

## ORIGINAL ARTICLE

# Assessing acute functional decline in older patients in home nursing care settings using the Modified Early Warning Score: A qualitative study of nurses' and general practitioners' experiences

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## Abstract

**Aims and objectives:** The study describes experiences of registered nurses and general practitioners when using the Modified Early Warning Score (MEWS) to assess acute functional decline in older home nursing care patients.

**Background:** Acute functional decline is common among older home nursing care patients; typically characterised by nonspecific symptoms and a mix of manifestations. Early warning score systems for detecting clinical deterioration have been thoroughly evaluated in hospital settings, but few studies have evaluated these systems used with older people in a community care setting.

**Methods:** A descriptive exploratory research design and a qualitative approach. 36 nurses and eight general practitioners were purposively sampled. Data were collected in seven mixed focus groups and analysed using an inductive thematic content analysis in an iterative process that moved between text, codes, categories and themes. The COREQ checklist was used.

**Results:** Two main themes were developed in the analysis. The first theme derived, was that the MEWS along with medical-technical equipment and clinical judgement, was used to support nurses' and general practitioners' clinical decisions in assessing older deteriorating patients. The second theme referred to nurses' and general practitioners' experiences with several adjustments when using the MEWS with the older patient group and in complying with its trigger recommendations.

**Conclusion:** The use of the MEWS when assessing older patients in home nursing care is potentially useful in supporting clinical reasoning. However, the tool's usefulness is limited because it is not experienced as sufficiently adapted to neither the home nursing care services nor to older patients.

**Implications for practice:** This study increases our knowledge of how the MEWS tool is used in a community care setting and highlights the importance of adjustment of assessment procedures for older persons with acute functional decline.

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**KEYWORDS**

assessment, clinical, content analysis, decision-making, evidence-based practice, home care, older people

## 1 | INTRODUCTION

Standardised hospital procedures, such as early warning score (EWS) systems have been widely implemented in community-based settings in order to structure the communication across levels of care and between health professionals and to promote early detection of clinical deterioration.

The key to successfully implementing standardised procedure like an EWS is to strike a balance between flexibility and rigidity and to deploy the procedure in a physical and cultural infrastructure that allows it to function (Timmermans & Almeling, 2009). Additionally, standardised procedures leave some residual work that requires active involvement by the practitioners to use their clinical judgement and ensure compliance with the instructions (Timmermans & Epstein, 2010).

The present study focuses on how an EWS tool designed to function in acute hospital settings is perceived and experienced to influence clinical reasoning and decisions by registered nurses (RNs) and general practitioners (GPs) working with older home nursing care patients with acute functional decline.

## 2 | BACKGROUND

The older population receiving home nursing care is a frail group of individuals with complex diseases who need comprehensive health care (Bing-Jonsson et al., 2015; Næss et al., 2017; Vegda et al., 2009). When frail older persons become acutely ill, the symptoms are often nonspecific and atypical and present with a combination of physical, psychological, social and functional manifestations (Anpalahan & Gibson, 2008; Bell et al., 2016; Cigolle et al., 2007; Hébert, 1997; Hsin-Ju Tang et al., 2016). When this condition develops within a few days or weeks, it is referred to as 'acute functional decline'. The condition refers to both physical symptoms such as fatigue, weakness, loss of activities of daily living (ADL) capacity, loss of appetite, falls and incontinence and psychological symptoms such as loss of attention, initiative and motivation and general cognitive impairment. Acute functional decline is often caused by somatic diseases common among the older population (Bell et al., 2016; Hébert, 1997), such as infections and cardiovascular, cerebrovascular, pulmonary, neurological, musculoskeletal, metabolic and endocrine diseases. Based on the knowledge that physiological parameters change rapidly when a patient's health condition deteriorates, EWS tools, such as MEWS, can provide health care personnel additional clinical support in detecting acute functional decline (Subbe et al., 2001).

Early warning score systems, or physiological 'track-and-trigger' systems, were designed to support health care professionals in

### Summary statement of implications for practice

#### What does this research add to existing knowledge in gerontology?

- This research contributes to the literature by providing new insight and knowledge of how Modified Early Warning Score (MEWS) is used by registered nurses (RNs) and general practitioners (GPs) to assess acute functional decline in older patients in a home nursing care setting.
- The MEWS has become an important tool in facilitating RNs' and GP' clinical reasoning and decision-making when acute functional decline is detected.
- The usefulness of the tool is experienced as limited by RNs and GPs, because it is neither experienced as sufficiently adapted to the home nursing care setting nor to the older patient population suffering from acute functional decline.

#### What are the implications of this new knowledge for nursing care with older people?

- Modified Early Warning Score along with the medical-technical equipment and clinical judgement, is potentially useful to support RNs' and GPs' clinical decisions in assessing older home nursing care patients with acute functional decline.

#### How could the findings be used to influence policy or practice or research or education?

- This study shows that further research is needed to explore the characteristics of the vital signs of older home nursing care patients experiencing acute functional decline.
- This study highlights the need to adapt MEWS' normal ranges of vital signs to the older patient population with acute functional decline and the need to adapt trigger recommendations to the home nursing care.

identifying and responding to acutely unwell patients at risk of clinical deterioration (Brangan et al., 2018). The effects of EWS systems have been thoroughly evaluated in hospital settings. Various scoring systems used in hospital settings perform well for predicting cardiac arrest and death within 48 h (Downey et al., 2017; Smith et al.,

2014; Subbe et al., 2001). However, studies show that EWS systems cannot replace clinical judgement, and combining EWS systems with clinical judgement is important for making appropriate clinical decisions in pre-hospital and hospital settings (Brangan et al., 2018; Foley & Dowling, 2019; Fox & Elliot, 2015; Fullerton et al., 2012; Jensen et al., 2017; Williams et al., 2016). Several studies have noted the challenges of using EWS in a variety of clinical settings and patient groups and pointed out the need to adjust EWS approaches to ensure their proper use (Brangan et al., 2018; Downey et al., 2017; Foley & Dowling, 2019; Fox & Elliot, 2015). One study showed that EWS and rapid response systems (RRS) improved RNs' decisions about whether to summon help and their collaboration and communication during the referral process. Conversely, RNs found it challenging to contact the physician when their clinical intuition caused them to be concerned about a patient even though the patient's EWS score was low (Jensen et al., 2017).

Few studies have investigated the use of EWS in community care settings. One study found that an EWS in pre-hospital settings could identify patients at risk of deterioration and the need for hospitalisation, while patients at low risk of deterioration could be safely managed at home (Patel et al., 2018). Another study explored RNs' and GPs' experiences with the UK's track-and-trigger National Early Warning Score (NEWS) system in pre-hospital, primary and community health care setting. Participants reported that NEWS could support clinical decision-making around the escalation of care and could provide a clear means of communication between clinicians and across different health care organisations. However, the study suggested that modifications were needed to make the tool relevant for specific patient groups in community services, such as older patients (Brangan et al., 2018).

In the Hospital of Southern Norway, an EWS system for early identification of life-threatening conditions with the Norwegian acronym TILT was developed in 2014 (Pedersen, 2014). TILT consists of a five-item Modified Early Warning Score (MEWS), an observational curve for vital parameter registration and an e-learning system for training health care personnel.

In 2016, eight municipalities in southern Norway decided to implement MEWS, the same tool used at the regional hospitals, to ensure consensus and common terminology across settings. Necessary medical equipment such as blood pressure monitors, ear thermometers and pulse oximeters to conduct measurements related to MEWS was purchased by all municipalities. MEWS in combination with the medical equipment, represented a new opportunity for RNs to assess vital signs in home nursing care.

Modified Early Warning Score consists of five items of vital parameters: heart rate, temperature, respiratory rate, blood pressure and level of consciousness (Morgan et al., 1997; Pedersen, 2014) (Figure 1). The score is calculated based on vital sign measurements. These parameters provide information about a person's overall physical condition; parameters that deviate from the normal range represent scores in points and colour codes and generate support concerning when the measurements are to be repeated and when to contact a physician: a MEWS score of 0 (blue) triggers new measurements every 24 h, a score of 1 (yellow) within 8–12 h, a score of 2 (orange) every 4–8 h and a score of 3–4 (red) every 1–4 h. A score of four or higher requires health care personnel to contact a physician. In TILT, the MEWS version used at the Hospital of Southern Norway and by the municipalities in this study, oxygen saturation is also part of the assessment but does not contribute to the score. A sudden drop in saturation (<90%) requires the health staff to contact a physician and indicates general concern for the person's condition (Pedersen, 2014).

Despite the lack of research into the effect of these systems on older persons in general and in community health care in particular, international and Norwegian health authorities, have strongly recommended that EWS be implemented at all levels of health care services (Brangan et al., 2018; The Norwegian Directorate of Health, 2020). Knowledge is therefore needed on whether these scoring systems are used as intended and how they are perceived to influence the clinical reasoning and decision-making of RNs and GPs in community care.

Score	3	2	1	0	1	2	3
Respiratory rate		<9		9-14	15-20	21-29	>30
Heart rate		<40	41-50	51-100	101-110	111-129	>130
Systolic blood pressure	<70	71-80	81-100	101-199		>200	
Temperature		<35		35-38,4		>38,5	
Level of consciousness				Alert	Voice	Pain	Unresponsive

Contact physician when MEWS score >4, if oxygen saturation drops to <90 % with oxygen treatment and if you are concerned of the patients' condition.

Color-code	MEWS score	Follow up/new measurements
Blue	0	24 hours
Yellow	1	8-12 hours
Orange	2	4-8 hours
Red	3-4	1-4 hours
	>4	Contact physician

FIGURE 1 Modified Early Warning Score (MEWS)

## 2.1 | Aim

The aim of this study was to describe RNs' and GPs' experiences with the MEWS tool to support clinical reasoning and decision-making when working with older home nursing care patients who suffer from acute functional decline.

## 3 | METHODS

### 3.1 | Design

This is a qualitative interview study with a descriptive exploratory research design.

### 3.2 | Setting

In Norway, municipalities are responsible for the primary health care of older persons living at home. Older persons in need of assistance with personal and instrumental ADL receive individualised help based on their needs that is provided by home nursing care services. The service hours are set for a certain number of visits and times for daily or around-the-clock care; service is based on individual assessment and is adjusted as needed (Dale et al., 2008). The overall responsibility for medical treatment is assigned to the patient's GP, who cooperates with RNs mainly through telephone calls or electronic messages (Lyngstad et al., 2014). An intermunicipal after-hours emergency service can be contacted when the GP's office is closed if there is a need for acute medical supervision.

This study explicitly evaluates the MEWS tool, which is used by RNs in home nursing care, while GPs indirectly relate to MEWS by receiving vital parameters and information systematised and communicated when RNs consider that a patient needs medical assessment. GPs and RNs with experience using MEWS in clinical settings with older home nursing care patients were invited to participate. The participants were recruited from one large (more than 20,000 inhabitants), three medium (5000–20,000 inhabitants) and three small (fewer than 5000 inhabitants) municipalities in southern Norway. The COREQ checklist was used.

### 3.3 | Sampling and recruitment

A purposive sampling procedure was applied in this study to recruit individuals with experience using MEWS in clinical settings with older home nursing care patients (Green & Thorogood, 2014). The administrative leaders and district medical officers of the municipalities approved the study and gave access to invite RNs and GPs to participate in focus groups. A letter outlining study information and an extended invitation to participate was posted at the workplaces of RNs and GPs. RNs and GPs who met the inclusion criteria were invited to contact the researchers to be enrolled in the study. All RNs

and GPs who consented to participate signed an informed, voluntary consent at the time of the focus group. No participants withdrew their consent during or after the focus groups.

### 3.4 | Data collection

Seven semi-structured mixed focus groups were conducted in the participants' workplaces to explore issues and challenges regarding using MEWS in clinical practice from the participants' perspectives (Green & Thorogood, 2014). Data collection started in September 2018 and was completed in November 2018. A dynamic interview guide was developed by the researchers in this study. Overall questions related to the advantages and challenges of using MEWS in clinical practice was employed during all focus groups (Figure 2). The researchers presented their academic background to the participants before the focus groups started. The focus groups lasted an average of 68 min (range 53–78 min).

All focus groups were audiotaped to ensure accuracy for transcription and analysis. Field notes were made during all focus groups. All authors participated in the data collection. MK (EdD) and LKB (PhD) are experienced researchers with experience in focus group interviewing, while KJ is a PhD candidate who was less experienced in focus group interviews at the outset of the study. MK moderated the two first interviews, with KJ attending as co-moderator. KJ moderated the remaining five interviews, with LKB attending as co-moderator.

### 3.5 | Data analysis

All interviews were transcribed verbatim using transcription software (f4transkript) (Autotranskription, 2018). The purpose of the present study is to describe the experiences of RNs and GPs in using MEWS with older home nursing care patients. The data were analysed using a basic thematic content analysis in an iterative process that moved between text, codes, categories and themes. The analysis was inspired by Green and Thorogood (2014). All transcripts were read by KJ, MK and LKB to obtain an overview of the interviews. KJ and LKB coded the first interview together to identify codes and ensure consensus. Subsequently, all transcripts were imported into the qualitative analysis software NVivo12 (QRS International, 2018). Furthermore, the second interview was coded by KJ and LKB separately. New and similar codes were discussed; the degree of agreement was assessed using NVivo12, resulting in 95%–98% agreement. KJ coded the remaining five interviews. The first coding process resulted in a total of 114 codes that were identified as suitable for sorting the material to obtain an overview of the interview content. All interviews were read again, and codes were grouped into 24 categories based on similarity of content. Several codes were included in these main categories, and examples of how we arrived at the main themes are presented in Table 1.

FIGURE 2 Interview guide

The purpose of this interview is to explore RNs and GPs experiences and perceptions regarding the use of MEWS with acute functional decline in older home nursing care patients, and whether the use of MEWS has had an impact in clinical practice:

- Would anyone please start with sharing immediate experiences with the use of MEWS in your clinical practice?
- Could anyone please share if the use of MEWS have changed clinical practice in any way? In case how? Feel free to give examples
- What would you say are the main advantages of using MEWS?
- What would you say are the main challenges of using MEWS?

The categories were discussed by KJ and LKB before subsequent analysis was commenced. In the ensuing analysis, two main themes emerged from nine categories and were found to be relevant for the purpose of this study.

### 3.6 | Ethical considerations

This study was approved by The Norwegian Regional Committees for Medical and Health Research Ethics (2018/469). All participants signed a consent form, assuring voluntary participation and confidentiality. All data are securely stored in the University of Oslo's Services for Sensitive Data.

## 4 | RESULTS

Altogether, 44 health care personnel were included in this study: 36 RNs and eight physicians. The mean ages of the RNs and GPs were 43.92 and 43.25, respectively. The mean work experience for RNs was 15.81 years and ranged from 0 to 40 years, while the mean work experience for GPs was 15.13 years and ranged from 6 to 20 years. All RNs worked in direct patient care, and all participating physicians worked as GPs, and four had additional functions in the municipal health service, such as supervisory doctors in nursing homes and municipal superiors. Participant characteristics are presented in Table 2.

The RNs and GPs had different perspectives on their experiences with MEWS. Whereas the GPs discussed the use and usefulness of MEWS through their experiences from collaborating with the RNs, the RNs alternated between sharing perceptions of how MEWS was intended to be used and experiences of how MEWS actually worked in the home nursing care setting. In the following sections, two main themes are presented: *MEWS as a support in clinical decision-making* and *adjusting the use of MEWS to older patients in community-based settings*.

### 4.1 | MEWS as a support in clinical decision-making

The interviews showed that MEWS had become an important tool in facilitating the RNs' clinical reasoning and decision-making when acute functional decline was detected in home nursing care patients.

#### 4.1.1 | MEWS as a part of the clinical judgement

It was not merely the MEWS tool that made the difference. The majority of the RNs emphasised that the new medical-technical equipment—including digital blood pressure monitor, pulse oximeter and ear thermometer—accompanying the introduction of MEWS as an important quality improvement in their clinical practice. One RN stated that the equipment for measuring vital signs had become an indispensable part of her practice:

It's like... when you are on your way to the patients and you discover that the MEWS equipment bag is not there [in the car]... then you feel so naked! (RN-37)

According to the RNs in all municipalities, MEWS was considered a common tool across the health service to comprehensively present vital signs, and it was perceived as a concise tool for communicating the deterioration of a patient's state of health. The GPs also emphasised the importance of concise communication from the home nursing care RNs in order to promote efficiency and quality in assessing patients and noted that MEWS facilitated that communication. One GP reported that he received more complete and objective information from the RNs after MEWS was implemented:

Really, before MEWS... I could ask the nurse, 'What is the respiratory rate'? It really didn't happen. It didn't happen before... or... I didn't get the answer to these questions. It's something that has happened after

TABLE 1 Examples of codes, categories, and main themes of the qualitative analysis

Transcribed text	Code	Category	Main theme
It gives a certain reassurance that there may not be anything seriously wrong with the patient if the MEWS score has not changed much from what is normal. They do not suffer from sepsis when the pulse and everything is fine. (RN-27)	MEWS provides specific information	Change of practice after the introduction of MEWS	MEWS as a support in clinical decision-making
“Really, before MEWS... I could ask the nurse, ‘What is the respiratory rate?’ It really didn’t happen. It didn’t happen before... or... I didn’t get the answer to these questions. It’s something that has happened after implementing MEWS. I don’t think the nurses measured the respiratory rate. They would say ‘shortness of breath’ or ‘no shortness of breath’ or ‘the patient is breathing fast’.” (GP-3)			
‘A lot of our patients have dementia, and they are often unable to express symptoms; you just really have to know your patients in order to assess if it’s normal or not’. (RN-3)	Nurses must be in contact with the patients to identify changes	Nurses and GPs have to know their patients to make proper clinical decisions	
‘I think it’s something about that continuity and that home nursing care nurses know the care recipients very well, and that is important. It is as important as well as an instrument like MEWS’. (GP-6)			
‘We work a lot with geriatric patients, and I think that MEWS is not adapted to geriatric patients. It’s kind of more like it would be suitable for me if I were hospitalised’. (RN-4)	Patients have parameters outside MEWS’ normal range in habitual state.	MEWS is not an appropriate tool for all patient groups	Adjusting the use of MEWS to older patients in community-based settings
I think that the respiratory rate score is very low; it’s for a healthy person, and we really have none of those. (RN-2)			
‘It should be said that we are not that structured when it comes to the MEWS follow-up intervals. But sure, we do our own reasoning, even if it’s a score of three [red] or two’ [yellow]. (RN-44)	MEWS trigger recommendations are not always relevant nor feasible		
‘Really, to leave the patient at home and to come back again for new measurements in one to two hours... that is really not how we work in home nursing care’. (RN-20)			

implementing MEWS. I don’t think the nurses measured the respiratory rate. They would say ‘shortness of breath’ or ‘no shortness of breath’ or ‘the patient is breathing fast’.

(GP-15)

The nurses explained that whereas the intention of using MEWS was to identify physiological changes early by comparing the most

recent MEWS with the patient’s habitual score, MEWS could not stand alone. Rather, MEWS was described as a tool to support the overall clinical assessment, as one RN made clear:

MEWS is just a tool to complete a comprehensive assessment. You do not solely make decisions on the basis of MEWS, there are many other observations as well.

(RN-44)



One RN described the constant possibility of making the wrong decision by relying solely on objective parameters:

There is a risk of blindly trusting the measurements and not interpreting the clinical situation. [MEWS] is a starting point, but there can be serious misjudgements.

(RN-44)

Throughout the interviews, both RNs and the GPs highlighted the importance of combining MEWS with knowledge of the individual older patient as an important part of reasoning about the clinical situation. The full sense of 'knowing the patient' included detailed knowledge of how patients managed daily functional activities and their diagnoses, including MEWS and vital signs in their habitual condition. An RN and a GP highlighted the importance of knowing the older home nursing care patients:

A lot of our patients have dementia, and they are often unable to express symptoms; you just really have to know your patients in order to assess if it's normal or not.

(RN-3)

I think it's something about that continuity and that home nursing care nurses know the care recipients very well, and that is important. It is as important as well as an instrument like MEWS.

(GP-36)

The RNs explained that MEWS, combined with clinical knowledge, could give them an indication of the severity of a patient's clinical deterioration and whether there was a need for a medical assessment or a higher level of care:

It gives a certain reassurance that there may not be anything seriously wrong with the patient if the MEWS score has not changed much from what is normal. They do not suffer from sepsis when the pulse and everything is fine.

(RN-27)

The RNs considered the clinical situation to be stable if the MEWS did not change significantly, but they were aware of the possibility of making incorrect decisions.

A MEWS score of 1–2 points higher than the habitual score, combined with diffuse clinical changes, resulted in a dilemma, because the symptoms and changes in vital signs could reflect both the complexity of the patient's chronic state of health or severe acute illness. A MEWS score higher than three or other obvious clinical indications of acute illness were situations that RNs found easier to assess, because they reasoned the clinical situation to be severe.

## 4.2 | Adjusting the use of MEWS to older patients in community-based settings

Implementing MEWS in the home nursing care setting entailed clinical and contextual challenges that needed to be addressed. In the following, descriptions of how RNs and GPs adjusted their use of MEWS to the older patient group in the context of home nursing care are presented.

### 4.2.1 | Adjusting MEWS' normal range to fit the patient group

The RNs and GPs emphasised that a significant limitation of the current MEWS version was the lack of an adjusted normal range to reflect the older patients' typical health conditions. These patients often have several chronic diseases that may cause deviations from the standardised normal range for vital signs in MEWS, which were developed for the general adult population. A GP stated that MEWS was not adapted to the older population:

I don't know which age population MEWS is adapted to, but the normal variations in vital signs with older patients are wide.

(GP-15)

The shortcoming of the tool led to difficulties in applying the MEWS normal range and trigger recommendations directly, and the RNs had to rely on their knowledge of a given patient's state of health when deciding what action was necessary. This was also clearly identified as a limitation by one RN:

We work a lot with geriatric patients, and I think that MEWS is not adapted to geriatric patients. It's kind of more like it would be suitable for me if I was hospitalised.

(RN-4)

This RN found that she rarely could relate MEWS' normal range with the realities of older patients. The RNs constantly assessed and differentiated between normal or abnormal vital signs by interpreting the patients' scores in the light of other relevant information. In particular, RNs in all municipalities identified a challenge with the normal range for respiratory rate. One RN emphasised that most patients had higher respiratory rates than MEWS' normal' range:

I think that the [normal] respiratory rate score is very low; it's for a healthy person, and we really have none of those.

(RN-2)

The RN indicated that the respiratory values were not adjusted to the elevated rates typical among older patients. The normal range

TABLE 2 Characteristics of the sample

Variable	GP (n = 8)	RN (n = 36)	Total (n = 44)
Age [mean (SD)] <sup>a</sup>	43.25 (5.94)	43.92 (13.26)	43.8 (12.2)
20–29			9 (20.5)
30–39			6 (13.6)
40–49			13 (29.5)
50–59			12 (27.3)
60–69			4 (9.1)
Clinical experience [mean (SD)]	15.13 (6.33)	15.81 (10.89)	15.69 (10.16)
0–5	0	6 (17.14)	7 (15.9)
6–10	3 (37.5)	6 (17.14)	9 (20.5)
11–20	5 (62.5)	11 (31.42)	15 (34.1)
21–30	0	8 (22.85)	9 (20.5)
31–40	0	4 (11.42)	4 (9.1)
Medical specialisation, physicians			
General medicine	7 (87.5)		7 (87.5)
Internal medicine	2 (25.0)		2 (25.0)
Anaesthesia	2 (25.0)		2 (25.0)
Continuing education, nurses (n = 9)			
Palliative care		4 (66.6)	4 (66.6)
Dementia care		1 (11.1)	1 (11.1)
Rehabilitation		1 (11.1)	1 (11.1)
Geriatric		1 (11.1)	1 (11.1)
Critical care		2 (22.2)	2 (22.2)

All values are n (%) unless otherwise specified.

<sup>a</sup>The individual age of the participants is not presented due to data protection restrictions to protect the identity of the participants.

for blood pressure used by MEWS was also cited by many RNs as too broad, and the normal range for temperature were also noted as not adjusted to the typical home nursing care patient. One RN explained that a patient's temperature could appear falsely low due to medication use:

There are many who believe that older patients 'should' develop fever with serious infections. It could be fatal if RNs don't consider that the patient regularly uses paracetamol, because they will never develop a fever if they do.

(RN-26)

The RNs could not initially relate to MEWS' normal ranges, which resulted in uncertainty and ambiguity rather than support. They were obliged to carry out comprehensive clinical reasoning and make decisions while interpreting measurements with a tool that was perceived as not fully adopted to the patient group.

#### 4.2.2 | Adjusting the MEWS trigger recommendations to the home nursing care setting

Throughout the interviews, situations of not following the MEWS trigger recommendations were discussed. RNs made it clear that it was

not always feasible to follow the MEWS trigger recommendations in home nursing care because of geographic distance and work lists with limited flexibility. One RN described the great distances involved in her home nursing care district and how it was impractical and sometimes even impossible to comply with MEWS trigger recommendations:

To achieve continuity all the time... it is fine if they live close to the base, but if the patient lives far away, for example, a 40-minute drive, and you are supposed to do a MEWS again two hours later [it becomes impossible].

(RN-2)

Another RN explained that if a patient had deteriorated significantly and MEWS triggered frequent measurements, the RNs often reasoned that it was not prudent to keep the patient at home, with the patient often admitted to a higher level of care:

Really, to leave the patient at home and to come back again for new measurements in one to two hours... that is really not how we work in home nursing care.

(RN-20)

This RN emphasised that the home nursing care service did not have the capacity to follow-up with patients as closely as the MEWS



trigger tool system required. In these cases, MEWS supported RNs who decided to contact the medical service and recommend a higher level of care when both MEWS and clinical deterioration appeared clear to them.

The RNs pointed out the challenge of complying with MEWS trigger recommendations, which highlights that MEWS was not adjusted to the home nursing care context before it was introduced into that practice setting. Another RN explained that, although the MEWS trigger recommendations were not routinely followed, comprehensive reasoning was safely adjusted to each patient's situation:

It should be said that we are not that structured when it comes to the MEWS follow-up intervals. But sure, we do our own reasoning, even if it's a score of three [red] or two [yellow].

(RN-44)

A GP supported experienced RN's ability of clinical judgement, and did not expect experienced RNs in home nursing care to comply with MEWS trigger recommendations, although the tool in some cases could support inexperienced RNs:

The inexperienced RNs don't know when to perform a new MEWS assessment, but experienced RNs have a 'gut feeling' and just know how to follow-up.

(GP-6)

The RNs made decisions regarding how and when to follow-up after conducting a MEWS measurement based on their clinical reasoning, often by consulting other colleagues rather than simply following the MEWS recommendations. In the following, we discuss advantages and challenges of applying standardised procedures designed for hospital settings in a community-based setting such as home nursing care.

## 5 | DISCUSSION

In this study, we have explored how RNs and GPs experienced the use of a EWS tool designed for acute hospital settings as a clinical decision-making tool in older home nursing care patients.

Although a number of challenges related to the use of MEWS with acute functional decline in older home nursing care patients emerged in all interviews, both RNs and GPs expressed a generally positive attitude towards MEWS as a support in clinical decision-making. This positive attitude may be attributed not only to the MEWS tool itself but also to the home nursing care services being provided with sufficient equipment to assess vital signs when clinical deterioration was suspected. Standardised procedures and evidence-based practice measures such as MEWS are considered the gold standard in health care practice (Timmermans & Epstein, 2010). For the home nursing care service to have MEWS and the equipment to perform these assessments may be perceived as confirming the importance

of comprehensive clinical reasoning and decision-making with older home nursing care patients by using similar standardised procedure as those found in acute hospital care. Indeed, MEWS in the home nursing care service provides RNs and GPs a common way of conveying a patient's clinical condition by using an aggregated score based on an agreement of specific relevant vital signs rather than relying on random descriptions combined with a variable selection of physiological observations. The GPs could respond to RNs' patient information on the basis of both subjective and objective information. The structuring effect of MEWS and the consequent concretisation of the older patients' state of health was interpreted as an improvement of the interdisciplinary collaboration, and these results are in line with other studies in other settings (Brangan et al., 2018; Downey et al., 2017; Jensen et al., 2017).

A high MEWS score indicates the need to contact the medical service and assess the proper level of care, but a low score combined with vague and uncharacteristic symptoms were difficult for the RNs to assess. Unlike Jensen et al.'s study (2017), where RNs in a hospital setting found it challenging to contact a physician when the patient was assessed to have a low score, the RNs in the present study did not report any hesitation in contacting the medical service when their clinical intuition aroused their concern about a patient, even when the MEWS score was low. However, the RNs found it challenging to comply with the MEWS trigger recommendations in home nursing care. The fact that MEWS was applied in a community care setting without any formal adjustment to the older patient groups' normal range in vital parameters and without adjusting the trigger recommendations to that context, resulted in situations characterised by uncertainty, ambiguity and individual interpretation rather than objective clinical support for the RNs. This is in line with the arguments of Timmermans and Almeling (2009), who point out the importance of applying a standardised procedure in a physical and cultural infrastructure that allows it to function properly. Studies outside hospital settings have found issues with the use of EWS systems and the need for adjustments related to different patient groups and contexts (Brangan et al., 2018; Downey et al., 2017; Foley & Dowling, 2019; Fox & Elliot, 2015).

In many situations, MEWS recommendations for measures were not possible to implement in the context of home nursing care service or did not comply with the clinical judgement, which in turn resulted in the RNs' trusting their clinical judgement and ignoring MEWS recommendations. Although the RN's clinical judgement is an important part of assessments in clinical care, it could be unsafe for RNs to rely solely on their clinical judgement and knowledge of their patient without a EWS adjusted to the patient population. The opposite practice—to trust solely objective measurements in MEWS—could also, according to both the RNs and the GPs, lead to misjudgements. According to Timmermans and Almeling (2009), a standardised procedure like MEWS must strike a balance between flexibility and rigidity in order to function well. The MEWS' normal range and trigger recommendations have a rigidity that calls for adjustments or even disregarding the MEWS trigger recommendations entirely in many situations.

In general, very few standardised procedures work as intended when used in contexts other than those for which they were designed (Timmermans & Epstein, 2010), and the need for adjustments is often pressing and prominent. The present study has identified both the utility of MEWS in home nursing care and the need to adjust the MEWS normal range and triggers for the context of a home nursing service caring for older people. In order to increase the support of RNs' comprehensive assessment of acute functional decline in older home nursing care patients, we encourage future research to explore the characteristics of the vital signs of older home nursing care patients experiencing acute functional decline in order to adjust the evidence-based MEWS normal range to the older patient group and the context of home nursing care.

## 5.1 | Methodological considerations

A number of criteria must be addressed to ensure the trustworthiness of the findings reported in this paper (Green & Thorogood, 2014). We have aimed for transparency, which relates to the explicitness of the method used and how clearly this is outlined through detailed descriptions of the process of analysis (Green & Thorogood, 2014). The process is outlined in this paper by giving several examples of coding the interviews, categorisations and main themes (Table 1). We recognise that, as researchers, we are part of the process of producing the data and interpreting their meanings. Our pre-understanding and experiences as health care personnel and researchers surely influenced the perception and interpretation of the data in this study. However, the use of rich quotes in this paper emphasises our aim of transparency and supports our interpretations of the data.

The study included both RNs and GPs and representativeness (Green & Thorogood, 2014) was enhanced by assuring variation in age and clinical experience, along with the representation of two health care professions and all sizes of Norwegian municipalities. One limitation was that nurses' assistants and unskilled workers were not included in this study. These groups could have contributed their experience with identifying acute functional decline, using and interpreting MEWS and sharing their experiences in collaboration with RNs in home nursing care.

## 6 | CONCLUSION

The results of this study show that MEWS used by the RNs and GPs in the home nursing care setting is potentially useful in support of clinical reasoning and decision-making. However, the usefulness of the tool is limited, because it is neither experienced as sufficiently adapted to the home nursing care setting nor to the older patient population. To improve the tool's usefulness the normal ranges of the vital signs should be adapted to the population and the trigger recommendations should be developed and adapted to the home nursing care setting.

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## DATA AVAILABILITY STATEMENT

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

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