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Nursing Practice for Early Detection of Long-Term Care Resident Deterioration: A Qualitative Study

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ABSTRACT

Introduction: In long-term care (LTC) facilities, nurses play a key role in detecting changes in residents' health conditions and preventing avoidable emergency transfers and hospitalisations through multidisciplinary collaboration. This study aimed to explore how nurses detect changes that indicate the deterioration in LTC residents' conditions.

Methods: Semi-structured interviews were conducted with 23 nurses from 14 LTC facilities. Data from these interviews were qualitatively analysed using coding and constant comparison methods.

Results: The three main categories were 'preparing', 'assessing' and 'judging'. Nurses worked closely with care workers who spent a considerable amount of time with the residents, and by sharing information, the nurses could rapidly respond to changes in the residents' conditions. They also evaluated the risk of residents experiencing changes by leveraging their clinical experience.

Conclusion: This study found that LTC nurses should collaborate with care workers to enhance their health assessment skills, enabling them to detect changes in residents' conditions. Findings from this study can be used to promote collaboration between nurses and care workers and to develop effective educational interventions to improve nursing practice in LTC facilities.

Implications for Practice: This study underscores the necessity of nurses' ability to identify early deterioration in LTC residents. The findings reveal key symptoms and warning signs that nurses should prioritize in their assessments. By leveraging clinical experience and close observation, nurses can make timely and effective decisions to address residents' health changes, preventing further deterioration and enhancing their quality of life.

1 | Introduction

The population of older people is increasing globally, with this demographic having high levels of dependency and requiring the services of long-term care (LTC) facilities (Katz 2011). Residents of LTC facilities often have diminished physical and

cognitive functions and are frequently afflicted with multiple comorbidities, increasing their risk of emergency transfers and hospitalisations (Gruneir et al. 2010; Wang et al. 2011). When an LTC resident's condition deteriorates, for instance, owing to a chronic disease, it may worsen beyond the facility's resources, necessitating hospital transfer or hospitalisation.

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Summary

- What does this research add to existing knowledge in gerontology?
 - This study clarified the nursing practice used to detect changes in residents' health conditions in long-term care facilities and the specific symptoms and conditions detected.
 - Nurses worked closely with care workers and were prepared to respond quickly to changes that could cause resident deterioration.
 - Nurses monitored the residents' usual condition, observed changes and judged the risk of change based on their clinical experience.
- What are the implications of this new knowledge for nursing care for and with older adults?
 - Nurses should collaborate with care workers to enhance their health assessment skills, enabling them to detect changes in residents' conditions.
 - Nurses should be able to judge whether a resident's symptoms and condition can lead to death or can improve with treatment and accordingly suggest appropriate timing of medical attention.
- How could the findings be used to influence practice, education, research, and policy?
 - The practices identified in this study may benefit the development of educational interventions and supportive measures to improve detection of changes in residents' conditions by nurses.
 - Further research should elucidate nursing practices for preventing avoidable emergency transfer and hospitalisation and to promote advanced skills required to make urgent judgements and prepare for end-of-life care.

To recognise deterioration in a resident's reversible conditions and prevent emergency transfer or hospitalisation, early detection of changes in their health condition is crucial. The Interventions to Reduce Acute Care Transfers (INTERACT) program aims to improve the quality of care and reduce hospital admissions from nursing homes by empowering the staff (e.g., certified nursing assistants, licensed nurses, administrators, nurse practitioners, physician assistants and physicians) with tools to preemptively identify and assess changes in residents' conditions (Ouslander et al. 2011). The INTERACT study found that most of the reported condition changes were not disease-specific, and only 10% of the changes resulted in hospitalisation between 72 h and 7 days after the change, while 1% were associated with death (Ouslander et al. 2018). This demonstrates that many LTC facilities can manage a variety of changes in condition without hospital transfer. Detecting potential changes in residents' conditions and providing appropriate symptom management can prevent serious illnesses and emergency transfers or hospitalisation.

In LTC facilities, nurses and care workers work together to provide nursing and personal care to residents. Care workers are the main care providers for frail and vulnerable older people who reside either in LTC facilities or in their homes with home-based support (Hewko et al. 2015). Care workers offer residents daily

living support and comfort by assisting with bathing, grooming, dressing, toileting and other personal hygiene activities. Feeding, mobility and exercise needs are also within the scope of a care worker's duties. Furthermore, care workers frequently observe changes in residents' conditions firsthand because of their consistent and intimate care (Andersen and Spiers 2016). Internationally, the average care worker has an education level of high school or less (Hewko et al. 2015); however, some care workers have bachelor's degrees and national licences. Care workers are expected to promptly report observations of changes in a resident's condition and concerns to nurses or other qualified healthcare professionals.

LTC facilities rely on their nurses to possess clinical knowledge and collaborate with care workers and other professionals to detect changes that may indicate deterioration in residents' conditions. Nurses must also provide preventive care and report to physicians before the condition becomes severe. A systematic review integrating qualitative research on nursing home nurses' perceptions of emergency transfers to hospitals revealed that nurses may encounter challenges owing to the complexity of the transfer process and lack of adequate clinical resources, including knowledge, skills, staffing and support (O'Neill et al. 2015). Exploring nursing practices that detect changes that indicate worsening residents' conditions could reveal knowledge, skills and resource gaps that require attention in LTC education. The required competencies for nurses working in LTC facilities are wide-ranging, encompassing those related to acute disease management and end-of-life care and those associated with teamwork, organisational management and leadership (Stanyon et al. 2017). However, to our knowledge, limited studies have investigated specific nursing practices that are focused on the early detection of condition changes in LTC facilities.

This article aims to explore how nurses detect changes that precede the deterioration in LTC residents' conditions.

2 | Methods and Materials

2.1 | Design

This qualitative descriptive study used a constant comparative method (Boeije 2002), with data collection and analysis conducted simultaneously. This study is part of a research project employing a grounded theory approach (Corbin and Strauss 2015) to identify nursing practices for preventing avoidable emergency transfers and hospitalisations. Specifically, this study focuses on describing nursing practices and observable indicators that nurses in long-term care facilities can use to detect subtle but critical changes in residents' conditions.

2.2 | Sample and Setting

We recruited participants from two types of LTC facilities: intensive care homes and private-pay homes for older people. These facilities differed in terms of accommodation criteria, medical services and staffing (Ministry of Health, Labour, and Welfare 2016). Intensive care homes provide permanent residences through the public long-term care insurance program,

and they accommodate stable individuals who require regular nursing care. They have higher nurse staffing requirements, with at least one nurse per 10 residents, and offer 24-h care, medical care, meals and rehabilitation services. These homes are operated by municipalities or social welfare corporations, and they have lower costs owing to public support. Conversely, private-pay homes, operated by private companies, cater to a broader range of older people, from those needing minimal support to those requiring significant care. These homes often require an initial deposit and higher monthly fees, with generally one nurse per 30 residents. They offer various services, including recreational activities, lifestyle support and flexible accommodation options. These LTC facilities, in many cases, do not have a physician on staff. The choice between these facilities often depends on the level of care required and the type of payment, with private-pay homes generally being more expensive. Nursing roles differ in responsibilities for implementing healthcare; however, daily care is commonly provided in collaboration with other healthcare professionals.

We selected the purposive sampling method to select suitable study participants and maximise the diversity of data (Campbell et al. 2020). We utilised our connections with facility administrators and gerontological nursing specialists in the research team for sampling. These facilities included a diverse range of urban and suburban settings in Japan, chosen based on the type of services provided and willingness to participate. Researchers then conducted theoretical sampling to collect data on specific topics that emerged through data analysis (Corbin and Strauss 2015). From the theoretical sampling data, we only analysed the data regarding nursing practice for early detection of LTC resident deterioration. The participants included both Registered Nurses (RNs) and Licensed Practical Nurses (LPNs) who were employed at an LTC facility and had at least 6 months of experience at their current facility. In Japanese LTC facilities, it is common for both RNs and LPNs to provide comprehensive care together, and both qualifications were included in this study to accurately reflect the composition of the nursing workforce. LTC facility administrators and those not involved in resident healthcare were excluded. The researchers had a discussion to determine the criterion of years of experience to ensure that nurse participants who could speak about the care of residents in the current facility. No new concepts emerged after 21 interviews. We conducted two additional interviews to confirm data saturation. As a result, the final sample size was 23 nurses.

2.3 | Data Collection

We acquired data through semi-structured interviews ($n=23$) between February and November 2021, each lasting 40–80 min (average 59.3 min). In light of the Coronavirus pandemic and its associated restrictions, we conducted most interviews ($n=19$) using a web-based video interview platform. The interviews were recorded with the consent of the participants. One or two participants were interviewed at each location. Although the interviews were predominantly one-on-one with the researcher, at one facility, two participants were involved in the interview process. The first author conducted all interviews using an interview guide. The interviewer had experience as a nurse in a geriatric hospital, which has an intensive care home for older

people adjacent to it. The interview guide was created following a comprehensive review of pertinent literature and in collaboration with multiple co-authors, including a gerontological nursing specialist with experience in long-term care facilities.

To identify nursing practices for preventing avoidable emergency transfers and hospitalisations, we requested the participants to recall specific past cases and expound on practices executed by nurses to prevent potentially avoidable hospitalisations of high-risk, vulnerable residents. ‘Potentially avoidable hospitalizations’ were explained as ‘unplanned hospitalizations that could be averted by early outpatient visits and house calls, routine management and care of chronic diseases (e.g., hypertension and diabetes), and advance discussions with the resident and family regarding sudden changes and end-of-life care’. Table 1 presents the interview guide used to elicit responses from participants.

We used the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al. 2007) as a reference to ensure transparency in the data collection and writing process.

2.4 | Coding and Data Analysis

We initially reviewed verbatim interview data repeatedly in context. The focus was on the research question regarding nursing practices to detect changes that worsen residents’ conditions, a crucial element in preventing avoidable hospitalisation. In addition, we included data on specific symptoms and conditions perceived as changes in residents in the analysis. The data were coded accordingly. We then created subcategories by grouping similar codes through repeated comparisons, and we grouped further subcategories to form categories.

The first author mainly conducted data analysis in collaboration with the second author while ensuring anonymity to maintain analysis validity. We organised the analysis using NVivo12 Plus (QSR International, Melbourne, Australia), a qualitative research support software. The interviews and data analysis were conducted in Japanese. The first author translated only the specific portions of the transcribed interview data and the derived categories into English.

To ensure the study’s rigour, we employed several strategies to establish trustworthiness, following Mays and Pope’s (2000) guidelines. We ensured dependability by thoroughly describing the research setting, participants, methods and processes. Furthermore, we conducted peer debriefing to enhance analysis reliability. Credibility was achieved by employing the constant comparative method, triangulating data sources, and involving

TABLE 1 | Interview guide.

Please tell me about the case (age, sex, medical history, etc.)
Can you tell me about daily practices for the case?
Can you tell me more about the practices before the emergency department visit, transfer and hospitalisation for the case?

multiple researchers in the data analysis. This included cross-checking codes and categories with experienced co-researchers, ensuring consistency and accuracy in the findings.

2.5 | Ethical Considerations

This study was conducted with the approval of a Research Ethics Review Committee.

After approval, we requested the facility administrator for research cooperation. Then, the administrator, along with the researcher, selected the nurse participants. The facility administrator provided the selected nurse participants with a research description that explained the purpose, methods, expected benefits, disadvantages and assurance of personal information protection and obtained their informed consent. The researcher coordinated the timing of the interviews with the facility administrator, who knew the working conditions of the nurse participants. Before the interview, we explained the study outline to the participants again in writing and obtained their written consent. Nurse participants were also informed in writing and orally that their participation in the study was voluntary. They could withdraw their consent, and the data would be strictly managed and kept anonymous; however, it would be made public. After obtaining consent, we asked the nurse participants to fill out a face sheet with basic information, such as age and years of experience. Interviews were conducted in an environment that ensured privacy within the participating institutions.

3 | Results

A total of 23 nurse participants from 14 facilities were interviewed: 17 were from 11 intensive care homes, and 6 were from 3 private-pay homes for older people. Table 2 presents the characteristics of the participants. The average duration of professional experience was 21.3 ± 9.6 years, whereas the mean length of service at the current healthcare institution was 8.5 ± 8.5 years, with >60% of nurses having worked there for >5 years.

From the analysis, we obtained three categories of nursing practices for detecting changes that could cause resident deterioration. Moreover, we also obtained 10 categories of specific symptoms and conditions detected when the residents' conditions deteriorated.

3.1 | Nursing Practice for Detecting Changes in Residents' Conditions

The analysis of the data revealed three categories and eight sub-categories. As shown in Table 3, the three major extracted categories were 'preparing', 'assessing' and 'judging'. The narratives of the participants were partially modified to the extent that the content was not compromised.

To detect changes that could cause resident deterioration, the nurses collaborated closely with care workers and deliberately

TABLE 2 | Participant demographics ($N=23$).

Item	<i>n</i>	%
Sex		
Men	4	17
Women	19	83
Age		
20–29	1	4
30–39	4	17
40–49	8	35
50–59	8	35
60–69	2	9
Facility characteristics		
Intensive care homes for older people	17	74
Private-pay homes for older people	6	26
Nursing qualification		
Registered Nurse	21	91
Licensed Practical Nurse	2	9

engaged in activities to detect such changes. The following is a description of each category of the nurses' practices that were extracted.

3.1.1 | Preparing

This category consisted of four subcategories: 'Knowing about the usual conditions of residents', 'obtaining information about the residents' past medical history and past symptoms', 'encouraging care workers to be aware of changes in the condition of residents and escalating them to the nurse' and 'sharing information about the conditions of residents with other professionals'. Nurses were prepared to recognise changes in residents' conditions from daily activities and interactions before serious deterioration occurred. They obtained information and received change reports primarily from care workers.

Despite staffing limitations, nurses were entrusted with the overall healthcare of the residents, making it difficult for them to keep track of every detail of the residents' daily routines. Consequently, the nurses relied on their peers and other care workers to gather information about the residents' usual conditions. One of the nurses said:

There are many people who are unable to express their discomfort verbally. As a result, even a normally composed person may become agitated and slightly irritable if they are experiencing pain but are unable to communicate it. Therefore, we must remain vigilant on a daily basis. Care workers typically spend a significant amount of time with residents, so we hold regular discussions to share

TABLE 3 | Nursing practice for detecting changes in residents' conditions.

Category	Subcategory
Preparing	Knowing about the usual conditions of residents
	Obtaining information about the residents' past medical history and past symptoms
	Encouraging care workers to be aware of changes in the condition of residents and escalating them to the nurse
Assessing	Sharing information about the conditions of residents with other professionals
	Identifying atypical resident changes noticed by care workers
Judging	Observing actual resident conditions
	Judging the risk of deterioration in the conditions of residents based on comparisons with similar conditions experienced in the past and with other cases
	Judging the risk of deterioration in the conditions of residents based on their own clinical experience

information and detect any abnormalities at an early stage. (P11-1)

The nurses also provided care by obtaining information about the residents' history before or when moving into the facilities so that they could understand the risk of possible changes in condition.

From the information we had before she moved into the facility, we knew that she had a history of aspiration pneumonia, so we shared the understanding that we would be careful about her meals from the beginning. (P13-1)

The nurses intentionally used the care workers' observations to identify changes in residents' conditions, as the care workers spent the most time with the residents and were responsible for their daily care. To effectively use the care workers' observations, the nurses used jargon-free explanations to convey their observations to the care workers in advance and encouraged them to report any changes they noticed. In this regard, a nurse stated:

The instructions given by the attending physician during the rounds are generally in technical terms that are a bit difficult to understand. For example, if I say "jaundice," care workers might not understand, so I would tell them to be careful when they see a color like this. (P11-1)

Additionally, nurses intentionally conveyed information whenever an opportunity arose to share their medical and clinical knowledge about the residents' condition in terms of precautions and observations. They utilised various channels to establish a shared understanding of residents' conditions and share specific observations, including regular conferences and meetings involving multiple professions, shared care plans and daily records and opportunities to interact with care workers on the floor and provide care to residents together.

We must hold conferences regularly, and because problems sometimes change in a short period, we must hold conferences with the care workers on a case-by-case basis and tell them to inform the nurses when such a situation arises. ... If we do not communicate to the nursing staff that we want them to make clear observations and report them to us, they may overlook them. (P1-2)

3.1.2 | Assessing

This category consisted of two subcategories: 'Identifying atypical resident changes noticed by care workers' and 'observing actual resident conditions'. The nurses reported being notified of alterations in the residents' condition, frequently indicated as 'something different from the usual', which were observed by the care workers. Additionally, the nurses promptly identified any changes brought to their attention by the care workers, and they independently observed and assessed these changes. One of the interviewees said:

It would be impossible for nurses to notice every sudden change in every resident, so we try linking the care workers' observations to the nurses' assessments. We avoid missing anything that the care workers notice that is something different from the usual, even if they don't know what is wrong. (P1-1)

Another nurse said:

When a care worker reports that something is wrong or that the resident is not feeling well, we always go to see her, as this has led to early medical attention on several occasions in the past. (P9-1)

3.1.3 | Judging

This category consisted of two subcategories: 'Judging the risk of deterioration in the conditions of residents based on comparisons with similar conditions experienced in the past and with other cases' and 'Judging the risk of deterioration in the conditions of residents based on their own clinical experience'. Nurses considered future risks and detected changes based on their clinical

experience and information about residents' conditions. The nurses relied on various sources of information to detect changes in residents' conditions, including their knowledge of the symptoms and conditions of the residents, experiences with residents who had deteriorated in the past, past experiences with other residents with similar conditions, and their clinical experiences gained outside the current facility. In this regard, one of the nurses stated:

It is important for us to take into account the past conditions of the residents and to predict several developments that may occur in the future, and we also try communicating the results of these predictions to the staff.

(P9-1)

Another nurse said:

Most of the nurses in the facility are not novice nurses, so most of them have some experience in various diagnosis and treatment departments in various places. ... We consider this by comparing it with our own past experiences.

(P1-1)

3.2 | Symptoms and Conditions Detected as the Condition Changes, Leading to Deterioration

The nurses detected various changes related to the residents' daily activities and diseases as changes deteriorated their conditions. Table 4 shows the 10 categories of symptoms and conditions detected. The nurses captured the symptoms and conditions the care workers observed in detail by seeing, hearing and touching the residents.

3.2.1 | Complaints of Abnormality

This category consisted of two subcategories: 'Complaint of pain' and 'Complaint of breathlessness'. The nurses first detected a resident's noticeable complaints of distress and the appearance of distress as important changes leading to the deterioration of the resident's condition, which led to an emergency room visit.

Of course, if the resident is in a situation where the pain in the abdomen is not his usual pain, he will go to the emergency room.

(P1-2)

TABLE 4 | Symptoms and conditions detected as the condition changes, leading to deterioration.

Category	Subcategory
Complaints of abnormality	Complaint of pain Complaint of breathlessness
Abnormal body temperature	Fever Hot body
Abnormal urination	Hematuria Anuria/oliguria
Abnormal oral intake	Poor food intake Poor swallowing Poor fluid intake
Abnormal respiratory system	Abnormal lung sounds Increased sputum requiring suction Voice changes
Abnormal level of consciousness	Decreased transcutaneous arterial blood oxygen saturation (SpO ₂) Listless Slow or no response Limp Few words
Decreased activity and mobility	Immobility/longer lying in bed Easy to fall over
Emotional and mental changes	Becoming angry
Facial expression changes	Change in facial expression Change in complexion
Weight loss	Weight loss

3.2.2 | Abnormal Body Temperature

This category consisted of two subcategories: 'Fever' and 'hot body'. The nurses considered fever as the main vital sign and noted 'abnormalities in the respiratory system', 'abnormalities in urination' and 'abnormalities in the level of consciousness'. They also considered the possibility of aspiration pneumonia or urinary tract infection.

A care worker informed me that a resident had a fever a short time after vomiting. I checked his oxygen saturation and asked if he had any abnormal lung sounds. I then suspected aspiration pneumonia.

(P1-1)

Additionally, one nurse reported detecting abnormalities in residents' conditions based on reports from care workers caring for residents.

Since the care workers are the ones who are in closest contact with the residents, they notice that the residents' bodies are hotter than usual when they touch them and wake them up.

(P3-2)

3.2.3 | Abnormal Urination

This category consisted of two subcategories: 'Hematuria' and 'anuria/oliguria'. The nurse noted the urinary status together with the 'abnormal body temperature'.

Emergency room visits are necessary in cases of severe hematuria, fever, or failure to produce urine itself.

(P1-2)

3.2.4 | Abnormal Oral Intake

This category consisted of three subcategories: 'Poor food intake', 'poor swallowing' and 'poor fluid intake'. Nurses noted that residents were unable to eat or ate less than usual, had difficulty swallowing and dysphagia and were unable to drink or drank less than usual.

He swallows more and more, or he holds his food in his mouth. When I feel that the resident is no longer able to swallow in one gulp, I think it's time to stop eating.

(P4-1)

3.2.5 | Abnormal Respiratory System

This category consisted of four subcategories: 'Abnormal lung sounds', 'increased sputum requiring suction', 'voice changes' and 'decreased transcutaneous arterial blood oxygen saturation (SpO₂)'. The nurses noted these conditions along with 'abnormal

body temperature', 'abnormal oral intake' and 'abnormal level of consciousness'.

She was unable to eat, her levels were a bit foggy, and she was starting to need to suction phlegm; we decided that it was clearly abnormal.

(P2-1)

3.2.6 | Abnormal Level of Consciousness

This category consisted of four subcategories: 'Listless', 'slow or no response', 'limp' and 'few words'. The nurses paid attention to the residents' lack of energy in their daily lives, slow or no response to calls, slouching and infrequent talking.

They don't talk much, they don't respond when I call out to them, they don't get up in the mornings as often as they used to...

(P9-1)

3.2.7 | Decreased Activity and Mobility

This category consisted of two subcategories: 'Immobility/longer lying in bed' and 'easy to fall over'. The nurse noted that the resident was lying in bed in their room longer than usual and that they were not getting up and going out of the room by themselves.

When it was time to eat, he usually walked to the hall by himself, but he did not come easily. When I went to check on him in his room, he was sleeping. I called out to him, "It's time to eat," and "Let's go over there," but he didn't get up very easily, and I thought he must be really sick.

(P10-1)

3.2.8 | Emotional and Mental Changes

This category consisted of one subcategory: 'Becoming angry'. The nurses noted specific symptoms and vague emotional and mental changes, such as an angrier appearance than usual, as signs that the resident's condition was worsening.

Today, he is always smiling, but today he seems to be angry. These are often the first signs of a fever or dehydration.

(P5-2)

3.2.9 | Facial Expression Changes

This category consisted of two subcategories: 'Change in facial expression' and 'change in complexion'. The nurses noted even minor changes in the residents' facial expressions and complexion as signs that their condition was deteriorating.

The resident had a characteristic that was like a prelude to the onset of a fever, which could be easily detected by the color of her face, and when her cheeks became flushed, I could always predict that she would have a fever next.

(P13-2)

3.2.10 | Weight Loss

There were no subcategories. Nurses noted weight loss as an important indicator in determining the risk of sudden death.

He was losing weight. He was a very good eater and ate all of his meals, but his weight was steadily decreasing. Weight loss is a major indicator of sudden death.

(P3-1)

4 | Discussion

An important contribution of this study was shedding light on the practice of nurses in detecting changes in residents' conditions, which is a crucial element in preventing avoidable emergency transfers and hospitalisation in LTC facilities. Additionally, specific symptoms and conditions detected by nurses were identified. Nurses in LTC facilities work closely with care workers, who spend a lot of time with residents and are prepared to respond quickly to changes that could cause resident deterioration. Nurses share information and communicate points of observation using words that are easily understandable by care workers to explain advanced clinical knowledge. In addition, they monitored the residents' usual condition by observing changes and judging the risk of change based on their own clinical experience.

The quality of communication among LTC staff about resident health and well-being is critical (Ouslander et al. 2009; Tena-Nelson et al. 2012). The findings of this study in the 'preparing' and 'assessing' phases provide further evidence that close collaboration between nurses and care workers is essential for nurses to detect changes in residents' health conditions. The nurses encouraged the care workers to report any changes in the residents' condition. The care workers' observations of unclear changes in the residents' condition led to the nurses' assessment of the resident. In other words, the care workers' awareness of a change in the residents' health status triggers the nurse to initiate an assessment. In a Canadian qualitative study that explored care workers' perceptions of the decision-making process when transferring residents of long-term care facilities to acute care, it was revealed that the nurses' responsiveness impacted the care workers' ability to communicate the changes in residents' condition and initiate the decision-making process concerning their care. Moreover, the nurses' responsiveness appeared to be associated with the clinical skills and knowledge of the nurses (Tate et al. 2018). Therefore, for effective collaboration between nurses and care workers, nurses must exhibit quick and effective responsiveness to any changes in residents' conditions brought to their attention by the care workers.

The practices identified in this study may promote collaboration between nurses and care workers and benefit the development of educational interventions and supportive measures to improve the detection of changes in residents' conditions in LTC facilities. This study highlights the importance of care workers noticing and reporting a resident's change in condition to nurses in LTC facilities. A systematic review of the practices of nursing staff managing patients with deteriorating conditions in hospitals concluded that a better understanding of the context in which the condition deterioration is recognised and reported is vital for planning effective education and support measures (Odell et al. 2009). Among the nursing practices for detecting changes in residents' conditions that resulted from this study, the category of 'assessing' suggests that nurses in LTC facilities need to be able to consider the possible causes and conditions of residents based on the changes noticed by care workers and to identify specific necessary observation items. Educational interventions and support measures to enable nurses in LTC facilities to make clinical inferences from a medical perspective about residents with changes in their conditions are necessary.

Additionally, the subcategory of 'judging the risk of deterioration in the conditions of residents based on comparisons with similar conditions experienced in the past and with other cases' within the category of 'judging' suggests that it may be effective to practice on-site case review and root cause analysis. Although some LTC facilities included in this study had opportunities to reflect on the care of deceased residents, such as through death conferences, there was a lack of systematic reflection on cases of emergency transferred or hospitalised residents. In a previous study in the United States, root cause analysis of acute care hospital transfer of residents in LTC facilities has been used to identify opportunities for improving the care process and education to prevent avoidable emergency transfers, hospitalisations and readmissions (Ouslander et al. 2016). Using root cause analysis to examine acute hospital transfers of residents within LTC facilities may prove beneficial.

In explaining the practice of detecting changes in residents' condition in LTC facilities, specific symptoms and conditions detected as changes deteriorating the condition were also identified. Previous studies have identified symptoms and changes in the end-of-life period of residents detected by LTC nurses in Japan, and categories like those in this study were extracted, such as decreased food intake function, fever, decreased activity and weight loss (Iwase 2018). The distinctive categories that were extracted in this study consisted of acute symptoms directly related to disease, such as 'abnormal level of consciousness', 'abnormal respiratory system' and 'abnormal urination'. Nurses need to collaborate with care workers to detect changes in residents' physical or mental status and respond to them by considering their impact on the residents' lives and quality of life. Furthermore, for nurses in LTC facilities to contribute to the prevention of potentially avoidable emergency transfer and hospitalisation, they must be able to judge whether a resident's symptoms and condition can lead to death or improve with treatment and accordingly make judgements to suggest appropriate timing of medical attention.

This study has limitations. First, the participants in this study consisted of 23 nurses from 14 facilities, 17 were from 11 intensive care

homes for older people, and 6 were from 3 private-pay homes for older people, with relatively little data from private-pay homes for older people. Generally, private-pay homes for older people tend to have more medical resources, such as staffing and cooperating medical institutions, than intensive care homes, which may induce a bias in the results. In a future study, consideration should be given to increasing the number of nurse participants from private-pay homes for older people. In addition, a qualitative study in care homes in the United Kingdom has shown that residents' families contribute to detecting changes in residents' health status (Powell et al. 2018). In this study, we could not determine the details of family involvement in the nurses' practice of detecting changes that indicate deterioration of the resident's condition. This may have been influenced by restrictions on family visits because of coronavirus during the study period.

In a future study, it is desirable to clarify the entire process of nursing practices to prevent avoidable emergency transfer and hospitalisation and to promote the advanced skills required to make urgent judgements and prepare for end-of-life care.

5 | Conclusions

This study provided insights and clarified the various nursing practices in detecting changes in residents' conditions in LTC facilities that lead to deterioration and the specific symptoms and conditions detected. These findings can be used to promote collaboration between nurses and care workers and to develop effective educational interventions to improve nursing practice in LTC facilities.

Author Contributions

Hirofumi Ogawara: conceptualisation, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, visualisation, writing – original draft, writing – review and editing. **Hiroki Fukahori:** conceptualisation, formal analysis, funding acquisition, methodology, project administration, resources, supervision, visualisation, writing – original draft, writing – review and editing. **Yuriko Mashida:** conceptualisation, formal analysis, resources, visualisation, writing – review and editing. **Sachiko Matsumoto:** conceptualisation, formal analysis, resources, writing – review and editing. **Katsumi Nasu:** conceptualisation, formal analysis, writing – review and editing. **Ardith Z Doorenbos:** conceptualisation, supervision, writing – review and editing. All authors read and approved the final manuscript.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data is not publicly available due to potential privacy concerns for the research participants.

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