2b. In study 2a participatory design methods were used as a frame for exploring nurses' and physicians' ideas on initiatives for using the EWS in a hospital setting. In study 2b a conversation analysis was carried out on data from study 2a to analyze and discuss how participatory design methods enable or impede nurses' and physicians' genuine participation when exploring ideas on initiatives for using the EWS in a hospital setting.

Findings

The findings showed that nurses' use of the EWS was influenced by internal factors such as nurses' clinical judgment of the EWS and external factors such as unspoken expectations in their collaboration with the physicians. In addition, findings revealed that nurses' and physicians' ideas on initiatives aimed at making use of the EWS flexible and influenced by nurses' clinical judgment. Also, findings disclose that involving clinicians when making changes to the EWS and providing introduction and training to staff that use the EWS may enable acceptance to use the EWS. Moreover, findings showed that operationalizing nurses' and physicians' collaboration is essential for using the EWS in a hospital setting. Use of participatory design methods facilitated an environment of genuine participation for nurses' and physicians' discussion and reflection about ideas on initiatives for using the EWS.

Conclusions

This PhD project has revealed that nurses' use of the EWS requires a flexible use of the EWS where the EWS is one source of evidence among others to inform nurses' judgment of patients' condition and subsequently decisions about appropriate interventions. Also, facilitating an environment for operationalizing nurses' and physicians' use of the EWS as a collaborative tool is essential for using the EWS in a hospital setting. Furthermore, agency staffs' assisting nurses in the EWS monitoring requires consideration to ensure patient safety is not compromised. Involving nurses and physicians in a process using participatory design methods provides a useful contribution in developing the EWS. However, continuous attention towards enabling genuine participation in the process is required.

DANSK RESUME

Baggrund

Early Warning Score (EWS) redskabet er indført med henblik på tidlig opsporing, rettidig og kompetent respons ved hospitalsindlagte patienter med tegn på forværring af tilstand. Ydermere, så bidrager EWS redskabet med beslutningsstøtte til klinikere via en protokol, der indeholder strategi for respons ved tegn på forværring af tilstand og kritisk sygdom ved patienterne. EWS indeholder sporing af vitale parametre som respirationsfrekvens, iltmætning, systolisk blodtryk, puls, temperatur og bevidsthed. Vitale parametre, der afviger fra prædeterminerede værdier, trigger et respons som led i tidlig opsporing af forværring af patienters tilstand. Sygeplejersker er involverede i at opspore tidlige tegn på patient forværring og i at respondere herpå ifølge protokol. Sygeplejersken kan igangsætte optimerende tiltag og/eller tilkalde læge. Sygeplejerskers brug af EWS er dog udfordret. Sygeplejerskerne følger ikke EWS protokollen, idet det påkrævede respons på afvigelser af vitale parametre, ikke overholdes. Derudover er der udfordringer i samarbejdet mellem læger og sygeplejersker omkring hvordan EWS skal anvendes. Det understreger behovet for forskning, der undersøger sygeplejerskers opfattelse og praksis for at bruge EWS.

Formål

Det overordnede formål med dette PhD projekt var at undersøge sygeplejerskers brug af EWS, samt undersøge sygeplejerskers og lægers idéer til initiativer, som kan støtte sygeplejerskers brug af EWS. Ydermere at undersøge, hvordan participatoriske design metoder kan facilitere eller hæmme ægte deltagelse i en participatorisk proces med læger og sygeplejersker.

Metoder

Dette PhD projekt er funderet i pragmatisme og består af to studier. Studie 1 anvendte en metodologi med fokuseret etnografi. Deltagerobservation og etnografiske interviews med sygeplejersker og læger blev gennemført for at beskrive og eksplorere påvirkninger på sygeplejerskers brug af EWS som støtte til kliniske beslutninger i en hospitalskontekst. Studie 2 anvendte en metodologi med participatorisk design og bestod af studie 2a og 2b. I studie 2a dannede participatoriske metoder en ramme for at eksplorere sygeplejerskers og lægers forslag til initiativer for brugen af EWS i en hospitalskontekst. I studie 2b blev en konversations analyse gennemført med data fra studie 2a for at analyse og diskutere hvordan de anvendte metoder faciliterer eller hæmmer sygeplejerskers og lægers ægte deltagelse når forslag til initiativer for brugen af EWS i en hospitalskontekst undersøges.

Fund

Fundene viste, at sygeplejerskers brug af EWS er influeret af interne faktorer som sygeplejerskernes kliniske vurdering og af eksterne faktorer som uudtalte forventninger i samarbejdet med læger. Derudover viste fundene at sygeplejerskernes og lægernes idéer til initiativer sigtede mod at brug af EWS bliver fleksibelt og influeret af sygeplejerskers kliniske vurdering. Endvidere var et fund, at involvering af klinikere når EWS ændres samt sørge for introduktion og træning til personale som bruger EWS kan medvirke til accept af at bruge og i at følge EWS. Fundene viste også, at operationalisering af sygeplejerskers og lægers samarbejde er essentielt for at bruge EWS i en hospitalskontekst. Brugen af participatoriske design metoder faciliterede et miljø med ægte deltagelse for sygeplejerskers og lægers diskussion og refleksion omkring idéer til initiativer for brugen af EWS.

Konklusion

Dette PhD projekt har vist, at sygeplejerskers brug af EWS fordrer fleksibel brug af EWS, hvor EWS er et bidrag blandt flere til at informere sygeplejerskers kliniske vurdering af patienters tilstand og efterfølgende beslutning vedrørende passende interventioner. Derudover er facilitering af et miljø for operationalisering af sygeplejerskers og lægers brug af EWS som et samarbejdsredskab væsentligt for brugen EWS i en hospitalskontekst. Ydermere, vikarer der hjælper sygeplejersker med at måle EWS bør overvejes med henblik på at sikre at patientsikkerheden ikke kompromitteres. Involvering af sygeplejersker og læger i en proces med brug af participatoriske design metoder er et brugbart bidrag til udvikling af EWS. Brugen af participatoriske design metoder fordrer dog kontinuerlig opmærksomhed på mulighederne for ægte deltagelse i processen.

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Rikke Rishøj Mølgaard, April 2023

LIST OF PAPERS:

This thesis is based on three original research papers:

Paper 1

Mølgaard, RR., Jørgensen, L., Christensen, EF., Grønkjær, M., & Voldbjerg, SL. (2022). Ambivalence in nurses' use of the early warning score: A focussed ethnography in a hospital setting. *Journal of Advanced Nursing*, 78(5), 1461-1472. https://doi.org/10.1111/jan.15118

Paper 2

Mølgaard, RR., Jørgensen, L., Grønkjær, M., Madsen, J.Ø., Christensen, E. F., & Voldbjerg, S. L. Nurses' and physicians' ideas on initiatives for using the early warning score in a hospital setting: A participatory design.

Re-submitted April 2023 to *Global Qualitative Nursing Research.*

Paper 3

Mølgaard, RR., Jørgensen, L., Madsen, JØ., Christensen, EF., Grønkjær, M., & Voldbjerg, SL. Enablers and barriers for genuine participation in a participatory design process with nurses and physicians.

Re-submitted April 2023 to *Qualitative Health Research*.

TABLE OF CONTENTS

ABBREVIATIONS

AWTTS:	Aggregate Weighted Track and Trigger Systems
EWS:	Early Warning Score
HCA:	Health Care Assistant
ICU:	Intensive Care Unit
MPTTS:	Multiple parameter Track and Trigger Systems
MRC:	Medical Research Council
NEWS:	National Early Warning Score
RCT:	Randomized Controlled Trials
RN:	Registered Nurse
SPTTS:	Single-parameter Track and Trigger Systems
UCN:	University College Nordjylland
UIM:	User Innovation Management
ViEWS:	VitalPAC™ Early Warning Score

TABLES AND FIGURES

Figures:

CHAPTER 1. INTRODUCTION

The focus of this PhD project is nurses' use of the early warning score (EWS). The study was motivated by my experiences as a nurse at the intensive care unit (ICU) and my current work as a lecturer at the Department of Nursing, University College of Northern Denmark.

As a registered nurse (RN) in an ICU, I understand the importance of monitoring patients' vital parameters as these influenced the care and treatment provided for the patients. These experiences were used as clinical examples in the classroom with nursing students when I became a nurse lecturer. They served to emphasize the importance of monitoring vital parameters as part of clinical judgment of patients' conditions and recognition of clinical deterioration and critical illness. On these occasions, it became clear to me that the nursing students did not perceive monitoring vital parameters as part of the EWS as an essential part of nurses' work. I noticed that the nursing students thought that monitoring the vital parameters was a simple task that could be done without much training and without taking the patients' situations and conditions into account. The nursing students told me that they or the health care assistants (HCAs) were delegated the monitoring of vital parameters by the nurses in practice. As this was opposed to my own professional experiences, I was curious how the nurses used the information from monitoring vital parameters as part of the EWS in their practice. The experiences from my own clinical practice and from my classroom teaching heightened my interest in nurses' practices of monitoring and using the information from the EWS in patient care. Therefore, I searched the literature to establish if these experiences were unique to the local settings or occurred nationally and even internationally. The search in the literature revealed challenges in nurses' monitoring of the EWS (Clifton et al., 2015; Credland et al., 2018; Treacy & Stayt, 2019) and challenged adherence to the EWS protocols (Credland et al., 2018; Downey et al., 2017; Treacy & Stayt, 2019). The literature also revealed that the implementation of the EWS challenged nurses' practices of using clinical judgment alongside using the EWS (Connolly et al., 2017; Downey et al., 2017). Thus, the implementation of the EWS in hospitals was characterized by complexity and challenges in how to use the EWS. (Connolly et al., 2017; Credland et al., 2018). Based on the review of the literature, a research gap was identified for this PhD project to investigate, which is explicated in the next chapter.

CHAPTER 2. BACKGROUND

This chapter is based on a systematic literature search that was conducted in collaboration with a research librarian. The purpose was to identify the state of the art concerning introduction of EWS systems in hospitals with an emphasis on nurses' use of the EWS. Appendix A outlines the literature search in greater detail.

This chapter is divided into six sections. First, it presents the rationale for using abnormal vital parameters in EWS systems. Second, it defines an EWS system as a decision-support tool and defines clinical decisions. Third, it briefly describes different types of EWS systems. Fourth, it briefly outlines the effect on patient outcomes and the ability to predict patient outcomes in a specific version of an EWS system. Fifth, it describes nurses' use of the EWS. Sixth, the rationale for the PhD project completes this chapter.

2.1 VITAL PARAMETERS

Vital parameters encompass systolic blood pressure, pulse rate, respiratory rate, temperature, oxygen saturation and level of consciousness (Jarvis et al., 2015). Patients admitted to hospitals have their physiological vital parameters monitored as part of judging their condition and potential clinical deterioration (McGaughey et al., 2021). This PhD project uses the definition of *clinical patient deterioration* proposed by Padilla and Mayo (2018, p. 1365): 'a dynamic state experienced by a patient compromising hemodynamic stability, marked by physiological decompensation accompanied by subjective or objective findings'.

Vital parameters are connected to patient deterioration because abnormal vital parameters are objective findings that may indicate that the patient's clinical state is worsening (Jones et al., 2013; Padilla & Mayo, 2018). Abnormal vital parameters are values for each parameter outside defined standard clinical limits (Andersen et al., 2016). Abnormal vital parameters are considered an early warning of antecedent cardiac arrest and ICU admission (Bleyer et al., 2011; Goldhill, 2001; McNarry & Goldhill, 2004; Schein et al., 1990). Approximately 31% of patients admitted to a medical or surgical acute hospital ward have an abnormal vital parameter at the time of their admission (Fagan et al., 2012). One or more abnormal vital parameters are found in 28.9% of patient records within 0–8 hours before in-hospital death (Hillman et al., 2001). The study may underestimate patients with abnormal parameters who deteriorate and need increased levels of care because the study only included those patients who died. In a more recent study based on registry data from 7851 medical and surgical patients, 59.4% of patients had abnormal vital parameters 1–4 hours preceding cardiac arrest (Andersen et al., 2016). The study may overestimate abnormal vital parameters preceding cardiac arrest because more than one third of patients in the study experienced cardiologic conditions. Andersen et al.

(2016), however, also found a 20% increase in mortality rates among patients with three deviating vital parameters compared to patients without abnormal vital parameters. Multivariable analysis, including, e.g., including pre-existing conditions (indicating specialty) supported the results of an increase in mortality with an increasing number of abnormal vital parameters (Andersen et al., 2016). Ultimately, monitoring of vital parameters is included in the development of different EWS systems to aid the early detection of patients' deteriorating condition and critical illness to provide patient safety (Gerry et al., 2020; Goldhill, 2001; Smith et al., 2008a; Spagnolli et al., 2017).

2.2 EARLY WARNING SCORE SYSTEMS FOR SUPPORTING CLINICAL DECISIONS

EWS systems are decision-support tools. A frequently cited definition in the literature of *decision-support tools* is that of Kawamoto et al. (2005, pp. 1–2): 'A clinical decision support system is any electronic or non-electronic system designed to aid directly in clinical decision making, in which characteristics of individual patients are used to generate patient-specific assessments or recommendations that are then presented to clinicians for consideration'.

This definition emphasises that clinicians are presented with pertinent information by the decision-support tool to consider as an integral factor when making decisions related to specific patients. Such tools encompass targeted clinical knowledge and aid to the direct and structure gathering of patient information (Castillo & Kelemen, 2013; Kilsdonk et al., 2017). The targeted clinical knowledge and the gathered patient information result in evidenced prompts, recommendations and guidelines for clinicians' easy and timely access to use in decisions to increase quality of care and patient safety (Castillo & Kelemen, 2013; Kilsdonk et al., 2017; McGaughey et al., 2021; Sutton et al., 2020). EWS systems as a decision-support tool encompass the monitoring of vital parameters like respiratory rate, oxygen saturation, systolic blood pressure, pulse rate, temperature and level of consciousness (McGaughey et al., 2021; Royal College of Physicians, 2017). These vital parameters are tracked, and deviating parameters function as an early warning of patients' potential clinical deterioration and critical illness. These deviating vital parameters are used to trigger nurses' decisions about escalation responses above different predetermined thresholds (Gao et al., 2007; McGaughey et al., 2021). The EWS is widely used across specialties such as in general wards, acute departments, emergency departments and prehospital settings (Credland et al., 2020; Downey et al., 2017).

EWS systems are introduced to support clinical decisions and collaboration among clinicians, such as nurses and physicians, and to optimise initiatives and referral to advanced care and treatment (Gerry et al., 2020; McGaughey et al., 2021; Royal College of Physicians, 2017). In this PhD project, *clinical decisions* are defined as suggested by Higgs and Turpin (2019 p. 466) as 'a process of making professional

judgments underpinned by a range of forms of evidence'. Evidence in this sense concerns data deriving from observations and interacting with patients, evidence as knowledge from research, theory and personal experiences and evidence as arguments constructed via related disciplines, like biomedical science and psychology (Higgs & Turpin, 2019). *Clinicians' judgment* is defined as assessment of alternatives and actions, while the decision itself is a choice among those alternatives and actions (Thompson et al., 2013). The EWS provides a standardised input in how that the agreed-upon set of vital parameters are tracked systematically. This input is then used for the clinicians to judge alongside other sources of evidence, such as observations and experience, and should lead to decisions based on the clinicians' judgment of input from these different sources of evidence. The goal of introducing the EWS into hospitals was twofold as it aimed to reduce avoidable adverse events due to early recognition of patients' deteriorating condition *and* the timely initiation of appropriate responses (Holland & Kellett, 2023; McGaughey et al., 2021). Hence, requiring clinicians in hospitals to use the EWS as a source of evidence to support their decisions is intended to help increase the quality of care and patient safety (Grant, 2019; Holland & Kellett, 2023). The World Health Organization (2019) states that patient safety is a health care discipline aiming at preventing and reducing risk, errors and harm to patients occurring during the provision of health care. Unrecognised patient deterioration may lead to risk or harm to patients and compromise patient safety (Andersen et al., 2016; Grant, 2019).

2.3 DIFFERENT EARLY WARNING SCORE SYSTEMS

There are different EWS systems, such as single-parameter track and trigger systems (SPTTS), multiple-parameter track and trigger systems (MPTTS) and aggregate-weighted track and trigger systems (AWTTS) (Jansen & Cuthbertson, 2010; Smith et al., 2008a). SPTTSs use a single deviating vital parameter as an indicator of an impending serious adverse event, such as cardiac arrest, ICU admission or in-hospital death (Shiloh et al., 2016; Smith et al., 2008b). A single vital parameter outside a threshold, allowing for extreme deviating values, triggers an escalation response (Shiloh et al., 2016; Smith et al., 2008b). Some SPTTSs track vital parameters exclusively for triggering an escalation response, whereas others have integrated additional subjective or objective criteria for triggering the escalation of care and treatment (Smith et al. 2008b). SPTTSs have demonstrated limited predictability of in-hospital mortality and limited effects on reducing cardiac arrest, ICU admission and death (Hillman et al., 2005; Jansen & Cuthbertson, 2010; Smith et al., 2008b).

Another variation of an EWS system is the MPTTS, in which a combination of deviating vital parameters is tracked to trigger a graded response according to the number of parameters triggered (Gao et al., 2007; Jansen & Cuthbertson, 2010; Shiloh et al., 2016). The use of MPTTSs is limited, as they are difficult to operate

and have shown limited ability to predict the need for ICU admission (Jansen & Cuthbertson, 2010).

A third type of EWS system is the AWTTS, which adds an aggregated score for the deviating vital parameters and may rely on tracking single and multiple parameters to trigger a response (Jansen & Cuthbertson, 2010; Shiloh et al., 2016). In addition, deviating vital parameters are allocated points according to the divergence of each parameter, and the sum of those points is aggregated to a total score, potentially triggering a response (Gardner-Thorpe et al., 2006; Jansen & Cuthbertson, 2010; Smith et al., 2008a). A special version of an AWTTS called the ViEWS has been found to be superior in the performance of predicting mortality within 24 hr of the ViEWS monitoring compared to other versions of AWTTSs (Prytherch et al., 2010). The ViEWS was used as the basis for developing the national EWS (NEWS) in the United Kingdom and was the first EWS system based on a large number of vital-sign observation sets and not on expert consensus (Prytherch et al., 2010; Shiloh et al., 2016). As the NEWS is a version of an AWTTS, each deviating vital parameter is assigned points, and a total aggregated score is calculated and used to prompt protocolled escalation responses (Royal College of Physicians, 2017). A triggered response may be based on a single extreme deviated vital parameter or a combination of multiple deviated vital parameters (Royal College of Physicians, 2017). The NEWS has been found to reliably identify patients at risk of unanticipated ICU admission and death within 24 hours of NEWS monitoring (Smith et al., 2013).

The EWS system used in northern Denmark builds upon the NEWS (Royal College of Physicians, 2017) and recommendations from a New Zealand report (Health Quality & Safety Commission, 2016) that summarises the evidence of handling deteriorating adult patients (Region Nordjylland, 2022). Therefore, this PhD project is based on the use of the NEWS (Region Nordjylland, 2022). The NEWS's ability to predict patient outcomes in hospitalised patients is detailed in section 2.4. The EWS in northern Denmark encompasses the monitoring of systolic blood pressure, pulse rate, oxygen saturation with and without chronic obstructive pulmonary disease (COPD), +/- oxygen therapy, respiratory rate, temperature, and level of consciousness (using the Glasgow Coma Scale) every 12 hours. Table 1 shows the thresholds for aggregated scores and associated instructions for triggered responses at the university hospital where this PhD project was conducted.

Table 1 - Thresholds for aggregated EWS and associated instructions for triggered responses. Adapted from the protocol in the northern region in Denmark (Region Nordjylland, 2022). (Mølgaard et al., n.d.(a)).

Aggregated score	Colour code	Monitoring frequency	Interventions
0		12 hours	
1-5		8 hours	Increased attention Nurse optimises care
6-7		4 hours	Physician is summoned, response time within 1 hour Nurse optimises care
8-9		15 minutes	Physician is summoned, response time within 15 min Nurse optimises care
≥10		Continuous	Physician is summoned, response time acute Nurse optimises care

2.4 THE NATIONAL EARLY WARNING SCORE

A recently published Cochrane review reporting the effect on patient outcomes due to the implementation of EWS systems and rapid response systems found no or little effect on, e.g., mortality and ICU admission based on four randomised controlled trials (RCTs) (McGaughey et al., 2021). It is difficult, however, to establish the effect on patient outcomes related to the NEWS, as the result was based on four RCTs using different scoring systems. A newly published systematic review by Holland and Kellett (2022) found that the NEWS aided the identification of patients who were most and least likely to die within the next 24 hr. Moreover, the review reported that 25% of patients that died within 24 hr after admission and 40% of all in-hospital deaths had a NEWS < 5 (Holland & Kellett, 2022). Thresholds within the NEWS have been assessed and validated in different studies. Studies have reported increased risk of death, ICU admission and transfers to a higher level of care with NEWS > 4 (Spagnolli et al., 2017) or NEWS > 5 (Spångfors et al., 2019). Patients with a 5–6 NEWS value were reported to have a twofold increase, and patients with NEWS ≥ 7 a more than threefold risk, of in-hospital mortality compared to patients with NEWS of 0–4 (Spångfors et al., 2019). Differentiation of thresholds for medical and surgical patients may be relevant to achieve equal detection rates of death and ICU admission and effect on workload (Kovacs et al., 2016). It may be assumed that, as the NEWS reliably identifies the patients most and least likely to die within the next 24 hours, fewer patients will experience adverse outcomes, such

as ICU admission or death (Smith et al., 2013). A decrease in mortality was associated with the implementation of the NEWS in a before-and-after study of two medical wards (Subbe et al., 2017). A significant decrease in mortality was associated with the ward, with an approximately threefold group of patients with NEWS values of 6 and a fourfold group of patients with NEWS values of 9 (Subbe et al., 2017). As this study was based on only two medical wards in a single hospital, the results may not be generalisable to other specialties or settings and should be interpreted with caution. A retrospective cohort study of 85,322 patients found that the NEWS had no effect on rates of death or ICU transfer due to implementation of the NEWS (Bedoya et al., 2019). Conflicting results and difficulties in showing improved patient outcomes due to implementing the NEWS may be owing to more explanations. These include: heterogeneity in patient categories and outcome measures, the use of different EWS systems, different implementation processes, potential workflow disruptions and the use of different methodologies to examine the effects on patient outcomes (Bedoya et al., 2019; Fang et al., 2020; Fu et al., 2020).

A trigger threshold of NEWS 5 is found to be optimal (Haegdorens et al., 2020). This threshold, however, also presents a significant number of false-positive triggers of patients who will not experience unexpected death, resuscitation or ICU admission within the next 24 hours (Haegdorens et al., 2020). Therefore, deciding on appropriate trigger thresholds is a trade-off between a high detection rate of clinical deterioration (sensitivity) and avoiding a high rate of false positives (specificity; Haegdorens et al., 2020; Pankhurst et al., 2022; Pimentel et al., 2019). Deciding on appropriate thresholds seems beneficial to mitigate the clinical workload and risk of alert fatigue, which may otherwise increase if the trigger thresholds are too low to increase sensitivity (Haegdorens et al., 2020; Pankhurst et al., 2022; Pimentel et al., 2019). Although the NEWS aids the identification of patients with increased risk of ICU admission and death, the NEWS cannot stand alone in identifying deteriorating patients, as a significant number of patients develop critical illness and die even with a NEWS < 5 (Holland & Kellett, 2022). Focusing on the detection of patients with an increased risk of death within 24 hours is well-suited for establishing timely and appropriate interventions to aim for the prevention of critical illness and death (Smith et al., 2013; Holland & Kellett, 2023). Consequently, it is suggested that focusing on developing workable NEWS guidelines in practice is important for achieving an efficient detection and response strategy for the nurses and physicians using the NEWS and thereby to benefit patient safety (Haegdorens et al., 2020).

In the following chapters, the term EWS is used and covers EWS in general, including the NEWS.

2.5 NURSES' USE OF THE EWS

The nurses' role in using the EWS is dual: recognition *and* response to signs of clinical deterioration in patients (McGaughey et al., 2021; Royal College of Physicians, 2017). Recognition of a deteriorating patient requires the nurses' competencies and presence to recognise that the patient's condition has changed to a worse clinical state (Grant, 2019; Royal College of Physicians, 2017). The dual role in using the EWS underpins that recognition and response to a potential deteriorating patient using the EWS is a process where recognition precedes the decision about how to respond (Bedoya et al., 2019). Nurses' initiation of interventions to optimise care and treatment and summon medical assistance is emphasised to achieve the benefits to patient safety of using the EWS (McGaughey et al., 2021; Royal College of Physicians, 2017). Nurses' use of the EWS, however, is challenged by different perceptions that influence how the EWS is used (Credland et al., 2018; Downey et al., 2017; Le Lagadec & Dwyer, 2017).

Studies have shown that nurses may be inclined to disregard an elevated EWS in situations where their clinical judgment contradicts the elevated EWS, and this may result in nurses' being desensitised towards the EWS due to alert fatigue (Foley & Dowling, 2019; Hands et al., 2013; Jensen et al., 2019b; McGaughey et al., 2017; O'Neill et al., 2021; Smith et al., 2021). The decision to disregard an elevated EWS may be related to the nurses' experience in situations where no adverse outcomes occurred in patients despite an elevated EWS (Hands et al., 2013). Decision-support tools that generate inappropriate alerts and unsuitable recommendations may result in clinicians' alert fatigue and loss of confidence in the tool (Castillo & Kelemen, 2013). The nurses may choose not to use the EWS if it is perceived to generate erroneous alerts and recommendations (Castillo & Kelemen, 2013; Foley & Dowling, 2019; Hands et al., 2013; Jensen et al., 2019b; McGaughey et al., 2017; Smith et al., 2021). Studies have suggested that, in situations where the protocol for responding to an elevated EWS was disregarded, serious adverse events were more likely to occur (Credland et al., 2020; Petersen et al., 2014). This indicates that nurses' disregard of the EWS protocol affects patients negatively (Credland et al., 2020; Downey et al., 2017). The literature has suggested investigating the reasons for nurses' disregard of the EWS protocol (Credland et al., 2018), as well as reasons for the adoption of an EWS in practice (McGaughey et al., 2021).

The literature has highlighted that some nurses have a task-driven approach to EWS monitoring (Cardona-Morrell et al., 2016; Foley & Dowling, 2019; Hands et al., 2013). This means that they are overly reliant on the EWS and therefore are inclined to use the EWS while ignoring their clinical judgment (Foley & Dowling, 2019; Jensen et al., 2019b; Massey et al., 2017). In these situations, the nurses fail to take advantage of the patient encounter as an opportunity to assess patients' clinical conditions (Foley & Dowling, 2019; Jensen et al., 2019b; McGaughey et al., 2017). In addition, the task-driven approach to EWS also causes some nurses to delegate the monitoring of the EWS to less-experienced staff, such as nursing students or HCAs (Massey et al., 2017), which sometimes leads to nurses' being uninformed

about patients' deviating vital parameters in the EWS (Smith et al., 2021). Taken together, these introduce a risk of overlooking patients' deteriorating conditions (Le Lagadec & Dwyer, 2017; Van Galen et al., 2016). Thus, nurses with a task-driven approach to using the EWS may compromise the soundness of their decisions about how to respond to the EWS, as they risk excluding important clinical data from their clinical judgment (Massey et al., 2017; Smith & Higgs, 2019). The literature has highlighted the relevance of exploring nurses' perceptions of and reliance on the EWS as a basis for influencing their decisions about using the EWS to enable appropriate recognition and response strategies (Grant, 2019).

As the EWS should be used as a decision-support tool, the EWS and clinical judgment should be interpreted as a joint tool set that together contribute to the detection of patient deterioration and the initiation of appropriate interventions (Clifton et al., 2015; Downey et al., 2017; McGaughey et al., 2017; Petersen et al., 2017; Smith et al., 2013; Spagnolli et al., 2017; Treacy & Stayt, 2019; Wood et al., 2019). Despite this, the EWS often stands alone when assessing the effects of implementing it in clinical practice. When the EWS stands alone when assessing the effects of implementing it, it defeats the intention with using it as a decision-support tool. A cluster-randomised multicentre study found that combining nurses' adjustments, based on their clinical judgment, with the aggregated EWS was non-inferior to the usual practice of using the EWS when all-cause mortality within 30 days was compared (Nielsen et al., 2022). This result indicates that there is potential for considering the nurses' clinical judgment as an influencing factor on the EWS (Connolly et al., 2017; Jensen et al., 2019b; Langkjaer et al., 2021; Le Lagadec & Dwyer, 2017). This potential, however, may be limited in surgical specialties, as the study by Nielsen et al. (2022) reported an increase in 30-day mortality within surgical specialties when nurses could adjust the EWS. The literature recommends exploring influences on nurses' decisions about the EWS in combination their assessments of patients (Clifton et al., 2015; Langkjaer et al., 2021; Wood et al., 2019). Moreover, further research is needed on what clinicians need from and envision in future EWS systems to increase their acceptance of the EWS and thereby the potential benefits of using it (Allen et al., 2017; Connolly et al., 2017).

The EWS is used in interprofessional collaboration between nurses and physicians, as nurses are prompted to summon physicians to help manage a deteriorating patient when the EWS values are elevated above predefined thresholds (Chua et al., 2020; Douglas et al., 2016). *Interprofessional collaboration* is defined by WHO thus (World Health Organization, 2010, p. 13): 'Collaborative practice in health-care occurs when multiple health workers from different professional backgrounds provide comprehensive services by working with patients, their families, carers and communities to deliver the highest quality of care across settings'.

Nurses and physicians collaborate when they engage in responding to a deteriorating patient to prevent adverse events based on mutual respect and sharing of knowledge from both professions (Chua et al., 2020; Green & Johnson, 2015). Collaboration with physicians can be a challenge to nurses' use of the EWS (Connolly et al., 2017;

Foley & Dowling, 2019; Treacy & Stayt, 2019). Studies have demonstrated delayed response times for physicians when summoned by nurses, unclear guidance for escalating initiatives when EWS elevates, and diverse perceptions about how the EWS should be used in collaboration between nurses and physicians (Allen et al., 2017; Connolly et al., 2017; Foley & Dowling, 2019; Petersen et al., 2017; Smith et al., 2019; Wood et al., 2019). Nurses fear criticism for making unnecessary calls or are criticised by physicians for not providing enough information about the patients' situations for the physicians to decide upon appropriate actions (Chua et al., 2020; Spångfors et al., 2020; Treacy & Stayt, 2019). These challenges may stifle nurses' inclinations to summon the physicians and may cause delays in referring and responding to clinical patient deterioration (Bingham et al., 2020; Credland et al., 2018; Foley & Dowling, 2019; Treacy & Stayt, 2019). Thus, there is a need for further research on how the EWS should be operated to support collaboration between nurses and physicians using it (Allen et al., 2017; Connolly et al., 2017; Hands et al., 2013; Treacy & Stayt, 2019).

2.6 RATIONALE FOR THE PHD PROJECT

The implementation of an EWS system in hospitals is complex, as factors like the composition of and clinicians' use of the EWS influence the benefits of using such a decision-support tool to increase quality of care and patient safety. Research suggests that predetermined thresholds for triggering a response may prove complex, owing to different patient cohorts and a trade-off between achieving high sensitivity without risking low specificity, which leads to a higher rate of false positives, thereby decreasing acceptance of the EWS and its use. As recognition of deteriorating patients relies on nurses' assessments of patients and decisions about whether initiation of further care and medical assistance is needed, decreased acceptance of u the EWS may pose a risk to quality of care and patient safety. Nurses' practices of using the EWS as a decision-support tool are challenged by either favouring the EWS as the source of evidence in decisions or by favouring other sources of evidence over the EWS to detect patient deterioration and decide upon appropriate interventions. Either way may lead to overlooking early signs of clinical deterioration among patients who should have received escalated care initiatives. This may compromise early recognition of clinical deterioration and thereby mitigate the benefits to patient safety of using the EWS in hospitals.

The literature suggests the need for more knowledge about reasons for nurses' disregard of the EWS in judging and deciding about patients' conditions and potential deterioration. Moreover, the reasons for nurses' adoption of the EWS in judging and making decisions about patients' conditions and potential deterioration are poorly explored. Interprofessional collaboration between nurses and physicians about the use of the EWS has proven challenging and may decrease nurses' inclination to summon physicians based on the information they get from the EWS.

Research focusing on how best to operate the EWS to support collaboration between nurses and physicians is warranted. Such research may help enhance the connection between nurses' detection of clinical deterioration and the subsequent response by physicians to improve the benefits of using the EWS in hospitals. Therefore, it is relevant to investigate nurses' use of the EWS to provide insights into their reasons for and perceptions of their use of the EWS in judging and deciding upon patient deterioration and appropriate responses. Furthermore, it is relevant to explore nurses' and physicians' ideas on initiatives for using the EWS in clinical practice. This may help increase nurses' early detection of deteriorating patients and increase the quality of care and patient safety.

CHAPTER 3. OVERALL AIM AND SPECIFIC AIMS

The overall aim of this PhD project was to investigate nurses' use of the EWS and to explore nurses' and physicians' ideas on initiatives that can support nurses' use of the EWS. Further, to investigate how participatory design methods can enable or impede genuine participation in a participatory design process with nurses and physicians.

To answer the overall aim, three research questions guided the investigation:

1. How do nurses use the EWS in a hospital setting?
2. What are nurses' and physicians' ideas on initiatives that can support nurses' use of the EWS in a hospital setting?
3. How do participatory design methods enable or impede genuine participation in a participatory design process with nurses and physicians?

The three research questions were explored in two studies which were reported in three papers. The specific aims of the two studies were as follows:

Study 1:

To describe and explore the influences in nurses' use of the EWS to support clinical decisions in a hospital setting (Paper 1)

Study 2:

A. To explore nurses' and physicians' ideas on initiatives for using the EWS in a hospital setting (Paper 2)

B. To analyze and discuss how participatory design methods enable or impede nurses' and physicians' genuine participation when exploring ideas on initiatives for using the EWS in a hospital setting (Paper 3)

Genuine participation: Is a concept within participatory design and is described in section 4.3

CHAPTER 4. RESEARCH DESIGN

This chapter consists of a brief description of pragmatism as the philosophical position in this PhD project. This is followed by a description of the methodologies applied to investigate the overall aim of the project. The PhD project comprises two studies to address the overall aim. Study 1 was a focused ethnographic study. Study 2 was a participatory design study. In the last section in this chapter, the connection between studies 1 and 2 is described.

4.1 PRAGMATISM

The researcher's philosophical assumptions influence the research process by guiding choices of methodologies and methods applied to elucidate the research aim (Carter & Little, 2007; Creswell & Poth, 2018). This PhD project was guided by philosophical assumptions within a pragmatic position. There are several forms of pragmatism and in the following the central ideas are briefly unfolded.

Pragmatism rejects dualisms such as realisms versus antirealism, objectivism versus subjectivism, and facts versus values (Johnson & Onwuegbuzie, 2004). Knowledge is gathered and attained from multiple sources and is provisional as it based on the changing reality that we experience and in which we interact (Greene & Hall, 2010; Johnson & Onwuegbuzie, 2004). Thus, there are no definite epistemological assumptions within pragmatism as truth is tentative and constituted within a given context (Johnson & Onwuegbuzie, 2004; Kelly & Cordeiro, 2020). According to pragmatism, science and practice are interconnected and reciprocally dependent and attempt to contribute knowledge that adds insights, makes changes, or solves problems in people's lives (Bacon, 2012; Greene & Hall, 2010). This means that knowledge derived from research needs to be useful, actionable, and contributable to problem solving within a given context (Creswell & Poth, 2018; Kelly & Cordeiro, 2020). In pragmatism diverse perspectives, theories, and methods are endorsed and are perceived useful to gain understandings of peoples' lives and their environment and to make appropriate changes (Johnson & Onwuegbuzie, 2004). Therefore, a pragmatic position enables application of multiple methodologies and methods pertinent to address the study aims (Creswell & Poth, 2018; Johnson & Onwuegbuzie, 2004).

This PhD project corresponds well with the central ideas of pragmatism. The overall aim in this PhD project is centred on nurses' use of the EWS and nurses' and physicians' ideas on initiatives that can support nurses' use of the EWS. Further to investigate how participatory methods can enable or impede genuine participation in a participatory design process with nurses and physicians. The knowledge derived from this PhD project is anticipated to be useful and actionable and to address what works for using the EWS in practice, which is emphasized as essential in

pragmatism (Creswell & Poth, 2018; Johnson & Onwuegbuzie, 2004; Kelly & Cordeiro, 2020). In addition, a pragmatic position allows for and guides decisions of appropriate methodologies and methods to answer the aims and to adapt to the new insights that arise during the research process. This position was well-suited to accommodate a useful and actionable choice of methodology and methods in studies 1 and 2 and for the connection between study 1 and study 2.

4.2 FOCUSED ETHNOGRAPHY

Focused ethnography was chosen for study 1. Focused ethnography focuses on gaining an understanding of a specific group of people's beliefs and practices with respect to a distinct problem in a specific context (Higginbottom et al., 2013; Roper & Shapira, 2000). Thus, focused ethnography was well suited for the aim of study 1 as it enabled description and exploration of the influences in nurses' use of the EWS to support clinical decisions by focusing on the nurses' beliefs and practices within their natural context for using the EWS.

Focused ethnography is a methodological position within ethnography that is often used within health research to address "the practice of nursing as a cultural phenomenon" (Cruz & Higginbottom, 2013). Ethnography is a methodology focused on "learning about people by learning from them" (Roper & Shapira, 2000). This means that the focus is to describe shared patterns of practices, behaviours, and beliefs within a given social context (Madden, 2017; Roper & Shapira, 2000). This is done by synthesizing an emic (participants' view) and etic (researcher's view) perspective to understand why people do as they do (Madden, 2017; Roper & Shapira, 2000). Cultural meaning within a context is elicited through continuous reflexivity and interpretation of data (LeCompte & Schensul, 2013; Madden, 2017; Roper & Shapira, 2000). Therefore, the use of focused ethnography in this study enabled learning about the nurses' practices and perceptions of the EWS by learning from them in their natural context of using the EWS. In addition, an ethnographic methodology was consistent with a pragmatic position since the connection between an emic and etic perspective enabled linking practice and research.

Knoblauch (2005) stressed that focused ethnography should only be conducted under conditions of *alterity* where the researcher's familiarity with the field guides the articulation of research questions and intensity in data collection and analysis. The researcher's preunderstanding of and familiarity with the field of interest enable the exploration of focused and specific questions within the studied context (Roper & Shapira, 2000; Knoblauch, 2005). Thus, focused ethnography was also relevant to this project as I entered the field under conditions of alterity through a specific focus of which I had a preunderstanding (Cruz & Higginbottom, 2013; Higginbottom et al., 2013). This preunderstanding enabled me to focus my process of data collection and analysis of nurses' use of the EWS in the clinical context (Roper & Shapira,

2000; Cruz & Higginbottom, 2013; Higginbottom et al., 2013). My role as researcher under the conditions of alterity is further elaborated in section 5.4.

4.3 PARTICIPATORY DESIGN

Participatory design was chosen for study 2. Participatory design focuses on designing solutions for a given practice through voiced participation and engagement of stakeholders (Kensing & Greenbaum, 2013; Robertson & Simonsen, 2013). Involving the stakeholders that will be affected in their practice by the designed solution is essential for the solutions to be practical (Kensing & Greenbaum, 2013; Robertson & Simonsen, 2013). Furthermore, research on decision support tools such as the EWS found that involving clinicians is pivotal for ensuring clinicians' acceptance and thereby use of decision support tools to support decisions (Khairat et al., 2018). Since the aim of study 2a was to explore nurses' and physicians' ideas on initiatives for using the EWS in a hospital setting, participatory design was appropriate. Therefore, participatory design was well suited since it provided the participants an opportunity to voice their viewpoints and influence the ideas on initiatives for using the EWS in their practice. In addition, the participatory design supports the connection between practice and the design of solutions to practice, which correlates well with the pragmatic position in this PhD project.

In participatory design, voiced participation is perceived as the participants' fundamental and democratic right to influence the practices in which they are engaged (Kensing & Greenbaum, 2013). Participants are engaged as experts to envision a solution that addresses a problem evident within their practice and that accommodates needs and visions they have identified (Robertson & Wagner, 2013; Robertson & Simonsen, 2013). In participatory design, it is essential that participants' participation is genuine, meaning that the participants' role is not limited to that of informants. Instead, their role is to engage in all steps of articulating, ideation, and deciding throughout the process via elicitation of everyone's perspectives (Robertson & Simonsen, 2013). The main advantage of applying a participatory approach to study 2 was a focus on achieving genuine participation. This participation democratically motivated the participants to genuinely involve themselves based on their experiences from practice and the input from study 1. When participants are involved in creating solutions, they can influence the solutions to accommodate needs in their future practice; thus, they have an emancipatory motivation to participate (Kensing & Greenbaum, 2013; Robertson & Simonsen, 2013).

4.4 CONNECTION BETWEEN STUDY 1 AND STUDY 2

Study 1 and study 2 are connected. Study 1 provided an understanding of influences in nurses' practices and perceptions of using the EWS. The knowledge from the ethnographic study was then useful for focusing and articulating the challenges that

the participatory study 2 addressed (Blomberg & Karasti, 2013). This second study 2a aimed to explore nurses' and physicians' ideas on initiatives for using the EWS. This connection further emphasizes the pragmatic position within this PhD project as findings from study 1 were used to adapt and modify the research process in study 2. The connection between study 2a and 2b is described in section 5.3.

CHAPTER 5. METHODS

The selection of methods is justified and guided by the methodology of each study, and the overall aim and specific aims guide the choice of methodology (Carter & Little, 2007). The methods applied in a study enable collection of data and analysis of the collected data (Carter & Little, 2007). This chapter presents the methods applied in the two studies that were guided by the methodologies described in Chapter 4. First, the study context is presented as this was the same in the two studies. Next, sampling, recruitment, participants, and methods for data collection and data analysis are described for study 1 and 2. The presentation is based on the three papers reporting the studies (Mølgaard et al., 2022; Mølgaard et al., n.d.(a); Mølgaard et al., n.d. (b)). This presentation supplements the papers by elaborating on the reflections on methodical decisions for studies 1 and 2. This chapter finishes with a section on the researcher's role and the ethical considerations.

5.1 STUDY CONTEXT

This PhD project was conducted at Aalborg University Hospital. The hospital employs more than 7,100 staff members and has close to 750 beds (Aalborg University Hospital, 2022). The EWS was implemented in the hospital in 2015 and was revised in 2019 and 2020. The EWS is used in all patients in the acute wards, medical and surgical wards, psychiatric wards, and pre-hospital services (Region Nordjylland, 2022). The study contexts for both studies were an acute and a surgical ward as these contexts were anticipated to sustain a continuous high flow of patients that required monitoring via the EWS during the day.

In the surgical ward, adult patients (elective and acute) are admitted needing physical examination and/or surgery related to gastrointestinal tract diseases. Patients are on average admitted in the ward for approximately five days. The ward decreased from 22 beds in 2019 to 16 beds in 2021 because of opening an additional acute ward targeting acute patients with gastrointestinal tract diseases. In 2019 when study 1 was conducted the ward employed 24 RNs, three HCAs, and approximately ten physicians. In the surgical ward, protocolled monitoring of the EWS encompassed elective and acutely admitted patients, i.e., patients returning from surgical procedures and newly admitted patients (elective and acute). Two mandatory daily routine rounds were conducted at around 7:30 a.m. and 3:30 p.m. and the EWS monitoring was conducted at the beginning of a shift

In the acute ward, patients in all ages were admitted acutely with gastrointestinal tract diseases related to the surgical specialty or with different medical diseases. The average hours for patients admitted in the ward is 23 hours and on average 33 patients are admitted to the ward daily. Patients may be referred from this ward to a specialized ward for further observation and treatment or patients may be discharged

directly from the ward. The ward encompassed 33 beds in 2019 when study 1 was conducted and employed 70 RNs, six HCAs and 35 physicians. In the acute ward, the protocolled monitoring of the EWS was undertaken when patients were brought into the ward or moved to a specialized ward of admission. Three daily routine monitoring rounds were mandated at around 5:00 a.m., 2:00 p.m., and 9:00 p.m. and the EWS monitoring was conducted at the end of a shift.

In both wards, monitoring of the EWS was undertaken in situations where the nurses judged monitoring of the EWS to be necessary regardless of the protocolled monitoring frequency.

5.2 STUDY 1

Study 1 was a focused ethnographic study. To meet the overall aim of the PhD project, study 1 addresses a specific aim and comprises research question 1. The specific aim of study 1 was to describe and explore the influences in nurses' use of the EWS to support clinical decisions in a hospital setting.

This section accounts for sampling, recruitment and participants, data collection, and the analytic strategy for data analysis in this study. This section is based on the content reported in paper 1 (Mølgaard et al., 2022).

5.2.1 SAMPLING, RECRUITMENT AND PARTICIPANTS

Sampling

The strategy for sampling of the participants was purposive, which is an appropriate strategy in ethnographic studies as the researcher is interested in the participants' emic perspectives and knowledge related to a specific topic of interest within the participants' context (Higginbottom et al., 2013; Roper & Shapira, 2000). Thus, this strategy is relevant when the study aim requires the participants to have knowledge specific to the topic in question (Carter & Little, 2007; Creswell & Poth, 2018; Malterud et al., 2016; Roper & Shapira, 2000). Purposive sampling helped in this project to ensure nurses were recruited who, in their daily practice, used the EWS and therefore were knowledgeable in using the EWS. The sampling criteria for inclusion encompassed nurses with different levels of seniority and experience. This meant that an equal distribution of nurses with a minimal level of experience (0-2 years), a moderate level of experience (2-3 years), and a high level of experience (more than 4 years) was sought so that the study would include diverse participants to achieve maximum variation in the sample (Carter & Little, 2007; Creswell & Poth, 2018). This categorization is based on Benner's (1982) description of five levels of skill acquisition among nurses. Benner argued that nurses on level 3 (competent) had 2-3 years of experience, which was perceived to reflect a moderate level of experience. Additionally, nurses with fewer than 2 years of experience were

categorized as having a minimal level of experience, and nurses with more than 4 years of experience were categorized with a high level of experience (Benner, 1982).

A sample of six nurses from each ward, or 12 nurses in total, was estimated. Nurses from two wards were included in the study because this enabled to explore nurses' use of the EWS across two sites as part of achieving maximum variation (Creswell & Poth, 2018). Estimating sample size comprises systematic consideration of the level of information power in the included sample (Malterud, 2016). The higher is the information power, the smaller is the sample needed to adequately elucidate the aim of the study (Malterud, 2016). The needed sample size is considered against the narrowness of the aim and the specificity of the participants' experiences and knowledge about the topic (Malterud, 2016). In addition, if the dialogue with the participants is focused, then this increases the information power (Malterud, 2016). The aim in study 1 was narrowly focused on influences in nurses' practices of using the EWS. The nurses were purposively sampled and thus held specified experiences and knowledge of interest to the aim. Moreover, the data collection was focused from the beginning through the conditions of alterity. Altogether, this increased the information power. Consequently, it was estimated that the 12 nurses would be an adequate sample.

Recruitment

The hospital management was asked for permission to conduct the research in the two abovementioned wards. After this permission was granted, I contacted the managing nurse in each ward by email to ask for their permission as well. As they both were interested in the study, I met with each managing nurse to give further details about the study and answer additional questions. During these meetings the managing nurses gave their consent to help as gatekeepers with recruitment of six nurses form each ward to participate in study 1. After this meeting written information to the gatekeepers was emailed as follow up to the oral information (Appendix B). The managing nurses as gatekeepers were asked to inform nurses on the wards about the study, and to recruit the nurses based on the inclusion criteria. Also, the gatekeepers handed out written information about the study to the nurses who were interested in participating (Appendix B), Contact information for the interested nurses was emailed to me, and I then contacted each nurse for a short meeting on the wards. I met with each nurse face to face to elaborate on the information about the study and to answer additional questions. If the nurses volunteered to participate in the study, they were handed written consent forms to sign (Appendix C). All the nurses who showed interest in the study volunteered to participate. For the short meeting, I had prepared demographic questions that all participants were asked during this meeting. The questions encompassed their ages, years of experience, seniority, and if they had received formal training to use the EWS.

When conducting ethnographic research, the researcher may need to adjust the data collection to fully comprehend what is going on in the field related to the topic of interest (LeCompte & Schensul, 2013). During the data collection and the initial analysis, I became aware that the nurses' use of the EWS was influenced by the physicians' practices concerning the EWS. Operating the EWS in the clinical context requires collaboration between nurses and physicians. Consequently, I adapted the data collection by recruiting four physicians for interviews to supplement data with the physicians' influence on the nurses' practices with respect to the EWS. Eligible for inclusion were physicians from the two included wards that had experience using the EWS in the clinical context.

The physicians were recruited by solicitation combined with convenience (Higginbottom et al., 2013) as I emailed physicians whose names I was provided by various contacts in the wards. The physicians were asked via email for the same demographic data as the nurses: their ages, years of experience, seniority, and if they had received formal training to use the EWS.

Participants

A total of 16 participants were included in study 1, with a distribution of 12 nurses (six from each ward) and four physicians (two from each ward). However, due to practical reasons, one of the nurses was neither observed nor interviewed for study 1.

The nurses' level of experience varied from 6 months to 35 years. The nurses´ seniority varied from employment in one ward to a broad seniority within specialties. In total, eight nurses had experience from a different specialty or ward. One of the 12 nurses had received formal training to use the EWS in the hospital and one of the nurses could not remember if any introduction was given. The physicians' level of experience varied from 7 to 19 years. Three physicians had experience from employment in a different specialty or ward. Three of the four physicians had received formal training to use the EWS. The demographic data are shown below in Table 2.

Table 2 – Demographic characteristics of participants in study 1. From paper 1 (Mølgaard et al., 2022)

Participant	Ward	Work experience (years)	Experience in present ward (years)	Participated in observations and/or formal interviews	Received formal introduction to the EWS
Nurse 1	Surgical	3	2.5	X/X	-
Nurse 2	Surgical	2.5	2.5	X/-	-
Nurse 3	Surgical	0.5	0.5	X/X	-
Nurse 4	Surgical	9	8	X/X	-
Nurse 5	Surgical	35	24	-/X	X
Nurse 6	Surgical	1.33	0.67	X/X	-
Nurse 7	Acute	1.5	1	X/X	-
Nurse 8	Acute	1	0.5	X/X	-
Nurse 9	Acute	6	6	X/X	-
Nurse 10	Acute	22	6	X/X	?
Nurse 11	Acute	8	4	X/X	-
Nurse 12	Acute	8	8	-/-	-
Physician A	Acute	19	8	-/X	X
Physician B	Acute	13	6	-/X	-
Physician C	Surgical	7	5	-/X	X
Physician D	Surgical	14	14	-/X	X

5.2.2 DATA COLLECTION

In ethnographic studies, two main methods for data collection are participant observation and interviews (Roper & Shapira, 2000; Madden, 2017; Higginbottom et al., 2013). These methods are appropriate in ethnographic research because they allow the researcher to observe the participants' activities in their natural context and to interview the participants about those activities, which may facilitate and guide further observations (Hammersley & Atkinson, 2007; O'Reilly, 2012; Roper & Shapira, 2000). These two methods also enable elicitation of the cultural meaning of the studied topic of interest (O'Reilly, 2012; Roper & Shapira, 2000). Therefore, participant observation and interviews were pertinent in study 1 as the nurses' activities could be observed when using the EWS. In addition, the observations were elaborated on during interviews with both nurses and physicians. Also, the interviews were appropriate to guide further observations about the influences in the nurses' use of the EWS.

Data collection was initiated in March 2019 and ended in August 2019.

Participant observation

Participant observations in focused ethnography are directed towards distinct activities or events within a specific group of people (Roper & Shapira, 2000; Cruz & Higginbottom, 2013). The approach "observer as participant" for participant observations was chosen as this approach is well suited for collection of focused and specific observations with minimal interference from the observer in the observed activities (Higginbottom et al., 2013; Roper & Shapira, 2000). This means that where the nurses were monitoring the EWS or otherwise engaged in using the EWS, I strived for minimal interaction to mitigate my influence on the nurses' practices (Higginbottom et al., 2013; Roper & Shapira, 2000). Management of the role as researcher is unfolded in Section 5.4.

Each participant observation was arranged and agreed upon between the participant and me, and we ended each observation with an agreement for when the next observation could occur. The observations were discontinued if the participants requested it or if the participant and I judged no further activities related to the EWS would be undertaken in the following hours of the shift. One participant requested discontinuation of an observation due to a heavy workload that made the nurse uncertain about how to prioritize her time. She therefore preferred to give undivided priority to the direct patient care. In total, 90 hours of participant observation were carried out from March 2019 to June 2019.

In the surgical ward, each observation was undertaken from the beginning of a shift (day or evening) since the routine monitoring of EWS was conducted at these times with potential re-monitoring if the EWS elevated from zero. Observations were conducted during day and evening shifts in the hours between 7:00 a.m. and 8:00 p.m. Approximately 59 hours of participant observation were conducted across 15 shifts.

In the acute ward, the best times for observations were noon, afternoon, and evening since the routine monitoring of EWS in this ward was conducted at the end of a shift. Observations were primarily conducted between 10:30 a.m. and 8:00 p.m. These hours were decided in collaboration with the participants and were chosen to establish the optimal conditions for observations. In addition, these hours had a high flow of acute patients being referred to the ward and therefore had the EWS monitored at arrival. On one occasion, the observation was conducted during a night shift between 4:30 a.m. and 7:00 a.m. In the acute ward approximately 31 hours of participant observation were conducted across 11 shifts.

The participant observations were guided by three overall analytical questions focusing on (a) how the EWS was used by the observed nurses, (b) when the nurses used the EWS, and (c) what their reasons were for how and when to use the EWS. These three analytical questions were articulated and re-articulated at the outset in

the aim for study 1. The analytical questions aided to focus the observations and make the observations selective as I became more familiar with the practices on the wards and the initial analysis of the data from the observations (LeCompte & Schensul, 2013; Spradley, 1980). Observations were written down in fieldnotes by following three principles articulated by Spradley (1980): the language identification principle, the concrete principle, and the verbatim principle. The principle of language identification means that the different speakers were identified in the fieldnotes, and each speaker's language was noted to enable analysis of cultural meanings related to the language. The concrete principle means that the fieldnotes were written with as many details as possible. At the same time, generalized descriptions of the observed activities were avoided to maintain depth in the fieldnotes and thus enable depth and substance in the analysis. The verbatim principle means that fieldnotes were recorded as verbatim as possible to reflect what people said during the observations. This principle allowed further exploration in observations and interviews to depict the cultural meaning of the content. These three principles for taking fieldnotes were used because they provided a structure for obtaining fieldnotes that stayed true to the participants' practices including their language related to the use of the EWS (Spradley, 1980). Moreover, following these principles aided to distinguish the events from one another as details such as time, place, and involved persons were noted (Spradley, 1980). After each participant observation, the fieldnotes were transcribed and expanded to ensure as many details and descriptions as possible were included (Spradley, 1980).

Ethnographic interviews

Conducting interviews as part of ethnographic research allows for elaborations of elements from the observations and the participants' thoughts and reflection that cannot be observed (Roper & Shapira, 2000; Higginbottom et al., 2013). The term *ethnographic interview* refers to interviews conducted within an ethnographic study and that are based on a continuum from unstructured to highly structured interviews (Madden, 2017). Moreover, interviewing can be divided into informal and formal, which have different characteristics (O´Reilly, 2012; Roper & Shapira, 2000). This research study involved both types, which were appropriate for different reasons. The choice to conduct informal interviews during the observations was appropriate because this served to bring forward as many nuances in the observations as possible (Roper & Shapira, 2000; Spradley, 1980). Also, the participants could have had difficulty remembering details if the questions had been posed disconnected from the actual situations (Roper & Shapira, 2000; Spradley, 1980). Secondly, the formal interviews were appropriate because they allowed to prepare questions based on the observations (Roper & Shapira, 2000). Moreover, formal interviews were well suited for posing questions that required the participants to reflect upon the observed practices that could be based on single or multiple events of a specific use of the EWS (O'Reilly, 2012; Roper & Shapira, 2000).

Informal interviewing

Informal interviewing is characterized by being impromptu and occurring during observations when an event or account of interest needs to be elaborated or clarified (Roper & Shapira, 2000). Questions are often open-ended to avoid limiting the participants' answers and to sustain the flow of a natural conversation (Madden, 2017; Spradley, 1979). Due to an agreement with the managing nurses that the observations would be conducted without disturbing the participants' workflow, these informal interviews occurred when feasible for the nurses and when pertinent to the quality of the data (Hammersley & Atkinson, 2007). Balancing the extent of informal interviews was part of maintaining access to the nurses by acknowledging that their primary obligation was the care and safety of the patients (Atkinson, 2015; Roper & Shapira, 2000). This is further unfolded in Section 5.4 study 1. Open-ended questions were used to allow for elaboration, such as on what made the nurse decide upon the patient's clinical condition (Roper & Shapira, 2000; Spradley, 1980). In some situations, more direct questions were asked to clarify what had been observed (Roper & Shapira, 2000). For instance, if there was uncertainty about what value was recorded for a specific vital parameter. Notes from these informal interviews were taken following the same principles as when shadowing the participants.

Formal interviewing

Formal interviewing is characterized by being pre-planned and may be structured or unstructured (Hammersley & Atkinson, 2007). Regardless of the degree of the structure, the intention with the questions is to motivate participants to talk thoroughly about topics of interest to the research aim (Hammersley & Atkinson, 2007). In the interviews, the participants were encouraged to elaborate on specific events from the observations, so structured formal interviews were used to ensure this elaboration was achieved (Hammersley & Atkinson, 2007; Roper & Shapira, 2000). Therefore, questions were prepared and structured in a topic guide in advance of each interview (Roper & Shapira, 2000; Madden, 2017). The topic guides were structured with inspiration from Spradley's three main types of ethnographic questions: descriptive, structural, and contrast (Spradley, 1979; Spradley, 1980). This structure was pertinent since these types of questions help to focus on asking for "use" instead of "meaning" as suggested by Spradley (1979). This focus ensures that the topic is explored from different angles and enables the discovery of patterns within the studied practice (Spradley, 1979). Asking for use instead of meaning mitigated the risk that the participants translated their answers to help me grasp what they were talking about (Spradley, 1979). Also, asking for use enabled the participants to talk naturally, allowing me to interpret the meaning afterwards (Spradley, 1979). Descriptive questions are used to bring about the participants' descriptions of a certain activity, event, or belief by using the language embedded in the culture (Spradley, 1979; Spradley, 1980). Structural questions are used to aid the discovery of cultural meaning surrounding the activities, events, and beliefs

(Spradley, 1979; Spradley, 1980). Contrast questions are used to discover dimensions of meaning employed by the participants by expressing differences among activities, events, and beliefs (Spradley, 1979; Spradley, 1980). Table 3 gives examples of each type of question. These types of questions encouraged participants' descriptions of and reflections on practices and beliefs for eliciting the cultural meaning of using the EWS in the clinical context. The prepared questions suggested topics and were not necessarily asked in the same way or order as in the topic guide (Hammersley & Atkinson, 2007; O'Reilly, 2012). Thus, all formal interviews were conducted flexibly by pursuing the participants' detailed thoughts and reflections on topics covering the use of the EWS as they occurred in the interviews (Hammersley & Atkinson, 2007; O'Reilly, 2012). The formal interviews were audio recorded and transcribed verbatim.

Table 3 - Examples of questions from a topic guide with formal interviews with a nurse and a physician

	Topic guide - Nurse	**Topic guide - Physician**
Descriptive question	I have noticed that sometimes you orient towards the previous EWS in the patients' records. Often you write these values in a note to yourselves. Can you describe your application of these previous EWS at the patients? Can you describe what responsibility the nurse has in relation to the EWS	Can you describe how you typically use EWS in the assessment of your patients
Structural question	What are (all) the ways to do the EWS monitoring What are (all) your options for intervening to a patients' elevated EWS?	What are (all) the subjects that nurses summon you about concerning the EWS?
Contrast question	What is the difference between interventions you initiate to an elevated EWS colour coded green, yellow, orange, or red? What is the difference between collaborating with the physicians about the EWS and the nursing colleagues?	What is the difference between downgrading in the electronic EWS system and doing it orally to the nurse?

Formal interviews with the nurses

The topic guide for the nurses included questions based on the observed practices across participants and the research literature on the topic. Also, questions based on concrete actions and/or answers from each individual nurse were included. The formal interviews with the nurses were scheduled flexibly with the participants. O'Reilly (2012) emphasised that planning and conducting of interviews needed to be adapted to the participants' circumstances and possibilities. Thus, some of the interviews were conducted in continuation of an observation whereas others were conducted at a separate time after the last observation to accommodate the nurses' workload and private appointments. The managing nurses in the wards were asked for permission to conduct the interviews during the nurses' working hours, and both gave their permission. However, in the surgical ward, the managing nurse set a 30-min limit for each interview due to nurses' heavy workload in the ward. O'Reilly (2012) noted that interviews should usually last between 45 min and 2 hr, but that shorter interviews may provide the required depth, especially if the parties are known to each other. As part of adapting the formal interviews to the circumstances and possibilities underlined by O'Reilly, this time restriction was the frame for the interviews in the surgical ward. The interviews with the nurses (both wards) lasted between 35 and 55 min with an average of 42 min.

Formal interviews with the physicians

The topic guide for the physicians was identical for all four interviews since participant observation of the individual physicians was not undertaken. The questions in this topic guide were focused on exploring the physicians' experiences collaborating with the nurses on use of the EWS, the physicians' perceptions of the EWS, and the physicians' practices on how the EWS was operated. Interviews with the physicians were scheduled by email similarly to recruitment for the study. These interviews were conducted in the same period as for the nurses. Interviews with the physicians lasted between 20 and 35 min with an average of 25 min.

5.2.3. DATA ANALYSIS

The analysis was carried out based on inspiration from an ethnographic method described by LeCompte and Schensul (2013). This method was chosen as it sustains a recursive connection between data collection and analysis, which is necessary in ethnographic studies (Higginbottom et al., 2013; LeCompte & Schensul, 2013; O'Reilly, 2012). Analysis of data is a process of organizing data and making sense of the data (LeCompte & Schensul, 2013; Roper & Shapira, 2000). Data collection and data analysis was a recursive process that was discontinued with the final interpretation of the data representing an exploration of the aim for study 1 (LeCompte & Schensul, 2013; Hammersley & Atkinson, 2007). That analysis is a recursive process means that the analysis is engaged with deductive and inductive

processes throughout the analysis by moving back and forth between them (LeCompte & Schensul, 2013). A deductive process is analysis from 'top-down', which means that predefined concepts or coding categories are applied for the analysis (LeCompte & Schensul, 2013). These concepts and coding categories may stem from research questions, theoretical knowledge, or research literature (LeCompte & Schensul, 2013). An inductive process is analysis from the 'bottom-up', which means that it is data-driven (LeCompte & Schensul, 2013.The purpose with the analysis was to reach a consistent exploration of the aim for the study (Higginbottom et al., 2013; Malterud et al., 2016; O'Reilly & Parker, 2013). The NVivo 12 PRO software was used to aid the management of the data in the analysis (Edhlund & McDougall, 2019).

Analysis was initiated when entering the field during participant observation and continued throughout the data collection as part of the recursive process (LeCompte & Schensul, 2013; Higginbottom et al., 2013). During transcription of the fieldnotes reflexive notes were made and areas for further focused observations and interviewing (informal and formal) were noted (LeCompte & Schensul, 2013). This initial analysis was guided by research literature about nurses' use of the EWS and three analytical questions. The three analytical questions were how and when do the nurses' use the EWS and what are the reasons for how and when they use the EWS the way they do. This contributed to the recursive process of refining questions and observations that were asked during the data collection (LeCompte & Schensul, 2013; Higginbottom et al., 2013). In this way the data collection was refined by the initial analysis and vice versa (LeCompte & Schensul, 2013; Higginbottom et al., 2013).

After the participant observations and informal and formal interviews the analysis proceeded. Transcripts from the observations including informal interviews and formal interviews with nurses and physicians were included in the analysis. This meant that 26 transcripts from observations and 14 transcripts from formal interviews were included for analysis. The transcripts were read several times to gain an overview and sense of the material (Hammersley & Atkinson, 2007). This was followed by transferring the material to NVivo for coding of the material (40 transcripts) and handling the initial management of the large amount of data (Roper & Shapira 2000; Hammersley & Atkinson, 2007). Codes were ascribed to the material based on the three analytical questions encompassing how and when do the nurses' use the EWS and what are the reasons for how and when they use the EWS the way they do. Also, codes were ascribed according to newly identified areas in the data and according to pertinent theoretical knowledge and research literature. Then the codes were reread and renamed when pertinent to achieve adequacy in the content of the codes. The purpose of this process was to make sure that the data collected was adequate to fulfil the study aim (LeCompte & Schensul, 2013). Codes that conveyed related content by looking for declarations, similarities, omissions, frequencies, co-occurrences, and contradictions were then categorized together,

which formed the identification of sub-themes (LeCompte & Schensul, 2013; Hammersley & Atkinson, 2007). Next, sub-themes were clustered into themes by identifying and explaining connections among the patterns related to the study aim, which was the influences in nurses' use of the EWS (Roper & Shapira, 2000; Creswell & Poth, 2018; Madden 2017). This process concluded with fine-tuning the themes and sub-themes to conform to the data (LeCompte & Schensul, 2013). The last process in the analysis was the final interpretation in relation to research literature to explain the meaning of the influences in nurses' use of the EWS and the implications thereof within a hospital context (LeCompte & Schensul, 2013; Madden, 2017). Throughout the analysis, the data, emerging patterns, findings, and interpretations were discussed, reflected upon, and validated together with the team of supervisors to sustain reflexivity and a receptiveness towards the analysis (Creswell & Poth, 2018; Knoblauch, 2005).

5.3 STUDY 2

Study 2 was a participatory design study based on two participatory workshops for data collection. To meet the overall aim of the PhD project, study 2 addresses two specific aims and comprises research question 2 and 3. The aim of study 2a was to explore nurses' and physicians' ideas on initiatives for using the EWS in a hospital setting. Study 2a is reported in paper 2 (Mølgaard et al., n.d.(a)). As the design was participatory design, with emphasis on genuine participation, the aim of study 2b was to analyze and discuss how participatory design methods enable or impede nurses' and physicians' genuine participation when exploring ideas on initiatives for using the EWS in a hospital setting. Study 2b is reported in paper 3 (Mølgaard et al., n.d.(b)).

This section elaborates on sampling, recruitment and participants, data collection, and the data analysis for this study. As two analyses were conducted to address research question 2 and 3 in response to the overall aim, section 5.3.3 is divided into two parts describing the analysis in study 2a and 2b, respectively.

The content in this section 5.3 is based on paper 2 (Mølgaard et al., n.d.(a)) and paper 3 (Mølgaard et al., n.d.(b)).

5.3.1 SAMPLING, RECRUITMENT AND PARTICIPANTS

Sampling

The strategy for sampling of participants was a combination of purposive and convenience sampling. This strategy was chosen because Sanders and Stappers (2012) described purposive sampling as a relevant method for sampling in participatory design to ensure participants contribute according to the aim of the study. Kanstrup and Bertelsen (2016) argued for selecting eight participants for a

participatory process to establish a balance between depth and breadth to allow patterns to develop in the process. Ørngreen and Levinsen (2017) explained that a small group (number not defined) of participants was preferable to allow every participant to voice their viewpoints and attend to the process. Moreover, Kanstrup and Bertelsen (2016) explicated three criteria to consider when sampling participants including that (a) the users are interested in finding solutions to problems, (b) the users are motivated through being troubled by their needs, and (c) the users are motivated for untraditional thinking. Considering these criteria is essential for establishing a group of participants who have a readiness to be involved in a participatory process (Kanstrup & Bertelsen, 2016). Attempts to accommodate these three criteria were made by recruiting a sample of the participants from study 1 since I knew the participants and their interest and engagement in the topic. This method may also reflect an element of convenience sampling as the participants within study 1 who were available for recruitment were included (Elfil & Negida, 2017).

Recruitment

For study 2, I sent an email to the managing nurses of each ward to establish whether they consented to continue contributing to the PhD project as gatekeepers and allowing the nurses to participate in study 2 as well. They gave their consent and provided information about the availability of the nurses from study 1. Only nurses who were still employed at the two wards were asked for participation in study 2. In the surgical ward, two nurses were no longer employed in the ward, and two nurses were on maternity leave. In the acute ward, one nurse was no longer employed in the ward, and two nurses were on maternity leave. The available nurses and the four physicians from study 1 were emailed to ask if they would participate in study 2. Two of the four physicians included in study 1 declined to participate due to time constraints or an inability to participate on the date set for the first workshop. Thus, five nurses and two physicians were available for participation in study 2. Next, written information about study 2 was emailed to the nurses and physicians after their preliminary acceptance. All seven participants replied to the email and volunteered to participate in study 2 and were therefore included. All seven participants signed consent forms at the first workshop.

Participants

A total of seven participants were included in study 2, with a distribution of five nurses (three from the acute ward and two from the surgical ward) and two physicians (one from each ward).

The nurses' level of experience varied from 10 to 37 years (2 years had passed between the two studies). The nurses' seniority varied from employment in one ward (one nurse) to a broad seniority within a different specialty (four nurses). The physicians' level of experience varied from 15 to 16 years of experience. One

physician had seniority in different specialties whereas the other physician's seniority stemmed from one specialty.

5.3.2 DATA COLLECTION

In participatory design, data collection can be planned in various ways by applying methods and techniques that enable the guiding principles of having a say, mutual learning, and co-realisation to be accommodated (Bratteteig et al., 2013). I chose to conduct workshops as this provided a frame for generated opportunities for participants' active and cooperative ideation of initiatives based on sharing experiences of using the EWS (Ørngreen & Levinsen, 2017). The workshops as a frame enabled the participants' diverse perspectives on ideas on initiatives for using the EWS come into play (Muller & Druin, 2012). As such the workshops facilitated a space for sharing knowledge on familiar topics like the EWS in unfamiliar ways (Muller & Druin, 2012).

A method described by Kanstrup and Bertelsen (2016), the User Innovation Management (UIM) approach, was chosen for planning and conducting the two workshops. This method is briefly described in the following subsection. Subsequently, the content for the two workshops is explained.

User Innovation Management

Kanstrup and Bertelsen (2016) accentuated the use of the UIM method for developing new work procedures or for designing new products by involving users in an early stage of the process. Involving users with knowledge within the field at early stages is significant for giving feasible and acceptable directions for the focus in the process (Kanstrup & Bertelsen, 2016). Therefore, users need to be involved early in the process to ensure the users' knowledge influences the ideas and suggestions for the output of the process. Thus, this method was chosen for study 2 because it is consistent with the focus in participatory design to involve participants from the practice for which the designed solution is intended and to give these participants a voice to influence the process.

This method provided a clear structure that aided the planning and the facilitation of the workshops (Kanstrup & Bertelsen, 2016). This method is structured after three themes encompassing six steps in total. The three themes in this method are cooperation, context, and concept, and they are explained in the following subsections.

Co-operation: select users and plan the workshops

The first theme is *cooperation*. This theme aided to establish the foundation for cooperation that ensured participants were involved in the process. The theme

consists of two steps, select and plan. The select step is about selecting participants according to the aim of the study (Kanstrup & Bertelsen, 2016), and this step was described in the above section 5.3.1.

The second step, planning the process, evolved around the aim for study 2. The focus was planning a participatory process that enabled the participants to (a) identify needs, motives, and visions derived from their practice of using the EWS and (b) explore ideas on initiatives for using the EWS in a hospital context. The first part, (a), was addressed in workshop 1 and the latter, (b), in workshop 2. The detailed planning of workshop 2 was based on the insights gained from analysing data from workshop 1 to ensure that content and activities in workshop 2 incorporated these insights (Kanstrup & Bertelsen, 2016; Robertson & Wagner, 2013). When planning the process, it is important to consider how many activities can be carried out to reach the study's aim in the time available (Kanstrup & Bertelsen, 2016). This consideration was accommodated by preparation of a timeline outlining the activities for both workshops. This timeline I discussed with an experienced facilitator of participatory workshops to ensure enough time for each activity (Kanstrup & Bertelsen, 2016). The collaboration with the facilitator is further elaborated in section 5.4. Methods and techniques that encourage mutual exploration and expression of needs, motives, visions, and the ideas on initiatives for using the EWS were considered when planning the workshops (Bratteteig et al., 2013; Brandt et al., 2013; Kanstrup & Bertelsen, 2016; Sanders & Stappers, 2012). These methods and techniques are described in detail in relation to the workshop where they were used. The facilitation method is explicated in section 5.4. See Table 4 for an overview of the selected methods.

Table 4 – Overview of the participatory methods used in workshops 1 and 2

Participatory method	**Workshop 1**	**Workshop 2**
Facilitation	X	X
"How it could be" on post-its	X	
Personas		X
Template with guiding questions		X

Although the workshops were planned in the "plan" step (theme 1), they were planned to connect with the content of the second and third themes in the UIM method where the planning efforts were performed. The outline of theme 2 (context) is described related to workshop 1 and theme 3 (concept) is described related to

workshop 2. Therefore, the following sections describe the detailed planning and the content for carrying out workshop 1 and workshop 2 respectively.

Context: Workshop 1

The second theme is *context* and covered workshop 1. This theme aided generation of the participants' understanding of their contextual knowledge about their practice and needs, motives, and visions derived from this practice (Kanstrup & Bertelsen, 2016). This theme consists of the two steps, insights, and vision. The insights step encompassed generation of the participants' articulation of needs and motives based on their practice of using the EWS. The vision step encompassed exploration of visions for future use of the EWS.

Workshop 1 aimed at generating insight into the participants' needs and motives concerning use of the EWS and articulating visions for future use of the EWS. It was important to enable participants to express their needs and motives through their thoughts and experiences about using the EWS (immersion into the current practice). This expression is part of setting the problem(s) on which to focus and serves as a precursor for reflecting upon what their visions (exploring future practices) for using the EWS were (Kanstrup & Bertelsen, 2016; Sanders & Stappers, 2012). Generating this insight among the participants was the foundation for exploring ideas on initiatives for using the EWS in a hospital setting (Kanstrup & Bertelsen, 2016). See Appendix F for the programme for workshop 1. Workshop 1 lasted for 3 hours and was audio recorded.

I allocated participants into two groups ahead of the workshop as the intention was to achieve maximum variation in the groups. Sanders and Stappers (2012) suggested that grouping of participants should aim for participants to have something in common such as age, interest, experience, or occupation to ensure beneficial group dynamics. In this study, all participants had a shared interest in the topic and several years of experience using the EWS. Since the participants had interest and experience in common, one physician and nurses from each ward were allocated to each group to ensure maximum variation in the groups. Two of the nurses had more than 20 years of experience, so one was allocated to each group. Sanders and Stappers (2012) stressed that the facilitator must be proactive and anticipate participants' behavioural patterns in the group. Since I knew the participants from study 1, I used this knowledge to determine how to allocate participants to the groups. This was an attempt to ensure that participants had equal access and opportunities to express themselves during the workshop by allocation to a group that ensured homogeneity (interest and experience) in some of the participants' characteristics while achieving heterogeneity in others (profession and specialty).

Workshop 1 was initiated by focusing on the insight step as the key findings from study 1 were presented after a short welcome and introduction to the process. After

this presentation, a group discussion followed in the two groups where the participants were asked to identify needs and motives based on the presented key findings from study 1. See Table 5 for prearranged questions for workshop 1. This approach aided the problem setting in the workshop and enabled participants a mutual opening to the process (Bratteteig et al., 2013). Moreover, this approach allowed participants the opportunity to bring tacit experiences and knowledge forward by discussing their practice with other clinicians (Kanstrup & Bertelsen, 2016; Sanders & Stappers, 2012). The insight step was followed with inviting the groups to present the content of their discussions to each other. There was an emphasis on the identified needs and motives derived from the key findings they were presented. A plenary discussion to elicit further relevant reflections was facilitated. The output from the insight step was incipient for subsequent voicing of ideas on future use of the EWS (Kanstrup & Bertelsen, 2016; Sanders & Stappers, 2012). The vision step was facilitated by providing the participants three types of beginning sentences to guide participants' ideas on the future uses of the EWS (Kanstrup & Bertelsen, 2016). These beginning sentences were *"What if …," "The problem is solved by …," or "Going forward, the EWS enables …."* This method sought to challenge the participants' thinking patterns with unorthodox thinking, which Kanstrup and Bertelsen (2016) described as focusing on "how it could be" in the future. Participants wrote the chosen beginning sentence on post-it notes and finished the sentences with their visions. Similar to the previous task, this was also followed up with the groups' presenting the content from the post-it notes for each other. Also, a plenary discussion was facilitated to challenge and elaborate the participants' elicited visions. Before ending the workshop, a short introduction to the process in workshop 2 was provided, and the participants were thanked for their time so far. The last task in workshop 1 was setting a date and time for workshop 2 in which all participants were free to partake.

Table 5 – Prearranged questions for workshop 1

Activity	**Prearranged question**
Insights on needs	What needs do you identify related to the four areas?
Insights on motives	What motivates these needs?
Visions for future use:	What if … The problem is solved by … Going forward, the EWS enables...
Plenum discussion related to visions	Can some of your visions be grouped together? Have new visions emerged that should be added?

Construction of personas before workshop 2

The use of personas was one method chosen to facilitate data collection in study 2, which is why this method is described here before describing workshop 2. The persona method was appropriate because it facilitated participants' immersion in discussions around the topic of interest through the developed personas based on their practices and perspectives of using the EWS (Nielsen, 2013). Thus, this method is consistent with the rationale for participatory design. Participants' practices and opportunity to voice diverse viewpoints are essential in participatory design for enabling a democratic and emancipatory process as a basis for genuine participation.

A *persona* was defined by Nielsen (2013) as a description of a recognizable, yet fictitious, individual within a given context. The persona description of a persona is focused as a lens towards the specific context in which the persona is used for developing a solution (Nielsen, 2013). The description of the persona is based on knowledge about the individuals in the context and exclude content that is not of interest to the focus (Nielsen, 2013). Thus, the constructed personas must be recognizable to the participants in the workshop as representing individuals with recognizable needs, motives, and visions identified from their everyday clinical practice (Nielsen, 2013). The intent of using personas was that participants at workshop 2 could be provided with a shared starting point for ideation of initiatives (Nielsen, 2013). The participants initiated the discussions in the mindset of a persona. The persona was based on the findings from study 1 and the needs, motives, and visions identified in workshop 1.

The detailed planning of workshop 2 encompassed my construction of personas (see Appendix G for an example). The participants identified four different kinds of users for the EWS in workshop 1. Four is a suitable number of personas as it allows participants to distinguish among the personas (Nielsen, 2013). The four identified users and associated personas were:

1. User: Nurses with a minimal level of experience.
   Persona: Lotte, a newly graduated RN with a few years of experience

2. User: Nurses with many years of experience
   Persona: Helle, an RN with many years of experience

3. User: Physicians collaborating with the nurses on the EWS
   Persona: Christian, a senior physician

4. User: Agency staff collaborating with the nurses on the EWS
   Persona: Julia, a nursing student working as agency staff at the hospital and assisting with monitoring the patients' EWS

Each of these four users of the EWS was the starting point for describing a persona since this would be recognizable for the participants (Nielsen, 2013). Needs, motives, and visions identified by the participants in workshop 1 were used to tell the story of the personas' experiences with EWS in the written descriptions. Situations and observations from the participants in study 1 were integrated to create a cohesive description of the personas (Nielsen, 2013). Nielsen (2013) described a persona template that was used as inspiration for deciding what areas to include in the description of the personas as this provided a structure for the descriptions. The areas included in the description of each persona were the following:

- Personal information such as name, age, and features that describe the character of the persona
- What experiences the persona has using the EWS in the clinical practice (inclusion of needs, motives, and visions)
- What the work routines around use of the EWS are (inclusion of needs, motives, and visions)
- What the perceptions and insights related to use of the EWS are (inclusion of needs, motives, and visions)
- What is the vision for the persona

The four personas were an essential part of the content for workshop 2 since they were the foundation for participants' ideas on initiatives in this workshop.

Concept: Workshop 2

The third theme is *concept* and covered workshop 2 with the sketch step. See Appendix F for the programme for workshop 2. This theme focused on creating connections among the insights and visions derived in the previous workshop and the ideation of initiatives to accommodate those insights and visions. This step was concerned with manifesting ideas on initiatives for using the EWS in a hospital setting (Kanstrup & Bertelsen, 2016). Lastly is the present step, during which the results from the process are disseminated to relevant stakeholders. This is done to ensure that the new knowledge contributes to developing strategies for implementation of the solutions (Kanstrup & Bertelsen, 2016). However, as the process requires further iteration to establish a well-defined solution to the problem in focus, this step was omitted until a complete solution was ready to be presented in detail (Kanstrup & Bertelsen, 2016). Since the aim with study 2a was to explore nurses' and physicians' ideas on initiatives for using the EWS in a hospital setting, it was not intended to develop a detailed solution that was ready to be presented. Therefore, this present step is not further described. Workshop 2 lasted for 2 hours and was also audio recorded.

For workshop 2, I grouped participants into two groups, and each group was allocated two personas for which to explore ideas on initiatives. These groups were

different from those in workshop 1, for I assigned participants this time to achieve homogeneity according to years of experience (Sanders & Stappers, 2012). This approach was chosen because an equalized level of experience was perceived to increase the group dynamics when discussing ideas on initiatives for using the EWS (Sanders & Stappers, 2012). The four participants with the most experience were two physicians and two nurses who together formed one of the groups. In addition, the physicians were grouped together because they were allocated the physician persona (Christian) because it was assumed that the physicians would prefer and perceive this persona to be most recognizable (Kanstrup & Bertelsen, 2012). This was done to enable more perspectives and nuances to be displayed in the physicians' perceptions during the discussions (Nielsen, 2013). This group was also allocated the nurse persona with a few years of experience (Lotte). The second group with three nurses was allocated the personas of the nurse with many years of experience (Helle) and the agency staff (Julia). This allocation for the two groups was chosen to ensure that both groups had a persona with limited clinical experience and a persona with many years of experience. This allocation was appropriate because it accommodated homogeneity in both groups according to years of experience, interest, and occupation while maintaining variation in clinical area to ensure space for exchanging different clinical experiences (Sanders & Stappers, 2012).

The first task on the programme was for me to present the findings from the analysis of the material from workshop 1 by presenting the four categories representing four visions with associated needs and motives. This was followed by a presentation of the four personas. The participants were asked to comment on each persona to establish that the constructed personas in fact were recognizable to the participants as a person they could imagine being part of their practice (Nielsen, 2013). See Table 6 for prearranged questions for workshop 2. The participants agreed on the four personas. Furthermore, this presentation contributed to obtaining a mutual understanding of the process so far and was a segue from the abstract visions to the more concrete ideas on initiatives (Bratteteig et al., 2013; Kanstrup & Bertelsen, 2016). After the first presentation, participants were introduced to the ideation of initiatives based on a template with eight guiding questions to fill out during the discussions. This aimed at facilitating the discussions and the content in the initiatives (Nielsen, 2013). See Appendix H for an overview of these guiding questions. This phase was rounded off with a plenary discussion where participants were asked to present their ideas on initiatives and both groups were invited to comment, elaborate, and reflect on the ideas on initiatives to allow any alteration to the ideated initiatives. Workshop 2 ended with the participants given the opportunity to reflect on and express what it was like to participate in the study using this participatory design. This served the purpose of bringing closure to the process for the participants (Kanstrup & Bertelsen, 2016).

Table 6 – Prearranged questions for workshop 2

Activity	Prearranged question
Presentation of personas	Can you recognize the X persona from your practice?
Sketch of ideas – mindset of the persona and with guiding questions	What ideas on initiatives do you have for the personas?
Plenum discussion related to ideas on initiatives	What challenges could your ideas on initiatives be facing in clinical practice? What needs to be considered if the ideas on initiatives could be implemented?

5.3.3 DATA ANALYSIS

This section comprises description of the analysis related to study 2a and 2b. Analysis of data in study 2a was two content analyses. The first content analysis was performed on data from workshop 1 and before workshop 2. The second content analysis was performed after workshop 2 on the data from workshop 2. The analysis of data in study 2b was a conversation analysis of data from workshop 2. All three analyses subsequently are described.

5.3.3.1 Analysis of data in study 2a

The method for analysis of data from study 2a was qualitative content analysis described by Graneheim and Lundman (2004). This method includes a manifest content analysis, which is concerned with analysing what the text says and is done close to the text with a low degree of interpretation (Graneheim et al., 2017; Graneheim & Lundman, 2004). The manifest content analysis allowed the participants' ideas on initiatives to be described and interpreted with a close connection to the words the participants used and based on the concrete content (Graneheim et al., 2017). This means that the participants' ideas on initiatives were analysed with a low degree of interpretation that enabled participants' concrete ideas on initiatives to be foregrounded in the analysis.

Content analysis of data from workshop 1

The unit of analysis consisted of the audio recording from workshop 1, and the post-it with participants' identification of needs, motives, and visions (Graneheim & Lundman, 2004). Workshop 1 was not transcribed verbatim as the purpose with the analysis was to identify what needs, motives, and visions the participants expressed during the workshop (Sanders & Stappers, 2012). The recordings were listened through several times, and everything that indicated a participant's need, motive, or

vision was transcribed. The emphasis was on the participants' expressed needs, motives, and visions since these were pertinent for the planning and facilitation of workshop 2. The transcription of needs, motives, and visions was then read several times to achieve an overall sense of the material (Graneheim & Lundman, 2004). Hereafter, the transcribed data was analysed by identifying meaning units and then organizing these meaning units under the headings of needs, motives, and visions. The meaning units were subsequently condensed to shorter meaning units close to the participants' words and codes close to the text were ascribed (Graneheim & Lundman, 2004; Lindgren et al., 2020). Finally, the interpretation was facilitated by seeking patterns of similarities and differences and was finished with four categories each representing a vision (Graneheim et al., 2017; Graneheim & Lundman, 2004; Lindgren et al., 2020). The condensed needs and motives were connected to a vision in conformity with the data. The process of analysis and the findings from this analysis were discussed with the coresearcher, who facilitated the workshops to establish consensus around the findings (Graneheim et al., 2017; Graneheim & Lundman, 2004). Also, the discussion served to maintain reflexivity throughout the analysis of the data (Creswell & Poth, 2018).

Content analysis of data from workshop 2

The unit of analysis consisted of a verbatim transcribed audio recording from workshop 2 and the completed persona templates from the participants in workshop 2. For analysis of data from workshop 2, the transcripts and templates were read several times to gain an overall sense of what the text was about (Graneheim et al., 2017; Graneheim & Lundman, 2004). Subsequently, meaning units expressing ideas on initiatives for using the EWS were identified. Then meaning units were condensed by shortening the sentences by removing words and content perceived as unnecessary to the manifest content (Lindgren et al., 2020). The next step was coding of the condensed meaning units by applying a code that described the content close to the text (Lindgren et al., 2020). Finally, codes were sorted into categories by assessing patterns of similarities and differences in the codes and in conformity with the data (Graneheim & Lundman, 2004). Five categories were elicited comprising participants' ideas on initiatives for using the EWS. The process of analysis and the findings from this analysis were initially discussed with the coresearcher, who facilitated the workshops and later with the supervisor team to establish consensus around the findings (Graneheim et al., 2017; Graneheim & Lundman, 2004).

5.3.3.2 Analysis of data in study 2b

The method for analysis of data in study 2b was a conversation analysis using selected elements from conversation analysis. Conversation analysis is concerned with participants' conversational actions to examine interaction among participants (Hammersley & Atkinson, 2007; Pallotti, 2007; Peräkylä & Ruusuvuori, 2018). Conversation analysis is concerned with the organization of conversations and builds upon three assumptions: "talk is action," "action is structurally organized,"

and “talk creates and maintains the intersubjective reality” (Peräkylä & Ruusuvuori, 2018). The assumption that talk is action conveys the understanding that talk is a way of communicating ideas and facilitates actions among people (Peräkylä & Ruusuvuori, 2018). The assumption that action is structurally organized means that the communicated ideas and actions follow a structure for ensuring orderliness in conversations (Peräkylä & Ruusuvuori, 2018). The assumption that talk creates and maintains the intersubjective reality is related to the construction of meanings and understandings that are made possible and accessible to the participants in a conversation through talk (Peräkylä & Ruusuvuori, 2018). Talk unfolds in a context and the context influences how participants engage in talk as a collaborative activity to obtain meaningful communication with others (Hutchby & Wooffitt, 2008). The participatory methods framed the context in which the participants’ talk unfolded (Halskov & Hansen, 2015). Methods applied in a participatory design study are adapted to the context in which they are applied to facilitate a process of genuine participation (Andersen et al., 2015; Bratteteig et al., 2013; Kensing & Blomberg, 1998). Although the participatory methods are adapted, uncertainties cannot be avoided as to whether the applied methods will work as intended as the participatory process is relational and evolves through interaction between participants (Andersen et al., 2015; Saad-Sulonen et al., 2018). As the methods come into play through interaction between participants in the process, it is relevant to analyse how participatory methods influence a participatory process and the enablement of genuine participation (Halskov & Hansen, 2015; Kushniruk & Nøhr, 2016; Saad-Sulonen et al., 2018). Thus, conversation analysis was well suited in study 2b because the participants’ discussion (talk) and interaction were analysed as to how the participatory methods enabled or impeded the discussions and ideas on initiatives and thereby the enablement of genuine participation.

Selected elements from conversation analysis

The intention with this conversation analysis in study 2b was not to conduct a comprehensive conversation analysis. Rather, the intention was to use selected elements from the method to elucidate how the participants’ discussions of ideas on initiatives for using the EWS in a hospital setting were influenced by the applied participatory methods as to enabling or impeding genuine participation. The elements that were selected were turn-taking, adjacency pairs, account, and repair. These elements are basic conversational elements and facilitate the unfolding of the conversation while maintaining its orderliness (Hutchby & Wooffitt, 2008; Pallotti, 2007; Schegloff, 2007).

Turn-Taking. In a conversation, a structure is provided by participants’ utterances and responses, which is a basic feature in a conversation (Hutchby & Wooffitt, 2008; Pallotti, 2007).

Adjacency Pairs. Connected to an utterance is drawing upon preferences for responding (Hutchby & Wooffitt, 2008; Potter, 1996). For example, this means that a preferred response to an invitation is acceptance or to an assessment is agreement or confimation; contrarily, a disfavoured response to an invitation is rejection or to an assessment is disagreement or disconfirmation (Hutchby & Wooffitt, 2008; Pallotti, 2007; Schegloff, 2007). This connection between utterance and response in adjacency pairs aids sensemaking and helps to align the conversation between the speakers (Hutchby & Wooffitt, 2008; Pallotti, 2007).

Account. Within the exchange of adjacency pairs, giving a disfavoured response may require accounting for an utterance to establish conditions for negotiating a mutual understanding in the conversation (Potter, 1996). This accounting may encompass elaborating utterances and providing justification for disfavoured responses such as disagreement or rejection (Potter, 1996).

Repair. The procedure of repair is initiated when difficulties of understanding, hearing, or speaking are identified in an utterance. The procedure is established to prevent or precede misunderstandings that may lead to unreachable unfolding and negotiating of the meaning in the conversation (Hutchby & Wooffitt, 2008; Pallotti, 2007; Schegloff, 2007).

Conversation analysis of data from workshop 2

Conversation analysis can be conducted in multiple ways and with or without a clearly defined strategy (Hutchby & Wooffitt, 2008; Sidnell, 2012). In the conversation analysis in study 2b, the analysis was performed with a strategy inspired from three stages. The stages guided the approach to the transcripts to grasp what was noticeable to initiate the analysis (Sidnell, 2012). Moreover, using the selected elements from conversation analysis as a lens to analyse how the participants' interaction was influenced through the applied participatory methods aided to elucidate the aim of the analysis (Hutchby & Wooffitt, 2008; Sidnell, 2012). The three stages are unfolded in the following.

The unit of analysis consisted of a verbatim transcribed audio recording from workshop 2. The same that was used in the content analysis in study 2a.

Stage 1. The transcripts from the workshop were read several times to gain an overall sense of the conversations and how the applied participatory methods impacted the participants' discussions (Hutchby & Wooffitt, 2008). This stage was characterized by looking for interesting conversational elements that caught the attention in relation to each applied participatory method and the impact on the participants' interaction (Hutchby & Wooffitt, 2008; Sidnell, 2012). In other words, the transcripts were searched for instances that were linked verbally to the personas' names, instances that were referring to a question from the template with guiding

questions, or instances where facilitation took place in the groups. Only instances that revealed "a possibly interesting phenomenon" as to the aim of the study were noticed in this stage (Hutchby & Wooffitt, 2008). These noticed instances were grouped related to the participatory method to which each seemed to be related (Hutchby & Wooffitt, 2008).

Stage 2. Next, from the collected and grouped instances, all instances were analysed using the selected elements from conversation analysis as described above (Hutchby & Wooffitt, 2008). This analysis demonstrated enablers and barriers to genuine participation related to the three participatory methods (facilitation, personas, and template).

Stage 3. In this stage, the transcripts were revisited to refine the analysis against the remaining data in the transcripts to ensure that the descriptions were adequate and accurate (Hutchby & Wooffitt, 2008) Moreover, this refinement aided the selection of illustrative examples of the participatory methods enabling or impeding nurses' and physicians' genuine participation to include in Paper 3. This stage also included reflexive discussions with the coresearchers to ensure that the illustrative examples were accounted for in the transcribed material (Hutchby & Wooffitt, 2008).

5.4 RESEARCHER'S ROLE AND REFLEXIVITY

This section elaborates on the difference between my role as a researcher in study 1 and in study 2 according to the data collection process. Within qualitative research, researchers themselves are the instrument for collecting data, which means that the researchers need to be transparent about how they influenced the collection of data and to maintain reflexivity throughout all steps of the research (Creswell & Poth, 2018; Malterud, 2001). For the two studies in this PhD project, my role as a researcher differed in the process of data collection for study 1 and study 2 whereas the required reflexivity during analysis was the same between the two studies.

Study 1

Before initiating the participant observations, I met with the recruited nurses to establish contact before shadowing them in the participant observations. This approach was chosen to prevent a potential barrier of the nurses' being concerned about my role in the ward by elaborating on my interest in the topic. This approach supports establishment of the nurses' trust with me, which allowed me access to the nurses and the clinical practice (Madden, 2017; Roper & Shapira, 2000). Furthermore, the nurses and I agreed on how to present me to the patients and on the time for the first observation. To maintain access to the nurses during data collection, striving for the nurses' trust was crucial (Hammersley & Atkinson, 2007; Roper & Shapira, 2000). During data collection, I made efforts to underline my role as a novice researcher interested in learning from the nurses about their practices

using the EWS in the clinical context. Four of the recruited nurses knew me as a nurse lecturer from their time as nursing students. On several occasions during participant observations, some of these nurses asked questions related to me being a nurse lecturer, e.g., asking why I became a nurse lecturer or if I missed the direct patient care. I answered these questions carefully ensuring that the nurses did not perceive me as being dismissive. I also was careful to remind nurses that I was not there as a nurse lecturer but instead as a novice researcher being interested in learning about their current practices (Madden, 2017). To build the nurses' trust, I posed curious questions concerning their practice. In other situations, for instance, when the nurses were dispensing medication for intravenous infusion, the nurses knew this was not the focus in the PhD project and in these occasions, the talks were more spontaneous and allowed for reciprocal exchange of experiences. In situations that were not preoccupied with the nurses' practices of using the EWS, I aided the nurses with practical tasks such as bringing requested beverages to the patients or needed equipment for nursing tasks from outside the patients' rooms. These actions attempted to show the nurses that their participation in the study was appreciated and that I was interested in returning their favour (Hammersley & Atkinson, 2007; Madden, 2017). Moreover, to ensure the nurses' trust and my continued access, I needed to constantly judge if informal interviewing was appropriate or would compromise the nurses' workflow (Madden, 2017). Disturbing the nurses' workflow by misjudging the appropriateness of informal interviewing could be interpreted as disrespecting their primary obligation of being responsible for patients' care and therefore jeopardize their trust in me as a researcher in nursing (Madden, 2017).

Key principles within focused ethnography are familiarity with the field and reflexivity (Higginbottom et al., 2013; Knoblauch, 2005). To challenge the familiarity, the researcher's reflexivity is significant for eluding myopia in the process of data collection in the field and to make strange what was familiar (Draper, 2015; Higginbottom et al., 2013; Roper & Shapira, 2000). Being an insider as a nurse colleague and a nurse lecturer allowed me to observe the nurses' use of the EWS with attention to the details of their practice (Gerrish, 2003; Knoblauch, 2005; Labaree, 2002). My insider role provided a lens from which the data collection was carried out (Labaree, 2002; Roper & Shapira, 2000). However, I was also an outsider who did not know the work routines in the specific wards. Being an outsider enabled me to be open-minded and reflexive during observations as it encouraged me to ask clarifying and naïve questions (Gerrish, 2003). To mitigate the risk that being an insider was restricting my attention during the observations, I made efforts to balance the insider-outsider roles through reflexivity throughout the data collection process (Borbasi et al., 2005; Gerrish, 2003; Labaree, 2002; Roper & Shapira, 2000). Therefore, reflections were shared with the team of supervisors to ensure that my influence and interaction with the participants in the field was not compromising the quality of the collected ethnographic data (Creswell & Poth, 2018; Higginbottom et al., 2013).

Study 2

My role as researcher during the workshops was planned to be observing and note taking, when not presenting according to the planned activities. As an inexperienced facilitator, I anticipated difficulty accommodating the twofold focus on facilitating and documenting the process at the same time (Kanstrup & Bertelsen, 2016; Ørngreen & Levinsen, 2017; Sanders & Stappers, 2012). Therefore, to foster the best conditions in the workshops, I invited an experienced facilitator to lead the workshops as part of applying a facilitation method. This facilitator was educated within the health care system but was from outside the nursing field. Moreover, the facilitator was an experienced researcher and an experienced facilitator of participatory workshops. Engaging with an experienced facilitator was anticipated to help me accomplish an environment for genuine participation as this cannot be expected to occur spontaneously (Andersen et al., 2015). However, early in workshop 1, my role as an observer taking notes was challenged because the participants invited me to join their discussions by asking me to elaborate on the findings from study 1 or asking questions about the evidence for using the EWS. I thus had to consider if my role as observer taking notes required adjustments since a researcher in participatory design may also have the role of facilitator (Sanders & Stappers, 2012). Since the facilitator's role is to engage in reflective discussions as part of orchestrating the process and reacting proactively to participants' utterances and behaviour during the workshops, this was not a role that I initially had planned to take part in (Kanstrup & Bertelsen, 2016; Ørngreen & Levinsen, 2017; Sanders & Stappers, 2012). However, I found it to be appropriate to take the role as co-facilitator. This role could foster an atmosphere that encouraged giving space for voicing opinions and experiences and being sensitive towards what participants said and how they communicated, which is pertinent in the facilitation method (Ørngreen & Levinsen, 2017). Since I could contribute to the reflective discussions with my specific knowledge on the topic and via the participants' invitations, my co-facilitating helped to sustain the participants' interest and participation in the process (Ørngreen & Levinsen, 2017; Sanders & Stappers, 2012). Moreover, this adaptation was perceived necessary to pursue the participants' expectations and ideas for the process. By declining their invitation, I feared being perceived as counteracting the positive atmosphere that was established during study 1 and during the introduction to the first workshop and thereby reducing the participants' inclination to voice their viewpoints (Kanstrup & Bertelsen, 2016; Ørngreen & Levinsen, 2017). As the workshops were audio recorded, the verbal content from the workshops was documented for analysis (Sanders & Stappers, 2012). Therefore, my deviating from note taking to take up the co-facilitating role was appropriate, as it contributed to facilitation of participants' reflections and discussions. My role as co-facilitator provided additional insights from the ethnographic study and the literature on the EWS because I was available at the tables for posing questions or giving answers.

5.5 ETHICAL CONSIDERATIONS

Initiation of a research project requires ethical considerations throughout all phases of the project to make sure legal permissions are granted before initiating the project and to avoid harming participants in the study (Creswell & Poth, 2018; Madden 2017). Therefore, this PhD project conforms to scientific principles within health research such as those described in the Declaration of Helsinki (World Medical Association, 2013) and the ethical guidelines for nursing research in the Nordic countries (Northern Nurses Federation, 2003). This section describes ethical considerations relevant for studies 1 and 2.

The regional Ethics Committee was asked for approval to conduct the studies and since no human biological material would be selected in the studies, their formal approval was not required according to Danish law. The unit of Information Security at Aalborg University approved and registered the study (Jr.nr. 2018-899/10-0516). The hospital management was asked for approval to initiate the PhD project and to make sure that the purpose of the research was sanctioned by the management.

In study 1, participants (nurses and physicians) were given written information that was orally elaborated before they gave written consent to participate in the study (Appendices B, C). In one situation, written consent was obtained at the time of the first observation of a nurse in the surgical ward. Participants were informed that they at any time could withdraw their consent to participate in observations (nurses) and interviews (nurses and physicians). Likewise, they were informed that when reporting the study, they would be anonymous, though they were likely to be recognizable to themselves.

Patients involved in the participant observation of nurses were informed by the nurse being observed that the nurse was part of a research study and that the observations were focused on the nurse and not the patients. Patients gave their oral consent to the nurse that they contented to my presence and that fieldnotes were being taken. Since the observation of the nurses included interaction with patients in a potentially vulnerable position and due to the access to sensitive information about the patients, I wore a uniform like the nurses on the wards. Moreover, I wore a badge to signal that I was working under a nurse's duty of confidentiality as described within the health care system.

In study 2, participants for the workshops were informed about the study by email (Appendix D) since they all knew about and participated in study 1 and knew that a subsequent study would be initiated after I analysed data from study 1. Participants were orally informed about the study at the first workshop. After an initial introduction of the process in the workshops, participants signed consent forms (Appendix E). Participants were informed that they at any time could withdraw their consent to participate in the workshops. Likewise, they were informed that when

reporting the study, they would be anonymous, though they were likely to be recognizable to themselves.

CHAPTER 6. FINDINGS

In this chapter, key findings from study 1 and 2 are presented. First, findings from study 1 are presented, and then findings from studies 2a and 2b are presented. Findings from the content analysis in study 2a are presented first. Subsequently, the findings from the conversation analysis in study 2b are presented. The findings are presented as a summary of those reported in papers 1, 2, and 3 (Mølgaard et al., 2022: Mølgaard et al., n.d.(a): Mølgaard et al., n.d. (b)).

6.1 FINDINGS STUDY 1

Descriptions from the participant observations and quotations from the interviews are included in paper 1.

The aim of study 1 was to describe and explore the influences in nurses' use of the EWS to support clinical decisions in a hospital setting. The analysis revealed that internal and external factors influenced nurses' use of the EWS. The findings are reported in two themes: 'ambivalence towards the EWS as a decision support' and 'unspoken expectations in the collaboration on the EWS influencing the RNs' workflow'.

Ambivalence towards the EWS as decision support

This theme encompassed internal factors influencing the nurses' use of the EWS. The nurses were ambivalent towards using the EWS. The EWS monitoring was for some nurses perceived as a routine task that was not always welcomed. However, observations and interviews showed that it was also seen as an opportunity to collect useful data for clinical decisions regarding patient care and treatment. As such, using the EWS was observed to guide nurses' attention towards patients' vital parameters and care needs and created a useful space for optimized patient care.

The ambivalence towards using the EWS was also related to using the EWS to support decisions. Patients with elevated EWS were fairly common. In these situations, the nurses were often observed giving priority to their clinical judgment even in situations where a patient's elevated EWS could not be accounted for by the nurse. This seemed to reflect that nurses in some situations were desensitized towards elevated EWS. However, the nurses acknowledged that this approach may impose a risk of neglecting signs of critical illness. In other situations, the nurses' clinical judgment of the patients' conditions was consistent with having an elevated EWS. In these situations, observations and interviews elicited that the nurses often established individualized follow-ups on single deviating vital parameters. As such, the internal factors influencing nurses' use of the EWS derived from their ambivalence towards the EWS as a support tool for decisions.

Unspoken expectations in the collaboration on the EWS influencing the nurses' workflow

This theme encompassed the external factors influencing the nurses' use of the EWS. During observations, physicians often omitted making patient-specific adjustments when EWS deviated from zero, which increased nurses' mandatory monitoring workload. Observations and interviews explicated that the nurses then often tried to control their monitoring workload by disregarding the monitoring frequencies based on an unspoken assumption that this was in agreement with the physicians. Observations and interviews revealed that nurses and physicians did not necessarily judge elevated EWS as requiring increased attention, which was expressed as a common perception of a cultural norm. This cultural norm in the group of nurses and physicians seemed to influence the individual nurse's decision to disregard the EWS protocol even in some situations where there was no obvious and justified explanation for an elevated EWS.

During interviews, the physicians revealed differences about their roles and perceptions of adjusting the monitoring frequency when scores elevated above zero, which was influenced by unclear guidance on their roles and responsibilities. Physicians expected and were dependent on the nurses' presenting vital parameters and judgment for deviations. This facilitated physicians' decisions when summoned for assistance. The premise for the exchange of patient data between nurses and physicians was not verbally established during observations. In interviews, the physicians expressed they expected the nurses to deviate from protocolled summoning to restrict the number of calls to the physicians. This expected behaviour for the nurses was observed to be an unspoken behaviour. However, interviews with the nurses' elicited that this deviation made some nurses feel insecure since the call to the physician was protocolled and intended to reassure the nurses that patients' situations were under control. In other situations, it was observed that the nurses requested the physicians to adjust the EWS, which was sometimes refused without further discussion or sharing of thoughts. Ultimately, a missed opportunity for achieving mutual understanding for decisions on the EWS was likely as neither physicians nor nurses were observed to invite further discussion of the request. Thus, nurses' use of the EWS was externally influenced by the physicians' perceptions and use.

6.2 FINDINGS STUDY 2

Quotations from workshop 2 are included in paper 2.

6.2.1 FINDINGS FROM THE CONTENT ANALYSIS IN STUDY 2A

The aim was to explore nurses' and physicians' ideas on initiatives for using the EWS in a hospital setting. As two content analyses were carried out to elicit findings related to workshops 1 and 2 respectively, findings are reported for each workshop in the following.

Findings from workshop 1

Workshop 1 aimed at generating insight into the participants' needs and motives concerning use of the EWS and articulating visions for future use of the EWS. The analysis elicited four categories each representing a vision with associated needs and motives: 'permanent staff have knowledge about the evidence behind the use of the EWS and are trained to use the EWS', 'nurses' clinical judgment influences the EWS', 'the EWS protocol is flexible and simple in its composition', and 'agency staff understand their role related to use of the EWS and are trained to use the EWS'.

Permanent staff have knowledge about the evidence behind the use of the EWS and are trained to use the EWS

Needs elicited related to this vision were:

- Knowledge about the evidence for using the EWS needs to ensure meaningfulness and confidence in using the EWS
- Introduction to the EWS needs to be clinically relevant and needs to be updated continuously
- The EWS ensures systematic measurements that can be used to identify deviations

Motives elicited related to this vision were:

- The EWS is used because it aids to identify critical illness and early intervention
- Mistrusting the outcome for using the EWS to early detection of critical illness
- Top-down tasks automatically build resistance

Nurses' clinical judgment influences the EWS

Needs elicited related to this vision were:

- It needs to be possible to use clinical judgment in the EWS protocol
- The EWS must timely and accurate detect critical illness

Motives elicited related to this vision were:

- Mistrusting the outcome for using the EWS to early detection of critical illness
- Using the EWS must secure the staffs' working conditions
- Using the EWS must be meaningful to the individual staff member

The EWS protocol is flexible and simple in its composition

Needs elicited related to this vision were:

- Using the EWS must be simple to the individual staff member and in collaboration with others
- Trust in the nurses' professionalism and competencies to intervene adequately

Motives elicited related to this vision were:

- Correlation of time spend using the EWS and the outcome of using the EWS
- Collaboration between nurses and physicians about the EWS is enhanced using a shared language
- Legal obligation to document
- Mandatory tasks are not perceived positive and result in inappropriate work routines

Agency staff understand their role related to use of the EWS and are trained to use the EWS

Needs elicited related to this vision were:

- Agency staffs' education is within health care and use of the EWS is based on training
- Agency staff can assist with the EWS monitoring without compromising patient safety

Motives elicited related to this vision were:

- The EWS is used because it aids to identify critical illness and early intervention
- Nurses are assured that the agency staff use the EWS under the nurses' responsibility

Findings from workshop 2

Participants' ideas on initiatives for using the EWS in a hospital setting were comprised in five categories that were elicited in the analysis: 'integrating new functions into the EWS protocol', 'balancing a structured EWS protocol with nurses' clinical judgment', 'informing and involving clinical staff in the development of the EWS protocol', 'a twofold introduction course for newcomers', 'certifying agency staff to monitor the EWS'.

Integrating new functions into the EWS protocol

Two functions were suggested to be integrated into the EWS protocol. The initiatives were rooted in the two visions that nurses' clinical judgment influences the EWS and that the EWS protocol is flexible and simple in its composition. One initiative was based on a need to permit nurses to upgrade or downgrade the EWS and thereby integrate nurses' clinical judgment into the EWS protocol. The rationale behind this initiative was that in some situations, the EWS was expected to be elevated (due to chronic conditions, for example) but could be safely downgraded. In other situations, though, the nurses judged upgrading the EWS as relevant due to their concern for the patient. The second initiative was to add a box for registering nurses' comments based on their clinical judgment. Such a function could help to communicate clinical information about patients' conditions as well as to disclose nurses' reasons for omitting adherence to the EWS protocol. In this way the comment box motivated a need for communicating clinical information.

Balancing a structured EWS protocol with nurses' clinical judgment

The participants noted a need for balancing nurses' adjustments to the EWS when judged appropriate and retaining a structured EWS. Sustaining such balance was a motive for endorsing the visions of EWS as flexible and simple in its composition and that nurses' clinical judgment influences the EWS. This balance was perceived as crucial to accommodate differences in nurses' levels of experience for making sound decisions. Moreover, this balance was perceived to accommodate differences in physicians' responses upon being summoned by different nurses. The participants' initiative was to revise the criteria for summoning the physicians to establish this balance. The initiative served to uphold the visions that nurses' clinical judgment influences the EWS and that the EWS protocol is flexible and simple in its composition. Revising these criteria was anticipated to facilitate the collaboration between nurses and physicians and acknowledgement of sharing of clinical information from using the EWS related to patients' conditions.

Informing and involving clinical staff in the development of the EWS protocol

Related to the vision that permanent staff have knowledge about the evidence for use of the EWS and are trained to use the EWS, the participants suggested that when developing and revising the EWS, the steering group and users from clinical practice should be mutually engaged. This initiative revealed a need of being noticeable contributors with useful clinical information when changes to the EWS were preferable. In addition, an idea for an initiative was providing continuous updates to the staff using the EWS. New knowledge about the EWS may motivate considerations if this needed to influence how the EWS was used in the wards.

A twofold introduction course for newcomers

Corresponding to the vision that permanent staff have knowledge about the evidence behind the use of the EWS and are trained to use the EWS, participants also suggested a mandatory and introductory course for newcomers. This initiative modified the vision as it would focus on a need for newcomers' preparation for operating the EWS and would provide insights and knowledge about the EWS. It was suggested that this course evolve from cases deriving from practice and underpinned a motive for the initiative in that the EWS in some situations was useful whereas in other situations the EWS holds disadvantages. To support the need for newcomers' to be prepared to use the EWS in the wards, a second initiative was that newcomers would be introduced to how the EWS could be adapted within the specific context in the ward.

Certifying agency staff to monitor the EWS

Based on the vision that agency staff understand their role related to use of the EWS and are trained to use the EWS, the participants' initiative was that agency staff needed be trained and certified to use the EWS and to assess when they need to summon the nurse who is responsible for the patient. This initiative was motivated by the experience that the agency staff provided appreciated help to the nurses related to the EWS monitoring. However, the participants were sceptical about the current practice where no specific requirements were sanctioned for the agency staff before being sent to the wards because the nurses sometimes were uninformed about patients' deviating EWS.

6.2.2 FINDINGS FROM THE CONVERSATION ANALYSIS IN STUDY 2B

Quotations from workshop 2 are included in paper 3.

The aim of the analysis in study 2b was to analyze and discuss how participatory design methods enable or impede nurses' and physicians' genuine participation when exploring ideas on initiatives for using the EWS in a hospital setting. A summary of the key findings is presented for each of the applied participatory methods.

Facilitation

The facilitation method revealed two approaches for facilitation that both were enablers for genuine participation. One approach was proactive facilitation that was enabled through the facilitator's encouragement to exchange adjacency pairs and explain disfavoured responses to other participants' ideas. This resulted in participants' opportunities to think deeper about what needs their ideas on initiatives for using the EWS in a hospital setting needed to accommodate. The participants' opportunity to think deeper facilitated their progression in the discussion and helped them to negotiate their shared opinions when they exchanged conflicting viewpoints. Thus, the proactive facilitation enabled genuine participation in these situations. Another enabling approach was reactive facilitation that was enabled through the facilitator's response and encouragement to challenge the participants' routine thinking patterns. The facilitator reacted by encouraging the participants to return to exchanging viewpoints around an idea for an initiative. This was facilitated through the exchange of adjacency pairs and giving accounts for these, which helped the participants to break free from static thinking patterns. Thus, reactive facilitation generated a basis for genuine participation when the facilitator was prepared to support and encourage participants to discuss the topic of interest.

Personas

The persona method elicited that the participants often had coinciding experiences from practice using the EWS. Discussions were framed by the persona description since the exchange of adjacency pairs and repair facilitated and broadened participants' reflections about what needs their ideas on initiatives should accommodate. In addition, the persona method helped to sharpen participants' discussion because they were framed by the focus in the persona description. Altogether the persona method was an enabler for genuine participation by covering needs and practices from a wide group of users of the EWS. Arguably, this method enabled engagement in the ideas on initiatives for using the EWS in a hospital setting.

On few occasions, the persona method limited the participants' exchange of viewpoints, and discussion of an idea for an initiative for using the EWS was challenged. This became clear as some of the participants initiated a repair because of doubt about whom to target with their initiative. This issue seemed to reflect that the participants had not generated a mutual starting point in the persona. Next, the exchange of adjacency pairs redirected the discussion to elucidate what some of the participants perceived to be the intention with the persona's vision. Therefore, the persona method presumably had limited acceptability among some of the participants, which acted as a barrier for genuine participation.

Template

The template method with guiding questions aided the participants to describe their clinical practice through the exchange of adjacency pairs and preferred responses. The prearranged questions in the template maintained the participants' attention on

critical reflection. Moreover, the template aided identification of challenges in their everyday practices concerning the appearance of agency staff in the wards to assist with the EWS monitoring. The participants' awareness of their work conditions increased in relation to having agency staff in the wards assisting with the EWS monitoring. Consequently, the participants modified the template by adding a word ("realistic") to frame their current discussion. The participants stated that the suggested initiative needed to be realistic within their practice. Therefore, this reflected that the template method was an enabler for genuine participation due to facilitation of reflection among the participants. The participants' initiative was promoted through sharing of their clinical examples and modifying the template accordingly.

In contrast, the template method did, in a few other situations, not initiate discussion. The participants exchanged adjacency pairs with preferred responses characterized by brief responses without encouragement to account for them. The questions seemed on these occasions to be perceived as a survey, so some questions prevented elaborate responses from the participants. Therefore, the template served as a barrier to genuine participation on these occasions because all aspects of the idea for initiatives were not thoroughly discussed.

CHAPTER 7. DISCUSSION

In this chapter, the findings from studies 1 and 2 are discussed in the context of the overall aim of the PhD project and the existing research literature. Subsequently, it reflects upon the methodological strengths and limitations of studies 1 and 2.

7.1 DISCUSSION OF FINDINGS

The overall aim of this PhD project was to investigate nurses' use of the EWS, and to explore nurses' and physicians' ideas on initiatives that can support nurses' use of the EWS. Further, to investigate how participatory design methods can enable or impede genuine participation in a participatory design process with nurses and physicians.

Findings from study 1 revealed that the nurses used the EWS flexibly, as they were sceptical about using the EWS protocol as only source of evidence for making clinical decisions about care and summoning physicians. Nurses making independent decisions is consistent with Higgs and Turpin (2019), who have argued that clinical decision-making is not about applying knowledge and sets of rules for the professional to follow blindly. Instead, clinical decision-making is context-bound in a complex and dynamic health care setting, which underpins situated decisions based on professional judgment using different sources of evidence (Higgs & Turpin, 2019; Smith & Higgs, 2019). Nurses' capabilities and access to sources of evidence influence the soundness of their decisions (Smith & Higgs, 2019). Nurses' drawing on different sources of evidence when making decisions corresponds well with studies reporting that using the EWS should not replace nurses' clinical judgment, as this may lead to suboptimal management of deteriorating patients (Connolly et al., 2017; Douglas et al., 2016; Grant, 2019; Le Lagadec & Dwyer, 2017). Findings from study 2a emphasised that nurses and physicians agree that nurses' use of clinical judgment when using the EWS is an essential part of the recognition of patient deterioration and decisions about appropriate interventions. In study 1, nurses' interaction with patients during routine EWS monitoring provided a space outside the scope of the EWS for their planning and decisions about initiating care activities. Nurses' interactions with patients during routine monitoring of the EWS increased their level of patients' care. Similar findings were reported by Bingham et al. (2020), who noted that, when nurses interacted with patients, they assessed the patients' deteriorating conditions based on their clinical judgment, including the EWS, and used the information to motivate appropriate interventions. The study by Bingham et al. (2020), however, was an interview study, with nurses focusing on decisions regarding the escalation of deteriorating patients, which is different from observing the routine monitoring of the EWS as part of the early identification of potential deteriorating patients. Nevertheless, it underlines the importance of nurses' interaction with patients to collect clinical information from

patient assessment that may point to clinical deterioration (Douglas et al., 2016). Nurses' interaction with patients to detect patient deterioration corresponds well with the definition of patient deterioration (Padilla & Mayo, 2018): that patient deterioration is a dynamic state in patients where objective findings may be present, such as but not limited to, deviating vital parameters, together with subjective findings, such as nurses' concerns (Padilla & Mayo, 2018). Nurses' concern about patients' condition requires interaction with patients for the collection of objective and subjective findings to establish an overall judgment of signs, indicating a changing and deteriorating condition. Relying only on the objective findings from the EWS reflects a reductionistic approach in recognising patient deterioration'. Such a reductionistic approach may compromise patient safety due to overlooking risks and not responding to them appropriately. Thus, nurses' flexible use of the EWS as one source of evidence together with their clinical judgment based on more sources of evidence may increase the soundness of their decisions. Nurses' drawing on more sources of evidence to ensure sound decisions may ultimately minimise patients' risk related to the provision of health care and thereby benefit patient safety.

Findings from studies 1 and 2a showed that it was a common perception among nurses and physicians that elevated EWSs frequently occur without patients' conditions' being judged to be deteriorating. Padilla and Mayo's (2018) definition of a deteriorating patient states that deviating vital parameters that reflect normal compensatory mechanisms related to, e.g., infections do not indicate a deteriorating patient. The reason for this is that no hemodynamic instability is occurring, even though the patient's state is changed, making the condition dynamic (Padilla & Mayo, 2018). This means that nurses' and physicians' experience of frequently elevated EWSs could be due to normal compensatory mechanisms. The normal compensatory mechanisms would trigger a response, but not because of a deteriorating patient. The findings from study 1 suggested that nurses experiencing frequently occurring elevated EWS that contradicted their clinical judgment risked being desensitised towards elevated EWS and thereby becoming reluctant to react to an elevated EWS. This corresponds well with other studies reporting that nurses become desensitised when experiencing a high alert rate of elevated EWSs that do not seem to indicate patient deterioration (Jensen et al., 2019a; Le Lagadec & Dwyer, 2017; McGaughey et al., 2017). Nurses who are experiencing alert fatigue and becoming desensitised reduce their acceptance of and confidence in using the EWS as a decision-support tool (Braun et al., 2022; Kwan et al., 2020). By contrast, some nurses are found to be overly reliant on the EWS and thereby base their decisions about appropriate care solely on the EWS (McGaughey et al., 2017; Wood et al., 2019). Arguably, it is important to find a balance in which nurses' experiences of alert fatigue are minimised and nurses use the EWS as a trusted source of evidence among others for judging patients' condition and deciding upon appropriate responses. To balance this challenge, one idea for an initiative in study 2a was discussed. The participants in study 2a requested that nurses could decide to

up- or downgrade the EWS based on their clinical judgments of the patients' condition. A request to up- or downgrade the EWS is similar to the findings of Jensen et al. (2019b), who found that nurses valued the option to adjust the EWS, although some were uncertain about being qualified to make adjustments to the EWS. Nielsen et al. (2022) showed that allowing nursing staff (although nursing staff was not defined) to up- or downgrade the EWS was non-inferior to the current EWS protocol used in the involved hospital. The study included nurses with different levels of experience (Nielsen et al., 2022), which reflects that nurses, regardless of their level of experience, have the competence to make decisions about adjustments to the EWS. Additionally, Nielsen et al. (2022) showed that the nurses only made adjustments in 5.7% of situations. This may indicate that the nurses' need to make individual adjustments to patients' EWS is only of limited relevance, but having the opportunity to do so is critical, as suggested in study 2a. Having the opportunity to adjust the EWS may prevent nurses from becoming desensitised to using the EWS, as was indicated in study 1 to be a risk. Findings from study 1 showed that frequently occurring elevated EWS that contradicted the nurses' clinical judgment led to their disregard of the EWS. Providing clinicians with the opportunity to influence what decisions are appropriate when using decision-support tools is shown to increase their acceptance of using them (Khairat et al., 2018; Kilsdonk et al., 2017; Sutton et al., 2020). The findings from study 2b showed that the persona method framed and enabled the participants' broadened discussions of ideas on initiatives to achieve the flexible and simple use of the EWS in which nurses' competencies are trusted. Furthermore, the findings from study 2b demonstrated that the persona method enabled genuine participation. The persona method helped to specify how the flexible use of the EWS could be accommodated based on the participants' needs deriving from practice. Enabling participation using personas in the participatory process is consistent with Chasanidou et al. (2015), who found that the persona method opened the opportunity to share new perspectives on the problem in focus by guiding the participants' focus. The framing of focus helped direct the participants' attention towards what should be addressed to solve the problem in focus (Chasanidou et al., 2015). Consequently, the idea for an initiative in which nurses could up- or downgrade the EWS based on their clinical judgment should be considered, although further research is needed to ensure that their doing so based on their clinical judgment is acceptable and feasible to the clinicians.

The findings from study 1 revealed that some nurses did not justify or explain their disregard for the escalation of care despite patients' elevated EWS. As an elevated EWS may indicate patient deterioration, nurses who ignore an elevated EWS without justifying or explaining it in relation to the patients' condition may introduce a risk to patients' safety (Grant, 2019; Le Lagadec et al., 2017). In study 2a, the participants' idea for an initiative that could accommodate nurses' justification for ignoring an elevated EWS was a text box for communicating clinical information. Such a box was suggested to be integrated into the EWS

system. Communicating clinical information in a box was anticipated to include and justify nurses' judgment of a patient's condition and associated care activities. Nurses' being attentive towards judging patients' EWS and overall condition is pertinent as part of their responsibility for recognising additional subjective and objective findings indicating a deteriorating patient (Connolly et al., 2017; Le Lagadec et al., 2017). Nurses' responsibility to recognise signs of deterioration illustrates that providing a comment box in the EWS system for nurses' notetaking may reinforce their sensemaking of the clinical information related to patients and the EWS. Reinforcing sensemaking of clinical information is somewhat similar to recommendations for decision-support tools. Systems in which the clinicians are required to provide a reason for disregarding the recommendations increase adherence to the recommendations or awareness about the appropriateness of the recommendation (Castillo & Kelemen, 2013; Graham et al., 2018; Kwan et al., 2020). It may be counterproductive, however, to add a box for comments, as decision-support tools that require extra input of manual information may pose a challenge to adherence to the tool (Jaspers et al., 2011). Still, caution about requiring input is based on decision-support tools in which the manually added data were used to generate the recommendations or advice. This differs from the findings in study 2a, where the purpose with the box for comments was to respond to the generated recommendation instead of influencing the actual recommendation. Moreover, studies show that some nurses lack the knowledge and skills to use the EWS flexibly due to, e.g., not knowing or not understanding signs of patient deterioration (Treacy 2019; Grant, 2019; Wood et al., 2019). Arguably, an incitement to provide justification for decisions in a comment box does not provide these nurses with the appropriate knowledge and skills, although it may motivate the nurses to reflect on the patients' condition. As a result, this may pose a risk to patients' safety, as signs of deterioration risk being unrecognised. In addition, writing in the comment box increases the workload using the EWS, which may reduce acceptance of using the EWS unless such a box is perceived to add value to their use of the EWS (Castillo & Kelemen, 2013; Graham et al., 2018). As revealed in study 2a, achieving workable routines using the EWS emphasises the potential benefits of integrating a comment box into the EWS system.

It is intended that nurses and physicians collaborate about using the EWS by sharing clinical information that helps ensure that deteriorating patients are being referred to higher levels of care and treatment when appropriate to reduce patients' risk during the provision of health care (McGaughey et al., 2021). Nurses' and physicians' need to collaborate about the EWS is consistent with the findings from studies 1 and 2a. The findings disclose that the use of the EWS needs to be in collaboration between nurses and physicians, although the operationalisation for this collaboration was not mutually negotiated and agreed upon. By contrast, Douglas et al. (2016) reported that physicians perceive that they work alone with patient assessment, leading to decisions about patients' treatment, which indicates that the physicians do not need to collaborate with the nurses about the EWS. The study, however, is based on

survey data in which the questions concerned perceptions of using the EWS, not perceptions of the collaboration between nurses and physicians using the EWS. It may be that the physicians' response would have been different if they had been asked directly about their perception of using the EWS in collaboration with nurses. Despite the participants' agreement in study 2a that using the EWS requires their collaboration, this does not make their practice of using the EWS collaborative. The WHO's definition of interprofessional collaboration entails collaboration occurring when professionals are working together to ensure the highest quality in care (World Health Organization, 2010). The definition implies that, to make their practice collaborative, nurses and physicians need to operationalise their collaboration using the EWS in concrete situations to deliver care of the highest quality (Green et al., 2015). As findings from study 1 showed that nurses and physicians often did not share thoughts about adjusting the patients' EWS, collaborative practices were not operationalised regarding using the EWS. This is supported by Bunkenborg et al. (2013) who found that physicians seldom asked for clinical information associated with vital parameters, which impeded interprofessional dialogue. In addition, the findings from study 2b revealed that the method of proactive and reactive facilitation in the participatory process enabled the nurses and physicians to bring forward diverse perceptions of their shared practice. The participants negotiated what needs their ideas on initiatives should address based on the facilitation method that enabled genuine participation. Although not stemming from facilitation in a participatory process, this seems supported by Allen et al. (2017), who found that multidisciplinary meetings that involved sharing knowledge and performance data about the EWS motivated participants to collaborate on using the EWS. Furthermore, clear interprofessional communication of clinical knowledge and expertise limits conflicts among nurses and physicians (Allen et al., 2017; Newman et al., 2022; O'Neill et al., 2021). Thus, providing an environment for nurses' and physicians' sharing of clinical information and viewpoints using the EWS seems pertinent to enable collaborative practices in concrete situations that may support patient safety.

The findings from study 2a indicated that nurses depend on agency staff to assist with the EWS monitoring. The nurses perceived the agency staff to lack the competencies to assist with the monitoring. This motivated the participants' idea for an initiative that agency staff be certified to assist with the EWS monitoring. The participants' suggestion is in line with other studies recommending that clinicians who use the EWS should have knowledge and be trained in its use to increase the likelihood that deviating vital parameters are detected early and quickly reacted upon (Credland et al., 2018; Le Lagadec & Dwyer, 2017; O'Neill et al., 2021). Inadequate skills in using the EWS are found to contribute to poor recognition of patients' deterioration (Grant, 2019; McGaughey et al., 2017). Agency staff in the wards being unaware of the ward-specific routines around the EWS may lead to inadequate escalation of deteriorating patients (Treacy & Stayt, 2019). Not having insights into patient-specific objective and subjective findings in a ward may present

a risk to patients' deteriorating condition going unrecognised unrecognized (Olsen et al., 2022; Wood et al., 2019). Unrecognised deterioration compromises patient safety, as prevention of risk during provision of health care is not accomplished (World Health Organization, 2019). An attention towards preventing risk during the provision of health care is further underlined in the findings from study 2b. The template with guiding questions motivated the participants' critical reflection on their practices, which made them aware that the certification of agency staff needed to make the agency staff capable of prompting a nurse for further assessment. The certification was not intended to provide the agency staff with the ability to judge patients' overall condition. Instead, the findings in studies 2a and 2b revealed that nurses needed to collect additional information before judging and deciding upon patients' conditions, and, therefore, they depended on being prompted for further assessment by the agency staff. It could be argued that using agency staff who meet no formal requirements for how to use the EWS or who have no knowledge from education within the health care field should be considered. Agency staff cannot be expected to refer patients to the nurses based on their own adequate knowledge and skills (Grant, 2019). The idea for the initiative of certifying agency staff assisting with the EWS monitoring aimed to avoid nurses' being uninformed when further assessment of the patients' condition was needed. Ultimately, the EWSs' intention to aid nurses' decisions regarding the escalation of care is haltered if they must depend on unskilled agency staff. Further research is warranted, however, to establish whether training agency staff is sufficient to ensure that nurses are prompted for further assessment so that patient safety is not compromised.

In study 2a, the participants' idea for an initiative was to involve clinicians in the development of the EWS when changes to the EWS protocol were made. This was motivated by the perception that they were obvious contributors, as they were the users of the EWS in daily practice. This is consistent with the rationale for participatory design, as users are seen as pivotal contributors to developing designs or services within the practice in which they are engaged (Bratteteig et al., 2013; Robertson & Simonsen, 2013). Moreover, involving clinicians in developing decision-support tools like the EWS is essential to developing tools that are useful in practice and thereby building acceptance for using the tools in practice (Braun et al., 2022; Castillo & Kelemen, 2013; Kilsdonk et al., 2017). The relevance of involving clinicians in generating ideas on initiatives was emphasised by the findings from study 2b. These findings demonstrated that the selected participatory methods enabled the participant to discuss a shared practice. Also, that the participants used these insights to generate ideas on initiatives for developing the use of the EWS in their practices based on genuine participation. Although two of the selected methods (persona and template with guiding questions) in a few situations impeded genuine participation, overall, the selected participatory methods enabled genuine participation. This highlights that genuine participation requires attention before and during a participatory process rather than perceiving it as something that can be foreseen to be accommodated by applying methods in a certain way (Andersen et

al., 2015). Nevertheless, involving nurses and physicians in a participatory process to explore ideas on initiatives for using the EWS in a hospital setting contributes to knowledge that is useful to and based on their practice, which may increase the appropriate use of the EWS and patients' safety. Ultimately, the ideas on initiatives that were generated based on the nurses' and physicians' practices seem to be enabled because of the participatory process applying participatory methods. The advantages of participatory design processes for practice development have also been demonstrated in other studies (Clemensen et al., 2007, 2017; Wolstenholme et al., 2017). Being unable to achieve genuine participation, however, may challenge the implementation of new solutions related to, e.g., decision-support tools as they may not support the practice they are developed for. The findings from study 2b highlighted that genuine participation was the foundation for the participants' ideas on initiatives to develop the EWS system, which can support consideration of the initiatives for further development.

Participant demographic information from study 1 reveals that only four of the recruited 16 participants had received a formal introduction to the EWS. Interestingly, the participants' idea for an initiative in study 2a was that newcomers to the wards be introduced in a mandatory course, as well as introduced to the specific ward routines related to use of the EWS. The participants' ideas on initiatives about mandatory introduction and specific ward routines were aimed at newcomers. The participants aimed at newcomers, despite the participants' vision that all permanent staff should have knowledge about the evidence behind the use of the EWS and be trained to use the EWS. The findings from study 2b revealed that the persona description in some situations may have conflicted with some of the participants' viewpoints despite previous verification in the group, as recommended by Nielsen (2013). Despite this verification, one persona was modified by some of the participants to encompass newcomers rather than all permanent staff. Pilot-testing the materials, including the persona descriptions, might have demonstrated that the persona description should have been refined before being presented in workshop 2 (Sanders & Stappers, 2012). Consequently, it cannot be ignored that revising the persona would have generated a different idea for the initiative. Seemingly, genuine participation was impeded due to the potential limited recognisability of the persona describing introductions for all permanent staff to use the EWS. Studies have stressed, however, the necessity of users' formal training with the EWS to benefit from the system (Connolly et al., 2017; O' Neill et al., 2021; Padilla et al., 2018). The relevance of the idea for an initiative to train newcomers or instead focusing on all permanent staff should therefore be explored further to establish who to target with an introduction to and training in the use of the EWS.

7.2 METHODOLOGICAL REFLECTIONS

In this section, methodological reflections in terms of strengths and limitations associated with studies 1 and 2 are discussed. Different terms are used in the literature related to assessing quality of qualitative research (Creswell & Poth, 2018). Terms such as trustworthiness (e.g., Lincoln & Guba), rigor (Morse), validation (e.g., Creswell & Poth), and validity and reliability (e.g., Roper & Shapira) are used to describe quality in qualitative research (Creswell & Poth, 2018; Morse, 2018; Roper & Shapira, 2000) (Creswell & Poth, 2018; Morse, 2018; Roper & Shapira, 2000). Each term encompasses concepts that cover procedures for establishing quality of the research (Creswell & Poth, 2018; Malterud, 2001). The following discussion is centred on Malterud's (2001) criteria for assessing scientific quality; (a) reflexivity, (b) interpretation and analysis, and (c) transferability (Malterud, 2001).

7.2.1 REFLEXIVITY

Malterud (2001) accentuated that the researcher influences all steps in the qualitative research process since all choices are influenced by the researcher's position and background via the researcher's preconceptions. The researcher uses reflexivity to account for the impact of his or her preconception to ensure the quality of the research (Malterud, 2001). Malterud (2001) argued that the researcher needs to establish meta-positions, which are strategies that create a distance from the study, which is a premise for reflexivity.

A preconception in study 1 was rounded by my background as a nurse and a nurse lecturer together with the background literature for this research. In addition, having background knowledge is a prerequisite in focused ethnography as it aids in focusing on selective and specified topics of interest in the field (Knoblauch, 2005). To ensure that my background knowledge remained a strength to the study, I sustained a reflexive approach. This was done by discussing my preconceptions with the supervisors during all steps of the research process to balance the insider (nurse) and the outsider (researcher) roles and to sustain open-mindedness during data collection (Creswell & Poth, 2018). For example, we discussed selected situations from the participant observations that were difficult to manage as a novice researcher. Thus, discussing concrete situations from the data collection supported my reflections about my role as a researcher and supported the validity of the findings (Labaree, 2002).

Another preunderstanding in study 1 was that only nurses should be recruited. However, this preunderstanding was challenged through reflexivity based on the first participant observations. It was realized that the nurses' use was influenced by the physicians' use and perceptions of the EWS. Consequently, I decided to use data triangulation by also inviting physicians to the interviews. Malterud (2001) stated

that triangulation can increase validity when more data sources complement the studied topic. Involving physicians as a data source is a strength as the interviews with the physicians added nuances to how the nurses' use of the EWS was influenced by their diverse perceptions and practices. This enriched the data collection process and sustained the reflexive process between the data collection and the initial analysis, which is recommended in ethnographic studies (Higginbottom et al., 2013; LeCompte & Schensul, 2013).

Preconceptions regarding participatory methods for study 2 did not include any prior experiences with any such methods. Instead, my preconceptions were based on the literature on different participatory methods. The persona method was chosen although it has been criticized for containing fictional elements (Nielsen, 2013; Pruitt & Grudin, 2003). A possible weakness is that a persona description may not be accurate or may not represent the population in which it is used (Chapman & Milham, 2006). This means that the persona method may pose a limitation unless the development of the personas is transparent and based on systematically collected data (Nielsen, 2013). This PhD project used the persona method because it was possible to develop personas based upon the insights gained in the focused ethnographic study. The development of the personas used in workshop 2 was therefore a result of a systematic research process, which is a strength. In addition, the personas were developed based on the participants' identification of users of the EWS during workshop 1 and were therefore perceived to represent the targeted population. Furthermore, the personas were developed and described in a collaboration with the primary facilitator of the workshops. Collaborating with the primary facilitator enabled reflexivity through discussions with a coresearcher who facilitated attention to my blind spots, which strengthened the development of the personas as my preconceptions were contested (Malterud, 2001). Despite of the personas being systematically developed, one persona conflicted with some of the participants' viewpoints as discussed in section 7.1. Verification of the personas from single participants could have elucidated refinements to the persona description (LeRouge et al., 2013). As such verification was not obtained from single participants, this poses a limitation and may have influenced the participants' ideas on initiatives related to this one persona.

Reflexivity also concerns accounting for the influence that the researcher has in his or her role (Malterud, 2001). My position was as a novice researcher familiar with the field through my background. Borbasi et al. (2005) accentuated that as a nurse, researching in one's own field is advantageous for establishing a trusting relationship with the participants. I made efforts to gain the nurses' trust, but there were situations during the observations that required an instant response. Reflexivity was used to handle these situations in ways that sustained the trusting relationship while also allowing me to collect data. However, I cannot ignore that I may have handled the situations in ways that made the participating nurses feel uncomfortable about my presence, which may have influenced the data collection.

Altogether, the participant observations involved several instances in which nurses told private anecdotes or monitored the EWS in unintended ways and subsequently talked about the reasons for their practices. Therefore, I believe that the participants had trust in me, which suggests that the participant observations provided accurate descriptions of the nurses' practices of using the EWS. This strengthens the validity of the data.

In study 2 during the workshops, I abstained from taking notes since the participants invited me to join the group discussions by asking questions. This is not usual practice within participatory design since the notes are used for analysis purposes afterwards together with audio recordings and photographs (Sanders & Stappers, 2012). However, I was present during the workshops, and they were audio recorded, which meant that it was possible for me to recall the atmosphere in the room, the interaction in the two groups, and the participants' engagement in the planned activities, which was a strength. My knowledge achieved as a co-facilitator was used the same way that my notes would have been used. Therefore, my change from a notetaking observer to a co-facilitating observer did not seem to impact the quality of the data because the documentation of the workshops was nuanced by using more than one source (Sanders & Stappers, 2012). Further, improvising during the participatory process was stressed by Kanstrup and Bertelsen (2016) as pertinent to sustain an open attitude among the participants to facilitate their contribution to the process. Therefore, my abstaining from notetaking was a result of improvising through reflexivity because I found it to be more important to sustain the participants' open attitude than follow the method uncritically. I strived for co-facilitating the process when I was directly invited or when I felt that my contribution was helpful for the participants' discussions. Applying this approach allowed me to achieve a meta-position as stressed by Malterud (2001). This meta-position allowed me to contribute to the facilitation of the workshops while being distanced enough to observe the workshops, which is therefore a strength in study 2.

7.2.2 INTERPRETATION AND ANALYSIS

Malterud (2001) emphasized that it is important to ensure a systematic and transparent process for analysis and interpretation. Transparency allows the readers to assess whether the analysis was conducted systematically (Malterud, 2001). Also, a systematic approach to the analysis and interpretation is of relevance to ensure findings are trustworthy (Malterud, 2001).

In study 1, the analysis was described step by step because this enhanced the transparency of the study and therefore is a strength. The ethnographic method used in study 1 addressed how the systematic analysis requires the researcher to begin the analysis upon entering the field (LeCompte & Schensul, 2013). The insight gained from such initial analysis enabled me to focus on the study aim during the following observations and preparation of interviews (informal and formal). In addition, the

analysis continued in a recursive process between the data collection and the analysis away from the field to ensure that the interpretations were rooted in the data, which is pertinent to ensure findings are trustworthy (LeCompte & Schensul, 2013).

The analysis and interpretation in study 1 were also strengthened by using a topic guide in the formal ethnographic interview. The topic guides developed for nurses was individualized to accommodate the participant observations from each nurse. This was a strength as the connection between the data collection and the analysis was reinforced by using the specific observations as prompts in the interviews. This allowed the nurses to elaborate and explain their influences and practices for using the EWS. However, due to my inexperience as a researcher, I realized during transcription of the formal interviews that on a few occasions, I missed an opportunity to pose clarifying questions. Asking these clarifying questions would have allowed the participants to explore or deepen their responses. The formal interviews were transcribed after the last interview was conducted, which is considered a limitation. If the interviews had been transcribed throughout the interview process, then this insight could have been used to qualify the ability to ask clarifying questions during the next interviews. This could have contributed to even more nuanced data material, which could have added relevant details to the final interpretation of the findings.

The content analysis in study 2a and the conversation analysis in study 2b were also described step by step, which supports the transparency of the methods used and therefore enhances the credibility of the findings. However, the decision to abstain from verbatim transcription of the audio recording from workshop 1 may pose a limitation since only needs, motives, and visions were transcribed as they occurred in the recording. To accommodate this potential limitation, all recordings were reviewed several times to identify that no leftover data that should have been transcribed was missed, which is a strength (Graneheim & Lundman, 2017). Examples of leftover data include repetitions of needs, motives, or visions or small talk during the workshop. However, this step may introduce a limitation because needs, motives, or visions may have been overheard and thus may not have become part of the data analysis.

Malterud (2001) argued that the researcher needs to organise, compare, and validate interpretations as part of a transparent and systematic approach in the analysis. Within a comprehensive and systematic conversation analysis, distinct transcription conventions exist to allow for detailed analysis of the participants' dialogue as it occur in the interaction (Hutchby & Wooffitt, 2008; Pallotti, 2007). The conventions encompass details such as the length of participants' pauses, the intonation, gaze direction, and audible sounds (Hutchby & Wooffitt, 2008). I transcribed selected parts of the conventions, but I did not include details such as intonation and length of pauses. Deviating from transcribing these details may pose a limitation to the

interpretation as essential details in the participants' talks may have added more nuances to the interpretation. However, the aim with this conversation analysis in study 2b was not a traditional conversation analysis studying the orderliness and the strategies used when people talk in interactions (Hutchby & Wooffitt, 2008; Pallotti, 2007). Instead, it was to analyse how the participatory methods applied in workshop 2 enabled or acted as barriers for participants' genuine participation in the workshop. This was exemplified through selected elements from conversation analysis. Therefore, the interpretation was organised, compared, and validated using selected elements from conversation analysis through a transparent and systematic process.

7.2.3 TRANSFERABILITY

Transferability encompasses an assessment of to what degree the study findings can be applied to other settings beyond the study (Malterud, 2001). Assessing transferability includes consideration of the sampling strategy to establish whether the recruited participants contributed to elucidate the aim of the study (Malterud, 2001).

The participants recruited for study 1 had experiences using the EWS but their levels of experience varied. Therefore, the sampling strategy contributed to elucidate the aim of the study, which is shown in paper 1 via quotations and descriptions from observations and interviews. Moreover, the setting and the characteristics of the participants are illustrated in paper 1 and described in this thesis, which provides readers with opportunities to assess the similarities and differences from other settings and thus provides transparency for assessing transferability. However, a limitation of the sampling strategy may be that only nurses and physicians from a surgical and acute ward were included. Inclusion of participants from a medical ward could have strengthened the transferability. If the study also had been grounded in the medical inpatient ward, then it could be argued that the study would have covered nurses' use of the EWS more generally at hospitals. However, the nurses' and physicians' use of the EWS with medical patients is included in the data material as medical patients were admitted to the acute ward. Thus, the data material comprised examples from nurses' use of the EWS in acute, surgical, and medical patients. Nevertheless, it cannot be ruled out that inclusion of participants in medical wards would have added nuances to the nurses' use of the EWS due to differences in cultural norms.

Malterud (2001) further explained that assessing transferability includes the clarity of the nature and the extent of the data as this influences the conclusions that can be drawn. The formal ethnographic interviews were time restricted in the surgical ward due to nurses' heavy workloads in direct patient care. This could pose a limitation as the extent of these interview data could be limited. However, as participants knew me from the observations and were aware of and attentive towards the topic of

interest, this time restriction was not perceived to influence the depth of the interviews. During the interviews, I was attentive towards changing the subject to avoid repetitions and to ensure that the prepared topics in the topic guide were brought up during the interviews (Madden, 2017).

Transferability is connected to the sampling of participants, and purposive sampling is common in qualitative studies to obtain material that addresses the study aim (Malterud, 2001). For study 2, seven participants were recruited purposefully as a subsample of participants from study 1. Kanstrup and Bertelsen (2016) recommended eight participants for a participatory process, but only seven were available for participating in study 2. Thus, convenience sampling was also applied as no efforts were made to recruit an additional eighth participant. The number of participants may present a limitation as the depth and breadth of the data material may have impacted the results of both study 2a and study 2b. However, transferability is assessed by the reader as he or she is the only one to judge whom and what the findings may concern in other contexts and therefore if the findings are applicable within those contexts (Malterud 2001). From that perspective, transferability in this work is a strength since the characteristics of both the context and the participants in study 2 were described, which means it is possible for the reader to make assessments about transferability.

CHAPTER 8. CONCLUSIONS

This PhD project aimed to investigate nurses' use of the EWS and to explore nurses' and physicians' ideas on initiatives that can support nurses' use of the EWS. Further, to investigate how participatory design methods can enable or impede genuine participation in a participatory design process with nurses and physicians. The following are conclusions drawn as a response to the overall aim for this PhD project:

- Nurses' use of the EWS requires a flexible use of the EWS in which the EWS is one source of evidence among others to inform nurses' judgment of patients' conditions and subsequently their decisions on appropriate interventions. Nurses' interactions with the patients and their assessments of patients' conditions provide useful clinical information for making sound clinical decisions based on different sources of evidence. The ideas on different initiatives generated through genuine participation in a participatory design process provided knowledge on how a flexible use could be accommodated to benefit decisions about patients' EWS. A flexible use of the EWS, however, is dependent on individual nurses' ability to recognise and interpret the signs of patient deterioration, which are not limited to the EWS.

- Nurses' use of the EWS is influenced by the opportunity to share clinical information with physicians to ensure high-quality care and patient safety. Nurses' and physicians' collaboration about the EWS needs to be operationalised. This may be enabled by facilitating an environment in which nurses and physicians can discuss how the EWS could be used as a collaborative tool.

- Nurses' use of the EWS is influenced by agency staff when they are asked to assist with EWS monitoring. Agency staff assisting with EWS monitoring pose a risk for nurses' recognition of deteriorating patients. The nurses risk being uninformed about signs of deterioration if agency staff have insufficient knowledge of and skills at using the EWS. Ultimately, this may affect patient safety. Attention towards untrained and unskilled agency staff is critical to avoid risks to patients' safety.

- Applying participatory methods to involve nurses and physicians in developing the EWS contributes to ensuring that the changes made to the EWS are based on and done for the users' practice.

- Overall, the application of participatory methods enabled participants to genuinely partake through voicing and discussing their experiences, needs and motives derived from practice. Continuous attention in the participatory

process, however, is required to be paid to how to accommodate the intention with the participatory methods, as otherwise genuine participation may be impeded.

CHAPTER 9. PERSPECTIVES

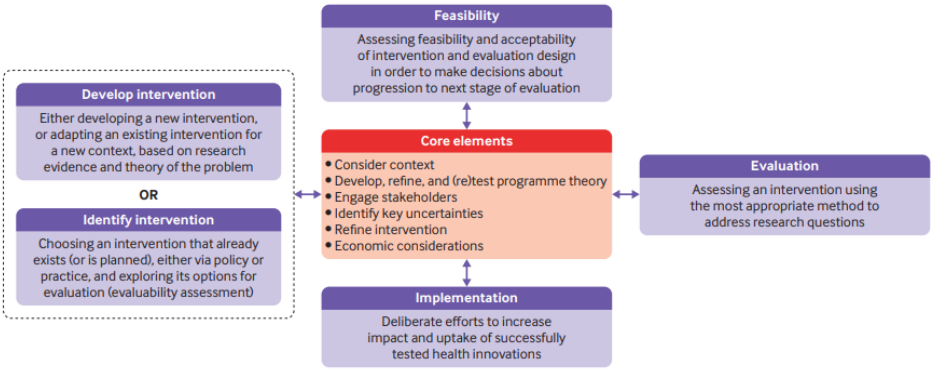
In this chapter, perspectives for further research and implications for clinical practice are described.

9.1 FURTHER RESEARCH

This PhD project found that nurses' use of the EWS is multifaceted, as are the ideas on initiatives that derived in the PhD project. This supports the notion that nurses' use of the EWS is complex. The suggested ideas on initiatives from this project need further development and refinement to provide concrete and workable solutions that can be considered as interventions that can be tested, evaluated, and implemented in clinical practice. Therefore, it is recommended that further research on initiatives that can support nurses' use of the EWS is developed within the Medical Research Council's (MRC) Framework for Developing and Evaluating Complex Interventions (Skivington et al., 2021).

A complex intervention is characterized by involving multiple components, targeting multiple groups, targeting skills and expertise, and flexibly using components (Skivington et al., 2021). The MRC's framework encompasses four phases when performing research in complex interventions (see Figure 1): Phase 1 is development or identification of the intervention, Phase 2 is feasibility, Phase 3 is evaluation, and Phase 4 is implementation (Skivington et al., 2021). Each phase in the framework encompasses core elements to be addressed, and the research should not progress before these elements are thoroughly considered and handled (Skivington et al., 2021).

Figure 1 – MRC Framework for developing and evaluating Complex interventions (Skivington et al., 2021)



Further research on the use of the EWS within this framework is suggested to ensure systematic handling of the multiple ideas on initiatives derived from this PhD project encompassing: multiple involved clinicians, flexible use of the EWS by integrating nurses' clinical judgment to influence the EWS, and required skills and knowledge for the involved clinicians.

The findings from this PhD project could therefore be further researched within the MRC Framework in phase 1 (development or identification of the intervention).

The findings of this PhD project indicate that further research on agency staff is required to establish if and how these staff should be provided with knowledge and training to use the EWS. However, an intervention delivering such training and knowledge does not currently exist. Based on the experiences of study 2, it is recommended that agency staff and nurses are invited to participate in the development of an intervention to accommodate this gap in knowledge. Also, development of such an intervention should build on research evidence that involves agency staff's use of the EWS in hospitals.

Further research is recommended on how use of the can be operationalised as a collaborative tool between nurses and physicians, including onboarding of new, less experienced nurses. Therefore, it is recommended to conduct further exploration of what relevant components such an intervention might involve.

Further research should also explore if and how a comment box for nurses' communication of clinical information about patients' EWS could be included in the EWS protocol to support the nurses' recording of notes in this box based on their clinical judgment. The nurses' acceptance to use the box and impact on workload should be considered accordingly.

In this PhD project, ideas on initiatives were developed based on two workshops applying methods within the field of participatory design. The analysis in study 2b showed that genuine participation was accommodated using the applied participatory methods. Therefore, further research could benefit from applying participatory methods to support development of interventions that are founded in practice. For instance, participatory methods could be used when developing an intervention to accommodate how to use the EWS as a collaborative tool between nurses and physicians. Such participatory design engages relevant stakeholders like nurses, physicians, and management (hospital and ward) as appropriate. This collaboration enables articulation of the key uncertainties deriving from practice and potential economic considerations, which may facilitate refining the interventions as described in the core elements in Figure 1.

9.2 IMPLICATIONS FOR CLINICAL PRACTICE

The findings from this PhD project have several implications for clinical practice:

As there is a shortage of staff in hospitals, nurses need to consider how agency staff best can assist with the EWS monitoring. The nurses need to be assured that they are summoned when patients' vital parameters deviate since the nurses cannot expect the agency staff to always adhere to the EWS routines. In addition, an organizational initiative should state minimum requirements for agency staff to meet related to the EWS routines. This would serve to reassure the nurses in the wards so they can rely on being summoned by the agency staff when patients' EWS are deviating.

Nurses in clinical practice should be aware of the relevance of their interaction with patients as it will provide them with essential clinical information about the patients. Therefore, nurses should consider when it is and is not appropriate to delegate the EWS monitoring to others such as agency staff and nursing students.

The EWS development and implementation groups in hospitals should involve the daily users of the EWS in conversations about the system. The daily users can provide insights into advantages and disadvantages, or blind spots related to use of the EWS that may ensure its protocolled use. In addition, the development and implementation groups should consider how best to introduce and train clinicians to use the EWS. This should also include the agency staff. As the health care setting is changeable, it is imperative that the clinicians' use of the EWS is adapted accordingly and based on evidence.

Finally, the organization, including hospital and ward management should be supported in developing a forum for nurses and physicians to discuss how to collaboratively operate the EWS. This forum should enable sharing of experiences and mutual learning to support use of the EWS as a collaborative tool. This is an important step towards nurses and physicians' understanding of being dependent on one another to enhance the efficiency of using the EWS.

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APPENDICES

Appendix A. Literature search

Appendix B. Written information for gatekeepers, nurses, and physicians – study 1

Appendix C. Written consent nurses and physicians – study 1

Appendix D. Written information for gatekeepers, nurses, and physicians – study 2

Appendix E. Written consent nurses and physicians – study 2

Appendix F. Programme workshop 1 & 2

Appendix G. Example of a persona for workshop 2

Appendix H. Template with guiding questions for workshop 2

Appendix A. Literature Search

The purpose of the literature search was to identify studies investigating the introduction EWS systems into hospitals and their effect on patient outcomes. Further to identify how nurses have used the EWS systems in hospitals. In collaboration with a librarian, I searched for literature in PubMed, CINAHL Complete, Embase, Scopus, and SweMed+.

The search for literature comprised a block search with three blocks that initially were developed and searched for in PubMed (Table A1) and afterwards adapted to the other aforementioned databases. Within this block search strategy, the three blocks were "early warning score," "hospitalization," and "nurses." Within each block, thesaurus terms and free-text terms were combined. In the block "early warning score," it was not possible to identify a thesaurus term that covered this. Consequently, the librarian and I were increasingly attentive to the use of free-text terms in this block. Truncation of "nurs*" when searching for free-text terms was used to ensure that the search would include diverse variations of the word such as "nurse," "nurses," and "nursing." The Boolean operator "OR" was used to combine the search terms within each block, whereas the Boolean operator "AND" was used to combine the blocks. However, as shown in the top row in Table A1, the first search in PubMed for the three blocks combined with "AND" resulted in only 240 hits and in the exclusion of studies investigating the effect of the EWS system. Consequently, the "nurses" block was excluded because nurses are implicitly included in the "hospitalization" block as part of the clinical staff employed in hospitals and mandated to use the EWS in this context.

Table A1 – First search in PubMed:

History Download history Clear history

Search	Add to builder	Query	Items found	Time
#23	Add	Search **((((Nurses [MeSH]) OR nurs*[tw])) AND (((((((early warning score*[tw]) OR early warning system*[tw]) OR EWS[tw]) OR ((track and trigger system*[tw]))) OR ((track and trigger score*[tw]))))) OR TTS[tw])) AND ((Hospitals [MeSH]) OR Hospital*[tw])**	240	07:13:10
#22	Add	Search **(Hospitals [MeSH]) OR Hospital*[tw]**	1529514	06:05:34
#21	Add	Search **Hospital*[tw]**	1515332	06:05:17
#20	Add	Search **Hospitals [MeSH]**	265845	06:04:59
#19	Add	Search **(((((early warning score*[tw]) OR early warning system*[tw]) OR EWS[tw]) OR ((track and trigger system*[tw]))) OR ((track and trigger score*[tw])))) OR TTS[tw]**	6761	06:04:35
#18	Add	Search **TTS[tw]**	2287	06:04:14
#17	Add	Search **((((early warning score*[tw]) OR early warning system*[tw]) OR EWS[tw]) OR ((track and trigger system*[tw]))) OR ((track and trigger score*[tw]))**	4480	06:03:49
#16	Add	Search **(track and trigger score*[tw])**	6	06:02:51
#15	Add	Search **(track and trigger system*[tw])**	60	06:02:29
#14	Add	Search **EWS[tw]**	2240	06:02:03
#13	Add	Search **early warning system*[tw]**	1637	06:01:35
#12	Add	Search **early warning score*[tw]**	813	06:01:07
#11	Add	Search **(Nurses [MeSH]) OR nurs*[tw]**	714669	06:00:41
#10	Add	Search **nurs*[tw]**	714669	06:00:12
#9	Add	Search **Nurses [MeSH]**	85979	05:59:03

After removing the "nurses" block, the search consisted of two blocks that were searched again in PubMed and afterwards also in Embase, Scopus, SweMed+, and CINAHL Complete. The thesaurus and free-text search terms were adapted to the specific databases. In addition to using the Boolean operators "OR" and "AND," the Boolean operator "NOT" was used to narrow down the topic of interest. We used "NOT" to exclude studies investigating use of the paediatric early warning score (PEWS) and those in the paediatric context.

Moreover, in the Embase and Scopus databases, it was possible to apply additional strategies to increase the number of hits while attempting to increase their precision as well. First, we used a strategy to include all studies that in the title, abstract, or keywords used the term "early warning" near terms such as "score," "system," "tool," or "signal." Second, we limited the search to include only studies in English, Danish, Swedish, and Norwegian. Third, the type of publication was used to limit the number of hits by excluding conference abstracts, for example. This strategy is exemplified in Table A2 below for the Embase search.

The references identified in each search were sorted systematically, and duplicates across databases were removed. The remaining hits were systematically categorized according to investigating the implementation and effect of EWS systems or for identifying how nurses used the EWS systems in hospitals. Studies were screened by title and abstract, and excluded studies included those focusing on an EWS system in an obstetrical or prehospital setting, those comparing an EWS system to e.g., CURB65 or the qSOFA, or those that did not encompass a study that used an EWS system based on vital parameters.

Table A2 - Search in Embase:

Embase®

Embase Session Results

No.	Query	Results
#14	#13 AND ('article'/it OR 'article in press'/it OR 'conference paper'/it OR 'conference review'/it OR 'review'/it)	923
#13	#10 NOT #11 AND ([danish]/lim OR [english]/lim OR [norwegian]/lim OR [swedish]/lim)	1,572
#12	#10 NOT #11	1,620
#11	pediatric*:ti,ab,kw OR paediatric*:ti,ab,kw	506,201
#10	#5 AND #9	1,927
#9	#6 OR #7 OR #8	8,926,117
#8	'hospitalization'/exp	324,704
#7	'hospital patient'/exp	150,170
#6	hospital*:ti,ab,kw OR inpatient*:ti,ab,kw OR inhospital*:ti,ab,kw OR patient*:ti,ab,kw	8,862,077
#5	#1 OR #2 OR #3 OR #4	3,973
#4	'early warning system'/exp	30
#3	'early warning score'/exp	54
#2	('early warning' NEAR/3 (scor* OR system* OR tool* OR signal*)):ti,ab,kw	3,918
#1	('track and trigger' NEAR/3 (scor* OR system* OR tool* OR signal*)):ti,ab,kw	126

Appendix B - Written information for gatekeepers, nurses, and physicians – study 1

The studies described in the three written information letters presented in appendix B, represent a prior planning of this PhD project. Therefore, participants were provided with new information letters and written consent forms accordingly for study 2.

Informationsbrev til Gatekeeper

Forespørgsel om deltagelse i forskningsprojekt samt hjælp til rekruttering af deltagere**.**

Baggrund og formål:

Baggrunden for projektet er, at såvel danske som internationale studier viser, at screeningsredskabet Early Warning Score = Tidlig Opsporing af Kritisk Sygdom (TOKS) ikke altid anvendes systematisk som hjælp til opsporing af kritisk sygdom i relation til sygeplejerskers kliniske beslutninger. Studier antyder, at systematisk anvendelse af TOKS, som en integreret del af sygeplejerskers kliniske beslutninger, potentielt kan forbedre patientsikkerheden.

Formålet med projektet er derfor at udvikle en intervention, som sygeplejersker finder meningsfuld at anvende systematisk i relation til TOKS og vurdering af indlagte patienters kliniske tilstand i forbindelse med kliniske beslutninger. Det forventes, at projektet bidrager med et forbedringspotentiale i forhold til at støtte sygeplejerskers kliniske beslutningstagen og systematiske anvendelse af TOKS ved indlagte patienter.

Projektet:

Projektet indeholder et etnografisk studie samt udvikling af en intervention, som skal afprøves og testes. Projektet består af 3 delstudier, og jeg vil gerne samarbejde med sygeplejersker, som har lyst og interesse i at deltage gennem alle 3 delstudier.

Jeg er derfor meget interesseret i, hvis du vil være behjælpelig med at rekruttere sygeplejersker på afsnit XX, som vil være med i studiet. Jeg har brug for din hjælp til at rekruttere 6 sygeplejersker som udgangspunkt til at deltage i det etnografiske studie.

Jeg er interesseret i sygeplejersker med varierende anciennitet og varierende erfaring på afsnittet.

Hvis du vurderer, at afsnittet kan deltage og du indvilger i at hjælpe, så vil jeg bede dig gøre følgende:

- Kontakte 6 sygeplejersker, som opfylder ovenstående kriterier om varierende anciennitet og varierende erfaring på afsnittet.
- Kontakte mig med kontaktinformation, hvis den udvalgte sygeplejerske indvilger i at være med, så jeg kan kontakte vedkommende for yderligere information og samtykke
- Udlevere et informationsbrev til de sygeplejersker, som du kontakter

Såfremt du har brug for yderligere oplysninger omkring studiet eller rekrutteringen af deltagere, så skal du endelig kontakte mig på:

Mail r.moelgaard@rn.dk eller mobil XXX.

Jeg ser frem til at høre fra dig, og jeg håber, at du kan hjælpe med rekruttering.

Med Venlig Hilsen

Rikke Rishøj Mølgaard

Sygeplejerske, PhD studerende

Klinisk Institut, Aalborg Universitet

Forskningsenhed for Klinisk Sygepleje, Aalborg Universitetshospital

Sygeplejerskeuddannelsen, Professionshøjskolen UCN

Informationsbrev - Sygeplejersker

Forespørgsel om deltagelse i forskningsprojekt

Baggrund og formål:

Baggrunden for projektet er, at såvel danske som internationale studier viser, at screeningsredskabet Early Warning Score (TOKS) ikke altid anvendes systematisk som hjælp til opsporing af kritisk sygdom i relation til sygeplejerskers kliniske beslutninger. Studier antyder, at systematisk anvendelse af TOKS, som en integreret del af sygeplejerskers kliniske beslutninger, potentielt kan forbedre patientsikkerheden.

Formålet med projektet er derfor at udvikle en intervention, som sygeplejersker finder meningsfuld at anvende systematisk i relation til TOKS og vurdering af indlagte patienters kliniske tilstand i forbindelse med kliniske beslutninger. Det forventes, at projektet bidrager med et forbedringspotentiale i forhold til at støtte sygeplejerskers kliniske beslutningstagen og systematiske anvendelse af TOKS ved indlagte patienter.

Projektet:

Projektet indeholder et etnografisk studie samt udvikling af en intervention, som afprøves og testes. Projektet består af 3 delstudier, og jeg vil gerne samarbejde med sygeplejersker, som har lyst og interesse i at deltage gennem alle 3 delstudier.

Jeg vil gerne følge dig flere gange over nogle dage på afsnittet for at observere, hvordan, hvornår og hvorfor du anvender TOKS, og jeg vil i den forbindelse gerne tale kort med dig om det jeg har observeret mellem dine øvrige opgaver og afstemt ift. dine øvrige opgaver.

Jeg vil gerne samarbejde med dig om at afprøve den intervention, som udvikles, og i den forbindelse vil jeg gerne at du besvarer spørgeskemaer vedrørende anvendelsen af interventionen.

Jeg vil til slut gerne interviewe dig for at høre dine overvejelser om anvendeligheden af interventionen. Interviewet kan foregå på dit afsnit eller i Forskningens Hus afhængig af, hvad du foretrækker. Interviewet forventes at have en varighed på 30 – 60 min, og lydoptages.

Behandling af dine oplysninger:

- Det er frivilligt at deltage, og du kan til enhver tid trække dit tilsagn om deltagelse tilbage.

- Det materiale, som jeg får adgang til behandles fortroligt, og opbevares utilgængeligt for andre.
- Lydoptagelsen fra det sidste interview slettes, når projektet er afsluttet.

Hvad gælder i øvrigt for projektet:

- At projektets gennemførelse er godkendt ved Videnskabsetisk komité for Region Nordjylland.
- At projektet er registreret med følgende nummer 2018-899/10-0516 ved afdelingen for Persondata, Aalborg Universitet i relation til Persondataforordningen.
- At jeg arbejder under vejledning fra erfarne forskere.
- At jeg kan kontaktes ved behov i relation til projektet.

Såfremt du har brug for yderligere oplysninger omkring studiet, så skal du endelig kontakte mig på:

Mail r.moelgaard@rn.dk eller mobil XXX.

Med Venlig Hilsen

Rikke Rishøj Mølgaard

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Forskningsenhed for Klinisk Sygepleje, Aalborg Universitetshospital

Sygeplejerskeuddannelsen, Professionshøjskolen UCN

Informationsbrev - Læger

Forespørgsel om deltagelse i forskningsprojekt

Baggrund og formål:

Baggrunden for projektet er, at såvel danske som internationale studier viser, at screeningsredskabet Early Warning Score (TOKS) ikke altid anvendes systematisk som hjælp til opsporing af kritisk sygdom i relation til sygeplejerskers kliniske beslutninger. Studier antyder, at systematisk anvendelse af TOKS, som en integreret del af sygeplejerskers kliniske beslutninger, potentielt kan forbedre patientsikkerheden.

Formålet med projektet er derfor at udvikle en intervention, som sygeplejersker finder meningsfuld at anvende systematisk i relation til TOKS og vurdering af indlagte patienters kliniske tilstand i forbindelse med kliniske beslutninger. Det forventes, at projektet bidrager med et forbedringspotentiale i forhold til at støtte sygeplejerskers kliniske beslutningstagen og systematiske anvendelse af TOKS ved indlagte patienter.

Projektet:

Projektet indeholder et etnografisk studie samt udvikling af en intervention, som afprøves og testes.

Din deltagelse er i relation til det første studie, hvor jeg har observeret og interviewet sygeplejersker fra 2 afsnit på Aalborg Universitetshospital. Jeg vil gerne gennemføre et interview med læger, som er tilknyttet de 2 afsnit, og som har vanlig gang på de 2 pågældende afsnit.

Jeg er interesseret i lægeperspektivet på TOKS redskabet, idet anvendelsen sker i en kompleks klinisk praksis, hvor flere kontekstuelle faktorer kan influere på sygeplejerskers anvendelse.

Interviewet kan foregå på dit kontor eller i Forskningens Hus afhængig af, hvad du foretrækker. Interviewet forventes at have en varighed på 30 – 60 min, og lydoptages.

Behandling af dine oplysninger:

- Det er frivilligt at deltage, og du kan til enhver tid trække dit tilsagn om deltagelse tilbage.
- Det materiale, som jeg får adgang til behandles fortroligt, og opbevares utilgængeligt for andre.

- Lydoptagelsen fra interviewet slettes, når projektet er afsluttet.

Hvad gælder i øvrigt for projektet:

- At projektets gennemførelse er godkendt ved Videnskabsetisk komité for Region Nordjylland.
- At projektet er registreret med følgende nummer 2018-899/10-0516 ved afdelingen for Persondata, Aalborg Universitet i relation til Persondataforordningen.
- At jeg arbejder under vejledning fra erfarne forskere.
- At jeg kan kontaktes ved behov i relation til projektet.

Såfremt du har brug for yderligere oplysninger omkring studiet, så skal du endelig kontakte mig på:

Mail r.moelgaard@rn.dk eller mobil XXX.

Med Venlig Hilsen

Rikke Rishøj Mølgaard

Sygeplejerske, PhD studerende

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Forskningsenhed for Klinisk Sygepleje, Aalborg Universitetshospital

Sygeplejerskeuddannelsen, Professionshøjskolen UCN

Appendix C - Written consent nurses and physicians – study 1

Samtykkeerklæring – Sygeplejersker

Kære sygeplejerske _____ på afsnit XXX, Aalborg Universitetshospital

I forbindelse med PhD projektet; *"Nurses´ use of Early Warning Score in clinical decision-making"* har jeg brug for at indhente dit samtykke om deltagelse i projektet.

Din deltagelse i projektet medfører:

- At du lader undertegnede følge dig rundt på dit arbejdssted og observere din sygeplejepraksis i relation til anvendelsen af TOKS.
- At du lader dig interviewe – både korte, uformelle interviews og et formaliseret kvalitativt interview
- At du medvirker til pilot-test af en intervention udviklet til formålet
- At du besvarer spørgeskemaer i relation til afprøvningen

Ved underskrift giver du samtykke til deltagelse og:

- At du er indforstået med ovenstående punkter
- At du er informeret skriftligt og mundtligt om projektet og din deltagelse i projektet
- At der indsamles data i projektet i form af observationer, notater, interviewudtalelser og spørgeskemaer
- At kvalitative interviews optages på en lydfil, som slettes, når projektet afsluttes
- At du er anonym i enhver formidling i relation til projektet, og at data behandles fortroligt. Du vil dog kunne genkende dig selv.
- At du deltager frivilligt, og til enhver tid kan trække dit tilsagn om deltagelse tilbage

_____

Dato og Underskrift

Du er altid velkommen til at kontakte mig med spørgsmål på mail r.moelgaard@rn.dk eller på telefon XXX. Tak for at du vil deltage. Det værdsætter jeg meget.

Med Venlig Hilsen

Rikke Rishøj Mølgaard

Samtykkeerklæring – deltagelse i forskningsprojekt om TOKS og sygeplejerskers kliniske beslutningstagen

Kære _____ med tilknytning til afsnit ___, Aalborg Universitetshospital

I forbindelse med PhD projektet; *"Nurses' use of Early Warning Score in clinical decision-making"* har jeg brug for at indhente dit samtykke vedrørende din deltagelse i et interview.

Ved underskrift giver du samtykke til:

- At du er informeret skriftligt og mundtligt om projektet og din deltagelse i interview
- At interviewet optages på en lydfil, som slettes, når projektet afsluttes
- At du er anonym i enhver formidling i relation til projektet, og at data behandles fortroligt. Du vil dog kunne genkende dig selv.
- At du deltager frivilligt, og til enhver tid kan trække dit tilsagn om deltagelse tilbage

_____

Dato og Underskrift

Du er altid velkommen til at kontakte mig med spørgsmål på mail r.moelgaard@rn.dk eller på telefon XXX. Tak for at du vil deltage. Det værdsætter jeg meget.

Med Venlig Hilsen

Rikke Rishøj Mølgaard

PhD studerende ved Forskningsenhed for Klinisk Sygepleje, Aalborg Universitetshospital, Klinisk Institut, Aalborg Universitet og Professionshøjskolen UCN

Appendix D - Written information for gatekeepers, nurses, and physicians – study 2

Informationsbrev til deltagere i workshops

Deltagelse i PhD projekt vedrørende TOKS – Studie 2

Baggrund og formål:

Studie 1 var et etnografisk studie, som du deltog i ved at lade mig observere og/eller interviewe dig. I det studie blev sygeplejersker og lægers samarbejde i relation til TOKS synligt. Læger og sygeplejersker påvirker hinandens anvendelse af TOKS. Studie 2 er derfor planlagt som workshops med deltagelse af både læger og sygeplejersker.

Baggrunden for projektet er, at såvel danske som internationale studier viser, at screeningsredskabet Early Warning Score (TOKS) ikke altid anvendes systematisk som hjælp til opsporing af kritisk sygdom. Formålet med projektet er derfor at udvikle en intervention, som støtter anvendelse af TOKS ved indlagte patienter. Det forventes, at projektet bidrager med et konkret forbedringspotentiale i forhold til at støtte anvendelse af TOKS.

Projektet:

Projektet indeholder et etnografisk studie (studie 1), som nu er afsluttet, samt udvikling af en intervention (studie 2), i en participatorisk design tilgang med afvikling af workshops.

Behandling af dine oplysninger:

- Det er frivilligt at deltage, og du kan til enhver tid trække dit tilsagn om deltagelse tilbage.

- Det materiale, som jeg får adgang til behandles fortroligt, og opbevares utilgængeligt for andre.

- Lydoptagelsen fra de 2 workshops slettes, når projektet er afsluttet.

Hvad gælder i øvrigt for projektet:

- At projektets gennemførelse er godkendt ved Videnskabsetisk komité for Region Nordjylland.

- At projektet er registreret med følgende nummer 2018-899/10-0516 ved afdelingen for Persondata, Aalborg Universitet.

- At jeg arbejder under vejledning fra erfarne forskere.

Såfremt du har brug for yderligere oplysninger omkring studiet, så skal du endelig kontakte mig på:

Mail rirm@dcm.aau.dk eller mobil XXX. Jeg ser frem til vi mødes igen til den første workshop.

Med Venlig Hilsen

Rikke Rishøj Mølgaard

Sygeplejerske, PhD studerende

Klinisk Institut, Aalborg Universitet

Forskningsenhed for Klinisk Sygepleje, Aalborg Universitetshospital

Sygeplejerskeuddannelsen, Professionshøjskolen UCN

Appendix E – Written consent nurses and physicians – study 2

Samtykkeerklæring – deltagelse i PhD projekt om TOKS

Kære _____ fra Aalborg Universitetshospital

I forbindelse med PhD projektet; *"Nurses´ use of Early Warning Score in clinical decision-making"* har jeg brug for at indhente dit samtykke om deltagelse i projektets studie 2.

Din deltagelse i projektet betyder:

- At du deltager i 2 workshops – i alt 5 timer

Ved underskrift giver du samtykke til deltagelse og:

- At du er indforstået med ovenstående punkt
- At du er informeret skriftligt og mundtligt om projektet og din deltagelse i projektet
- At der indsamles data i projektet i form af observationer, notater, arbejdspapirer, fotos, samt udtalelser fra de 2 workshops
- At de 2 workshops optages på en lydfil, som slettes, når projektet afsluttes
- At du er anonym i enhver formidling i relation til projektet, og at data behandles fortroligt. Du vil dog kunne genkende dig selv.
- At du deltager frivilligt, og til enhver tid kan trække dit tilsagn om deltagelse tilbage

_____

Dato og Underskrift

Du er altid velkommen til at kontakte mig med spørgsmål på mail rirm@dcm.aau.dk eller på telefon XXX. Tak for at du vil deltage i dette studie også. Det værdsætter jeg meget.

Med Venlig Hilsen

Rikke Rishøj Mølgaard

Appendix F – Programme for workshop 1 & 2

Plan for workshop 1: 3 timer den 16. marts 2021

Tid	**Fokus**	**Ansvarlig**
10.00 – 10.15	Præsentation af deltagere Baggrund og gevinst ved at deltage. Formål Introduktion til processen	Jacob og Rikke
10.15 – 10.25	Hvad ved vi nu – Identifikation af problemer Hvad har jeg brug for jeres hjælp til	Rikke
10.25 – 10.55	Gruppe diskussion: 1. Hvad er det for behov I identificerer? 2. Hvad er behov styret af?	Jacob
10.55 – 11.40	Kort opsamling Intro til næste del – generering af visioner	Jacob
11.40 – 12.10	Gruppe diskussion – lad behov informere visioner. Fokus er udforskning af visioner for fremtidig brug af TOKS. 1. Hvad nu hvis… 2. Problemet er løst ved at… 3. Redskabet kan fremover…	Jacob
12.10 – 12.45	Opsamling med gruppering af visioner efter emne – er der noget der hører sammen, eller er helt forskelligt fra hinanden. Skal der føjes nye visioner til?	Jacob
12.45 – 13.00	Plan for næste workshop og dato Afslutning Hvad har jeg fået med i dag, og hvad gør jeg nu	Jacob og Rikke

Plan for workshop 2: 2 timer den 11. maj 2021

Tid	Fokus	Ansvarlig
10.00 – 10.15	Præsentation af visioner fra workshop 1 Hvad har jeg brug for jeres hjælp til? Præsentation af personas; Lotte, Helle, Julia og Christian	Jacob og Rikke
10.15 – 11.15	Formulering af løsningsforslag til personas - i grupper Introduktion til at arbejde med personas 1-2 visioner, med tilhørende løsningsforslag – beskrevet gennem scenarier	Jacob
11.15 – 11.35	**Kort opsamling:** Præsentation for hinanden med fokus på de sidste justeringer Konceptet – hvilke ændringer i strategier, forståelser, initiativer er fremkommet.	Jacob
11.35 – 11.45	**Kort refleksion: i plenum** Hvilke overvejelser og hvorfor kan være relevante ift. implementering af det foreløbige designede koncept? Hvilke mulige udfordringer kan der være ved implementering af det foreløbige designede koncept?	Jacob
11.45 – 12.00	**Afslutning** ”Check ud” Hvad har jeg fået med i dag, og hvad gør jeg nu	Jacob og Rikke

Appendix G – Example of a persona for workshop 2

Den nyuddannede sygeplejerske – vision 1

Lotte, 26 år. Få års erfaring.
Lotte er glad for at være sygeplejerske, og arbejder på fuld tid i skiftende vagter.
Lotte er optaget af at kollegaer og patienter synes hun gør det godt. At hun passer sine ting på en kompetent og ansvarlig måde

Arbejdsrutine
Lotte synes, at arbejdet som sygeplejerske til tider er et meget stressende. Lotte føler ofte, at hun ikke kan nå sine opgaver.
Nogle dage må Lotte lige stoppe op midt i alle opgaverne og koncentrere sig om at prioritere opgaverne og få overblik over de opgaver hun mangler at få styr på inden hun har fri.
Lotte er glad for at arbejde et sted, hvor der er erfarne sygeplejersker, som man kan spørge til råds.

Erfaring med TOKS
Lotte har hurtigt en fornemmelse af, hvordan scoren vil se ud for patienten inden hun har skrevet det ind i systemet. Hun skriver altid patientens sidste målte værdier ned på sit lommepapir, sådan at hun ved patienten hurtigt kan se om noget har ændret sig siden sidst.
Hvis Lotte vurderer at hun er nødt til at kontakte lægen, så gør hun det. Lotte lader mange gange være med at kontakte lægen, selvom hun egentlig burde, men hvis hun ikke synes patienten er dårlig eller påvirket, så lader hun være. Det kan hun også se, at de andre gør.
Lotte synes hun får mange oplysninger fra patienten når hun TOKSER på runderne, og hun kan faktisk bedst lide, når hun selv gør det og ikke får det overleveret fra andre. Det giver hende også en tryghed at vide, at patienterne hele døgnet får målt de her værdier.

Kendskab til TOKS
De har ofte talt om i kaffepauserne, hvorfor TOKS mon egentlig ser ud som den ser ud, og hvem har bestemt at man skal bruge TOKS.
Lotte kan godt være i tvivl om det virkelig forholder sig sådan at der er evidens for anvendelse af TOKS. Det ved hun at man siger, men hun ved ikke hvad det konkret er for evidens.
Lotte synes det faste personale bør have denne viden, sådan at man kan forholde sig til hvordan det kan bruges bedst i den kliniske praksis og på en måde der faktisk er god for patienterne.

Appendix H – Template with guiding questions for workshop 2

Template – vision 1

<table>
<tr><td colspan="2">Lottes vision er at det faste personale har viden om evidensen for TOKS, sådan at man kan forholde sig til hvordan det kan bruges bedst i den kliniske praksis og på en måde der faktisk er god for patienterne.</td></tr>
<tr><td>Beskriv, hvordan en løsning til Lottes vision ser ud

Hvad er målet for Lotte med løsningen</td><td>Beskriv hindringer for Lotte i at bruge løsningen

Hvordan kan hindringerne håndteres</td></tr>
<tr><td>Nævn alle de situationer, hvor Lotte har brug for løsningen

Beskriv, hvordan andre personer er involveret i løsningen</td><td>Opnås målet for Lotte med løsningen?

Skal der være opfølgning eller yderligere tiltag efter målet er nået?</td></tr>
</table>

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