Accepted manuscript

Laukvik, L. B., Rotegård, A. K., Lyngstad, M., Slettebø, Å. & Fossum, M. (2022). Registered nurses' reasoning process during care planning and documentation in the electronic health records: A concurrent think-aloud study. Journal of Clinical Nursing, 32, 221–233. https://doi.org/10.1111/jocn.16210.

Published in: Journal of Clinical Nursing

DOI: https://doi.org/10.1111/jocn.16210

AURA:

Registered nurses' reasoning process during care planning and documentation in the electronic health records: A concurrent think-aloud study

Abstract

Aims and Objectives: To explore the clinical reasoning process of experienced registered nurses during care planning and documentation of nursing in the electronic health records of residents in long-term dementia care.

Background: Clinical reasoning is an essential element in nursing practice. Registered nurses' clinical reasoning process during the documentation of nursing care in electronic health records has received little attention in nursing literature. Further research is needed to understand registered nurses' clinical reasoning, especially for care planning and documentation of dementia care due to its complexity and a large amount of information collected.

Design: A qualitative explorative design was used with a concurrent think-aloud technique.

Methods: The transcribed verbalisations were analysed using protocol analysis with referring phrase, assertional, and script analyses. Data were collected over ten months in 2019–2020 from 12 registered nurses in three nursing homes offering special dementia care. The COREQ checklist for qualitative studies was used.

Results: The nurses primarily focused on assessments and interventions during documentation. Most registered nurses used their experience and heuristics when reasoning about the residents' current health and well-being. They also used logical thinking or followed local practice rules when reasoning about planned or implemented interventions.

Conclusion: The registered nurses moved back and forth among all the elements in the nursing process. They used a variety of clinical reasoning attributes during care planning and nursing documentation. The most used clinical reasoning attributes were information processing, cognition, and inference. The most focused information was planned and implemented interventions.

Relevance to clinical practice: Knowledge of the clinical reasoning process of registered nurses during care planning and documentation should be used in developing electronic health record systems that support the workflow of registered nurses and enhance their ability to disseminate relevant information.

KEYWORDS: care planning, clinical reasoning, think-aloud technique, dementia care, electronic health records, registered nurses

1 | INTRODUCTION

The number of people living with dementia has increased over the last decade. According to the World Health Organization (WHO), more than half of the residents living in nursing homes suffer from some form of dementia (WHO, 2017). Nursing documentation supports effective communication, cooperation, and coordination between healthcare team members to ensure safety and continuity of care for residents living with dementia in nursing homes (Brown et al., 2020; Van Walraven et al., 2010). Access to relevant and comprehensive information in the electronic healthcare records (EHRs) about a resident's needs, values, preferences, and experiences in daily life is important for the clinical reasoning of registered nurses (RNs) to deliver high-quality care (Bail et al., 2021). Over the last decade, there has been an increase in the level and complexity of dementia long-term care and care planning. Residents living with dementia experience severe physical and cognitive impairments, such as decreased physical health, impaired communication, disorientation, confusion, and behavioural changes (Gilster et al., 2018). High quality nursing care in dementia involves communicating effectively, having an emphatic approach, monitoring the physical environment, assessing physical health, uncovering reasons for behaviours, and protecting the residents' rights (Fazio et al., 2018; Kolanowski et al., 2015). Care planning and documentation of nursing care for residents living with dementia require accurate nursing skills and involves combining and understanding large amounts of subjective and objective data (Sefcik et al., 2020; Tuinman et al., 2017). Documentation of nursing is essential for identifying the residents' needs, setting goals, planning, and implementing interventions, and evaluating resident outcomes (Jefferies et al., 2010). Previous research shows that RNs use several cognitive strategies and processes in clinical reasoning during care planning (Fossum et al., 2011; Gerber et al., 2015; Johnsen et al., 2016; Wihlborg et al., 2019). A recent review shows that the cognitive work of RNs increases during care planning and documentation of

nursing in the EHRs, causing inaccurate information, which can put resident safety at risk (Wisner et al., 2019). By increasing our knowledge about the way RNs retrieve, connect, synthesise, and communicate clinically meaningful and resident-supportive information, we may understand the clinical reasoning process in dementia care and improve care planning and documentation of nursing in this context (Bail et al., 2021; Cappelletti et al., 2014; Wihlborg et al., 2019). This paper presents a study designed to explore the RNs' reasoning process during care planning and documentation of nursing in the EHRs of residents living with dementia in nursing homes.

2 | BACKGROUND

2.1 | Documentation of nursing care

Documentation of nursing care in the form of EHRs is a professional responsibility of nurses and ensures practice accountability. Accurate and comprehensive information in the resident record is essential for providing safe, high-quality, and effective evidence-based nursing care (Gilster et al., 2018). The nursing process model consists of assessment, diagnosis, planning, implementation, and evaluation, widely used in education and clinical practice, to facilitate clinical reasoning and decision making (De Groot et al., 2019). In this study, the nursing process model presents the basis for RNs' behaviour in clinical situations, such as care planning and nursing documentation. Sufficient and comprehensive documentation of the core elements in the nursing process is essential for providing quality documentation in the EHRs to safeguard the continuity of high-quality care (Bail et al., 2021; Shiells et al., 2019). The VIPS model framework (as shown in Figure 1) was developed to support RNs in their verbalisation and documentation of essential data in accordance with the nursing process (Ehnfors et al., 1991; Ehrenberg et al., 1996). The model is internationally recognised and has shown positive impacts on RNs' understanding, care planning, and documentation of nursing

(Björvell et al., 2003; Darmer et al., 2004, 2006), in addition to supporting teaching and research activities (Akhu-Zaheya et al., 2018; Saranto et al., 2014). Several electronic healthcare systems have implemented nursing process elements as the basic structure of nursing care documentation to support nurses' workflow and thinking (Saranto et al., 2014). However, recent research has shown that RNs have trouble grasping and applying the core concepts of the process in their documentation of nursing care (Akhu-Zaheya et al., 2018). In addition, there is a lack of personalised and individualised information in nursing care documentation (Bail et al., 2021).

[Insert Figure 1 here]

2.2 | Clinical reasoning process in nursing

Clinical reasoning in nursing is used for the cognitive processing performed by RNs when collecting and analysing patient information, evaluating the significance of this information, weighing alternative actions, achieving positive patient outcomes, and reflecting upon care delivery (Higgs et al., 2008; Levett-Jones et al., 2010). Multiple concepts have been used in literature in relation to clinical reasoning, such as decision-making, problem-solving, and clinical judgement (Cappelletti et al., 2014). However, these concepts suggest an endpoint to the thinking process, while clinical reasoning emphasises the cognitive processes prior to the endpoint (Simmons, 2010).

Simmons' (2010) concept analysis of clinical reasoning guides this study. It defines clinical reasoning in nursing as a complex cognitive process that uses formal and informal thinking strategies in a forward chaining process that moves sequentially through a series of inferences to a final decision supported by the nursing process (Simmons, 2010, pp. 1154–1155). The following specific attributes explained by Simmons (2010) represent the essence of the meaning of clinical reasoning in the present study: data analysis (interpreting information),

deliberation (rumination), heuristics (informal thinking strategies), inference (speculation), metacognition (reflexive thinking), logic (argument), cognition (perception or awareness), information processing (organising data), and intuition (insight independent of reasoning). These attributes differ according to nursing experience, domain-specific knowledge, contextual parameters of the residents, and the environment (Simmons, 2010; Levett-Jones et al., 2010).

Research shows that RNs struggle in documenting nursing care optimally and effectively in a timely and accurate manner, causing poor content and lack of structure and comprehensiveness (McCarthy et al., 2019). Despite the implementation of EHR systems that support the nursing process model, several studies show that RNs fail to grasp and apply the core elements of the nursing process in their care planning and documentation of nursing in EHRs (Akhu-Zaheya et al., 2018; Bail et al., 2021; Tuinman et al., 2017; Wang et al., 2015). An understanding of how RNs retrieve, organize, synthesize, and communicate information can provide a deeper understanding of how RNs interpret and record vital information, such as the perspectives and experiences of residents living with dementia, that can secure continuity of care and safety of the resident (Varpio et al., 2015b; Wisner et al., 2019). The clinical reasoning process of RNs has previously been studied in both hospital and community care; however, this research topic lacks in dementia care (Fossum et al., 2011; Gerber et al., 2015; Johnsen et al., 2016; Lee et al., 2016; Wihlborg et al., 2019). The cognitive processes used by RNs during care planning and documentation of nursing in the EHRs of residents living with dementia should be captured and communicated to better understand how to reduce errors in nursing documentation and address omission of care (Bail et al., 2021). Understanding how RNs reason during the documentation process may enhance effectiveness of nursing education as well as training programmes for RNs in relation to care planning and documentation of nursing (Akhu-Zaheya et al., 2018; Cappelletti et al., 2014; Varpio et al.,

2015b). Knowledge about RNs' thoughts and reasoning during the documentation process can have implications for the improvement of EHR systems, specifically the design features and structures that support the competencies, knowledge, and cognitive work of RNs (Wilbanks & McMullen, 2018; Wisner et al., 2019).

2.3 | Aim

This study aimed to explore the clinical reasoning process of experienced RNs during care planning and documentation of nursing in the EHRs of residents in long-term dementia care. Our research questions were (i) How do experienced RNs use the nursing process in their clinical reasoning when planning and documenting nursing care for residents living with dementia? (ii) Which cognitive processes characterise the clinical reasoning of RNs when planning and documenting nursing care for residents living with dementia?

3 | METHODS

3.1 | Design

An explorative design was used to study the clinical reasoning process of experienced RNs during care planning and nursing documentation. The study was conducted using the concurrent think-aloud (TA) method to collect concurrent verbal protocols from RNs during the completion of daily documentation of nursing care in the EHRs of residents living with dementia in nursing homes. Collected data were analysed using verbal protocol analysis (van Somren et al., 1994). Coding schemes were developed based on the attributes defined by Simmons (2010) and the elements of the nursing process model explained through the VIPS model (Ehrenberg et al., 1996) to identify cognitive processes in the verbal protocols of the RNs (Appendices 1 and 2). The consolidated criteria for reporting qualitative research (COREQ) checklist (Tong et al., 2007) was used to ensure quality reporting (Supplementary file 1).

3.1.1 Think-aloud (TA) method

The TA method is a qualitative technique that asks the subject to speak out loud all the thoughts occurring during a problem-solving process, enabling collection of direct data from the working memory that are not interpreted by the subject. Concurrent verbal reports are beneficial as they reveal information by linking cognitive processes with 'active' perceptions (van Somren et al., 1994 p. 19–21). The TA technique combined with protocol analysis has been widely used in clinical settings to explore cognitive processes used by experienced RNs in their problem solving (Fonteyn & Fisher, 1995; Funkesson et al., 2007; Lundgrèn-Laine & Salanterä, 2010; Whyte et al., 2007). To capture and structure the clinical reasoning process, coding schemes that describe which cognitive processes will occur and in which order in the verbalization during problem solving in a specific context must be developed (van Somren et al., 1994, p. 120). Categories in a coding scheme can cover more than one segment in the verbal protocol (van Somren et al., 1994, p. 122). Aitken et al. (2011) compared the observational method to the TA method in their study of decision making of critical care nurses related to sedation assessment and management within intensive care. Their results showed that the concurrent TA method collected more relevant data than the observational method alone.

3.2 | Sample and setting

A convenience sample of 12 RNs (all females) was recruited to participate in this study by contacting the nurse unit manager via e-mail. Demographic data were collected from each participant and are summarised in Table 1.

[Insert Table 1 here]

The RNs were employed at three nursing homes, providing special dementia care in two large municipalities (populations of 40,000–50,000) and one medium municipality (population of

19,000) in southern Norway. The participants met the following inclusion criteria: (a) RNs with more than two years of experience, (b) RNs with documentation skills at an expert level, and (c) RNs that had access to an EHR system that supported the documentation of nursing care according to the nursing process model.

The investigators acknowledged that a minimum of two years of experience with clinical practice justified categorising these participants as experienced RNs (Simmons et al., 2003). Two of the respondents had special education in dementia care, and ten of them had more than five years of clinical experience working with residents suffering from dementia. The EHR workstation used for documentation of nursing at all study sites were in a separate office. At all the study sites, RNs were responsible for developing the nursing care plan (NCP). Nursing assistants were the primary contact of the residents, responsible for updating the NCP. All staff members, regardless of whether they had received a professional education, had access to the EHR system and were responsible for writing daily reports in the progress notes (PNs) at the end of each shift. The EHR system used at all study sites was structured according to the nursing process model, with freewriting for nursing diagnoses, resident outcomes, and interventions in the NCP, and evaluation of outcomes in the PNs. Assessment charts were documented in separate files. The NCP was visible on the same screen as the PN when the RNs used the EHR system for documentation.

3.3 | Procedure and data collection

Data were collected between December 2019 and October 2020. All TA sessions were performed at the nursing homes. Before the session started, an observer (LBL) explained to each participant the purpose of the study, the data protection method, and the principles of the TA method. The observer had previous experience as a nurse in dementia care. However, the participants and the observer had not interacted before the TA session. Each participant had a few minutes of training on how to speak out loud while solving a simple task on the Internet.

The participants were then asked to document nursing as usual. They were also asked to avoid interpretation or explanation of their activity and concentrate on the documentation process when speaking aloud. Data were collected at the end of the day shift. The participants were informed that the observer would only speak if a participant was silent for more than 30 seconds. The observer was sitting nearby the participants during the TA sessions to provide a comfortable environment. The documentation period lasted for a maximum of 60 minutes. During the session, the observer acknowledged the speech of the participants through sounds. If silence persisted, the observer asked the participant to 'keep on talking' or questioned 'what are you thinking now?' Each TA session was audiotaped using a digital voice recorder and transcribed into verbal protocols.

3.4 | Data analysis

Data were analysed in a series of steps adapted from earlier descriptions of verbal protocol analysis, using referring phrase analysis, assertional analysis, and script analysis (Funkesson et al., 2007; Johnsen et al., 2016; Simmons et al., 2003), and the coding schemes. First, the text was transcribed and divided into segments that reflected the natural boundaries of phrases in the participants' speech. Portions of the text that did not reflect verbal thoughts, such as when the RNs read the record, were eliminated from the segments. In addition, fillers such as 'ehh', 'umm', and 'uh' were removed. However, pauses in speech (while thinking) were marked with three dots for short pauses and five dots for long pauses to avoid unwarranted interpretations and highlight the segments. Further, all authors identified nouns and noun phrases in the established segments that referred to the elements of the nursing process and coded them according to the nursing process (as shown in Appendix 1). The codes were numbered in order of appearance to achieve the flow of the nursing process in relation to the reasoning process. Thereafter, all authors identified positive statements or declarations in the identified segments made by the participants related to the documentation process and coded

them according to the attributes of the clinical reasoning process (as shown in Appendix 2). Each segment was coded using one or several codes according to the nursing process and the attributes, as it was not possible to minimize the segments further without lifting the protocol statements out of their context (van Somren et al., 1994, p. 128). Finally, the identified segments were merged into episodes to aggregate data that corresponded in 'grain size' to the elements of the nursing process (van Somren et al., 1994, p. 127). This provided an overview of which elements of the nursing process the participants focused on and which attributes they used when reasoning. Tables 2 and 3 show examples of analysis.

[Insert Tables 2 and 3 here]

Inter-coder reliability was sought by all five authors in each step of the analysis and discussed until acceptable agreement (van Someren et al., 1994). Discussions mainly concerned which segment belonged to which step of the nursing process and the meaning of the attributes. Several elements of the nursing process and attributes were present in each segment, which when merged to form episodes led to the removal of duplicates.

3.5 | Ethical considerations

The Norwegian Centre for Research Data and the local ethics committee at the University of Agder approved the study (61364). Information about the study was provided and written consent was obtained from the RNs and the residents or residents' next of kin if the residents themselves were cognitively unable to consent to LBL's observations during documentation in the nursing record. The information letter followed the standards of the Norwegian Centre for Research Data and the General Data Protection Regulations (European Union; EU, 2016). Confidentiality was ensured by removing all personal identification information and assuring participants that the information would only be used for research purposes.

4 | RESULTS

Each TA session was between 22 and 60 minutes long (M = 35 minutes). A total of seven hours of TA sessions were transcribed into 54 pages, and 1,404 reasoning episodes were identified for analysis. In the following text, we present results from the stepwise analyses.

4.1 | RNs focus on the nursing process when planning and documenting nursing care

The referring phrase analysis showed that the RNs reasoned within all the elements of the nursing process when care planning and documenting nursing in the EHRs. Further, they combined different elements in their reasoning during the planning and documentation of nursing care. Information exchange (34%), assessment (28%), and implementation (23%) were the most focused elements. The frequency of the focus of each element in the nursing process is displayed in Table 4.

[Insert Table 4 here]

When the RNs focused on *assessment*, they concentrated on information related to the residents' current health status, such as physical or psychosocial function, needs in daily life, or the comfort or discomfort of the resident. One participant stated, 'It is challenging to claim that the resident is angry because it is not certain that is the case; maybe this is the resident's way of being. I will try to write what I experienced or what I saw and explain why I wrote it; I try to be objective' (RN1). It was important to be objective and document observations and experiences or what they witnessed.

The RNs concentrated on information related to planned or implemented interventions when focusing on *implementation*. It is important to document that the implemented interventions were completed. One participant said: 'All the residents shall have interventions concerning trust-building in their care plan; we must document information in relation to this after every

shift' (RN12). The participants mainly followed local rules or structures in the EHR system (for example, an obligation to document a specific type of information).

When the RNs concentrated on *information exchange*, they mainly focused on which information to document and how to write the necessary information. One participant stated: 'I need to read through what I have written; maybe it is not necessary to write so much. It is a bit difficult to write. It was a quiet evening; I would write more about what happened if it was not a quiet evening for the residents' (RN6). The participants often decided on the formulation of content based on what happened during their shift.

4.2 | How RNs used clinical reasoning attributes when planning and documenting nursing care

The assertional analysis showed that the RNs used all clinical reasoning attributes in their reasoning during care planning and documenting nursing in the EHRs. Inference (22%), information processing (22%), and cognition (18%) were the most used attributes by the RNs. The frequency of use of each clinical reasoning attribute is displayed in Table 4.

Using *information processing*, the RNs retrieved, organised, and recorded their data in accordance with the information they needed to document. The participants often reviewed the documentation to detect errors or changes or used the written text as a reminder of what to document. A participant stated, 'I look through the nursing care plan to be reminded of anything else I should document today. I usually start at the top of the list of problems and work my way through' (RN11). The participants commonly followed the structures in the EHR system when processing the data.

The RNs used *cognition* to think about relevant information to document by remembering the individual needs or preferences of the residents. One said: 'Sometimes she sits in her room to eat, and sometimes she sits in the living room. Today, she sat in her room for breakfast and in

the common area for lunch, and she ate well. I will document this' (RN8). Commonly, the participants connected information from their memory to their awareness or perceptions of the events during the shift, and their thoughts were often detailed.

Using *inference*, the RNs reached conclusions or formed opinions about what and how to write or disseminate necessary information. One participant stated, 'This seems updated and relevant, but very long. I do not think I should remove or add anything here, so I think this is good' (RN2). The participants often used written information or observations to form opinions on or conclude what or how to document.

4.3 | How RNs combined nursing process elements and clinical reasoning attributes when planning and documenting nursing care

The script analysis showed that all the participants moved back and forth among the elements in the nursing process and combined different elements when reasoning using multiple reasoning attributes. On an individual level, the use of the reasoning attributes varied greatly; however, the analysis revealed some patterns in the reasoning within different combinations of nursing process elements. Table 5 displays all the combinations used by RNs during the planning and documentation of nursing care.

[Insert Table 5 here]

The participants commonly used *information processing, cognition, deliberation, logic, and inference* when reasoning within the combination of *assessment and implementation*. The RNs often connected information about the residents' current ability to function when deciding what to document in relation to implemented interventions. One participant said: 'The resident has impaired mobility. We must avoid letting her fall, and she must have a walker nearby. We must pay attention to her when she walks around. I usually write that I have followed the implemented intervention, that I have watched her, and assisted her in

walking to the toilet or other places' (RN7). The participants commonly argued or negotiated their choices based on decisions made among colleagues. They expressed that it was important to document that they had followed and implemented the planned interventions.

The RNs mostly used *information processing, cognition, deliberation, heuristics, and inference* when reasoning within the combination of *assessment* and *evaluation*. The participants often stated the current health status of the resident, followed by an evaluation of signs or changes that had happened 'today' or 'lately'. One participant expressed: 'Usually, the resident eats well and normally comes out to eat with the other residents. He ate well today. However, he has had a problem with low intake of nutrition lately, and I should document how much and what he has been eating today. I will not document that he got himself a cup of coffee because it is typical that he gets his own drink' (RN5). When focusing on this information, the RNs commonly used narrative thinking by pondering or considering their observations to explain their conclusions about what information should be included in their documentation.

RNs commonly used *information processing, cognition, deliberation, heuristics, logic, and inference* when reasoning within the combination of *implementation* and *evaluation*. The participants often expressed thoughts concerning an intervention they had performed during the day, and it was important to explain the events in detail. One participant said, 'I have tried to calm things down and lower the expectations; as a result, the resident cooperated. She expressed some negative statements, but her body language was calm, and we got the intervention done. We did not force her; we would have to document that in a different way. Yes, I am satisfied with this documentation' (RN9). In addition, the participants often tried to make sense of the effect of the intervention on the residents' ability to function or their experience of well-being. The participants commonly decided what to write based on their experiences or a local rule concerning what to write.

5 | DISCUSSION

This study demonstrates that RNs use multiple cognitive processes in their reasoning process during planning and documentation of nursing care in the EHRs. The RNs move back and forth in the nursing process during their reasoning and use several clinical reasoning attributes. Some patterns in the clinical reasoning process did appear in this study showing that assessment, implementation, and information exchange were most focused by the RNs. In addition, the RNs combined the attributes of clinical reasoning differently within the stages of the nursing process.

The definite focus on assessment identified in this study might reflect that the RNs need to obtain a relevant and comprehensive understanding of the residents' actual status and situation to move forward in the care planning and documentation process (Lee et al., 2016; Varpio et al., 2015b). If RNs get an overview of a resident's case, they can obtain a cognitive framework that can guide their thinking, interpretation, and response to clinical data and anticipate the clinical trajectory of the resident (Nibbelink & Brewer, 2018; Wisner et al., 2019). The EHR system should provide possibilities for RNs in the assessment to synthesise information from the resident's relevant history and current health status to better understand what led to the current status and thus document personalised and individualised information accurately and consistently (Lee et al., 2016; Varpio et al., 2015b).

Most of the RNs in this study used heuristics when forming opinions and deriving inferences about what to write in the assessment step. This implies that the RNs' knowledge of residents and their observations during the shift provided essential information for relevant and meaningful assessment of the residents' status (Lee et al., 2016). If the EHR system can stimulate the visualisation of personal knowledge and observations made by RNs during their assessment, it may contribute to a comprehensive understanding of the residents' needs, thus,

enabling secure and holistic care planning, meaningful documentation, and resident safety (Cappelletti et al., 2014; Wisner et al., 2019).

This study also found a strong focus among RNs in the implementation step when planning and documenting nursing care in the EHR. Within this step, the RNs commonly followed local rules or structures of the EHR system when reasoning. These findings support previous research on clinical reasoning, where RNs often focused on factors besides the resident while reasoning about nursing interventions (Fossum et al., 2011; Göransson et al., 2008; Simmons et al., 2003). Recent reviews have shown that the clinical reasoning process and decision making of RNs are highly influenced by factors such as the culture within a unit or the structures of an EHR system (Cappelletti et al., 2014; Levett-Jones et al., 2010; Wisner et al., 2019). If RNs have cognitive concerns related to factors besides residents, it might lead to missing valuable information about the residents' response to nursing care, resulting in decreased opportunities to include perspectives and experiences of the residents relating to the planning and documentation of nursing care (Wisner et al., 2019).

The findings of this study might indicate that RNs need to review gathered information to plan and document relevant and meaningful information in relation to nursing interventions. Similar results were identified in a study by Lee et al. (2016), who showed that RNs returned to the assessment step for data necessary for confirmation or clearance to draw conclusions. By moving back and forth between the steps in the nursing process in their clinical reasoning, RNs can connect appropriate data for individualised and personalised interventions for residents living with dementia (Lee et al., 2016; Levett-Jones et al., 2010). Thus, the EHR system should support a workflow that enables RNs to quickly move back and forth among the elements of the nursing process and connect information when planning and documenting nursing care in the EHR (Wisner et al., 2019).

This study found that the RNs mostly used narrative thinking to make sense of the residents' status or situation by pondering, considering, and interpreting written or observed data. These findings might indicate that narrative content supports RNs in understanding what is going on with the patient. Previous research shows that it is challenging to understand how events have unfolded chronologically and how the history of the resident connects with and informs the present and future actions if narrative content is lacking in the EHR (Varpio et al., 2015a). Documented narratives enable RNs to retrieve relevant resident information and professional domain knowledge, which might improve clinical reasoning and maintain resident safety (Cappelletti et al., 2014; Varpio et al., 2015b; Wisner et al., 2019). However, research also shows that massive data do not necessarily enable RNs to obtain in-depth knowledge about the residents (Blair & Smith, 2012; Varpio et al., 2015a). A recent review found that narrative nursing notes are rarely read by others in the healthcare team because of the difficulties associated with interpreting the text (Wisner et al., 2019). If the EHR systems support RNs' narrative thinking, it could support the clinical reasoning process of RNs during care planning and documentation of nursing in dementia care (Varpio et al., 2015b; Wisner et al., 2019). However, unstructured nursing information and ambiguous language can cause inadequacies in the nursing documentation that might lead to misunderstandings and adverse events for the residents (Blair & Smith, 2012; De Groot et al., 2019). Findings related to the RNs' constant focus on content and formulation in this study might indicate that RNs need to secure the exchange of relevant information necessary for safe coordination and planning of care for residents living with dementia (Wisner et al., 2019). It is important to disseminate the professional domain knowledge and perspectives of RNs working in dementia care through documentation of nursing care in the EHRs. This can enable members of the healthcare team to access clinically meaningful information and maintain the 'wholeness' of the residents' needs and response to given nursing care (Cappelletti et al., 2014; Wisner et al., 2019).

However, a large amount of information presented on an EHR user interface can increase cognitive workload and mental fatigue in RNs (Wilbanks et al., 2018).

The diagnosis phase and the setting of goals were the least focused elements of the nursing process in this study, and the participants rarely formulated a specific nursing diagnosis or expressed thoughts concerning expected resident outcomes. These findings contrast with Funkesson et al. (2007), who found planning to be the most focused element of the nursing process when RNs reasoned about pressure ulcer prevention. An explanation for this discrepancy might be that, in the present study, RNs planned and documented nursing care for residents living in the nursing home, while in the study of Funkesson et al. (2007), the RNs started their planning and documentation before the arrival of the resident. After the arrival of the resident, the assessment phase was highly focused, indicating that RNs have a strong focus on assessing when the resident is physically present in the room (Funkesson et al., 2007). However, a lack of focus concerning nursing diagnosis in care planning and documentation of nursing may decrease the efficiency of care management and make it challenging to provide tailored care for the residents (Sanson et al., 2017).

5.1 | Methodological considerations

The complete and holistic articulation of thought processes might have been challenging for the participants, and the skills of each participant in thinking aloud might have affected the quality of the collected data and the results (Aitken et al., 2011; Koro-Ljungberg et al., 2013). However, training in think-aloud and explicit instruction to only speak out loud immediate thoughts and avoid explanations was provided to minimise this potential bias (Fossum et al., 2011; Gerber et al., 2015). The design of this study could have influenced the participants' thinking about documentation. To avoid impact of social and motivational aspects on the participants' reasoning process, a natural setting in an including environment was facilitated (van Somren et al., 1994 p. 34). A limitation of this study is the small sample size; however,

the participants had a wide range of experiences relevant for this study, implying information power (Malterud et al., 2016). All the participants performed their documentation in systems that had the same structures and interfaces (Wisner et al., 2019). Deductive coding was chosen for this study. However, inductive coding may provide a different result (Fossum et al., 2011). On the other hand, all steps of the nursing process (Ehnfors et al., 1991) and all clinical attributes (Simmons, 2010) were identified, which may support the deductive method of analysis.

6 | CONCLUSION

This study provides insight into the clinical reasoning process of RNs during care planning and documentation of nursing in the EHR of residents living with dementia. The results show that RNs move back and forth between the elements of the nursing process and use a variety of clinical reasoning attributes in their reasoning process. The study identified that the RNs in dementia long-term care regularly use their experiences and heuristics when reasoning about the residents' current health status and wellbeing. While reasoning about planned or implemented interventions, they use logical thinking and follow local rules for documentation.

7 | RELEVANCE TO CLINICAL PRACTICE

Knowing more about the clinical reasoning of RNs during their planning and documentation of nursing care is important for the development of routines and structures that facilitate better coordination and cooperation between RNs and other members of the healthcare team. This knowledge is important for optimising professional training and practice to increase good nursing documentation and high-quality care. The knowledge from this study of cognitive processes and clinical reasoning can be used to design EHR systems that support the clinical decisions and workflow of RNs and enhance their ability to connect data and disseminate

relevant information. Further research should be conducted to understand RNs' reasoning when documenting in EHRs, such as comparing the reasoning of RNs when writing in PNs and updating the NCP.

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8 | Tables

TABLE 1: Characteristics of respondents (*n* = 12)

	Years		
	Range	Mean	Standard Deviation

Age	25—58	40.6	11.1
Experience from clinical practice as registered nurse	2—32	11.7	9.4
Experience working with persons living with dementia	.5—35	10.9	9.5
Length of employment at the nursing home	.5—10	4.5	3.3

TABLE 2: Example of referring phrase analysis

Segment	Nursing process element with example†
'There has been a problem related to the resident wouldn't get up this morning and that is not normal. The nightshift wrote that she slept well during the night, but I don't know if she was wandering or something. I must be objective and only write what happened today. I will choose Night Sleep to write the report in, I could choose Cognitive Impairment, but I don't know why she refused to get up, it is hard to know'.	Assessment *'There has been a **problem** related to **the resident** wouldn't get up **this morning** and that is not normal'.*
	Evaluation *'**The nightshift** wrote that she slept well during the **night**, but I don't know if she was wandering or something'.*
	Information exchange *'**I must be objective** and only write **what happened** today. I will choose **Night Sleep** to write **the report** in, I could choose **Cognitive Impairment**, but I don't know why she refused to get up, it is hard to know'.*

†Bold text shows nouns and noun phrases that refer to the elements of the nursing process.

TABLE 3: Example of assertional analysis

Segment	Clinical reasoning attribute with example†
'There has been a problem related to the resident wouldn't get up this morning and that is not normal. The nightshift wrote that she slept well during the night, but I don't know if she was wandering or something. I must be objective and only write what happened today. I will choose Night Sleep to write the report in, I could choose Cognitive Impairment, but I don't know why she refused to get up, it is hard to know'.	Cognition *'**There has been** a problem related to the resident wouldn't get up this morning and that **is not normal.'***
	Heuristics *'**The nightshift wrote** that she slept well during the night, but **I don't know** if she was wandering or something'.*
	Metacognition *'**I must be objective** and **only write what** happened today'.*
	Information processing *'I will choose Night Sleep to **write the report in**, I could choose Cognitive Impairment'.*
	Inference *'**I will choose** Night Sleep to write the report in'.*
	Deliberation *'**The nightshift wrote** that she slept well during the night, **but I don't know if** she was wandering or something. **I must be** objective and **only write** what happened today. **I will choose** Night Sleep to write the report in, **I could choose** Cognitive Impairment, **but I don't know why** she refused to get up, **it is hard to know**'.*

†Bold text shows identified assertions, defined as positive statements or declarations made by the participant related to the documentation process.

TABLE 4: Frequency of focused elements of the nursing process and used reasoning attributes derived from identified reasoning episodes (*N*=1404)

	Elements of the Nursing Process focused						
	Assessment	Diagnosing	Planning	Implementation	Evaluation	Information exchange	
	Nursing history and status	Nursing- diagnose assessment and formulation	Expected outcome (goal)	Implemented or planned nursing intervention	Evaluating nursing		
Reasoning Attributes used							**Total** *f* (%)
Information Processing	80	3	4	79	33	110	309 (22)
Cognition	78	5	4	59	28	79	253 (18)
Heuristics	68	2	3	21	28	39	161 (11.5)
Deliberation	52	2	3	28	22	45	152 (10.8)
Inference	83	3	3	79	44	102	314 (22.4)
Metacognition	14	2	1	12	5	33	67 (4.8)
Intuition	1	0	0	0	0	0	1 (0.07)
Analyse	1	0	0	1	0	2	4 (0.3)
Logic	17	2	1	50	11	62	143 (10.2)
Total *f* (%)	394 (28)	19 (1.)	19 (1.4)	329 (23.4)	171 (12.2)	472 (33.6)	1404

TABLE 5: The participants' cognitive combinations of elements in the nursing process and clinical reasoning attributes during documentation (*n*=12)

Combinations of nursing process elements in focus	Combinations of attributes used	Number of times used
Assessment and Implementation	IP†, C‡, D§, L¶, INF††	11 (92%)
Assessment and Evaluation	IP, C, D, H‡‡, INF.	9 (75%)
Implementation and Evaluation	IP, C, D, H, L, INF.	8 (67%)
Assessment and Diagnosing	IP, C, D, H, INF	2 (17%)
Assessment and planning	C, D	1 (8%)
Planning and implementation	IP, C, D, H, INF	1 (8%)

†IP, information processing; ‡C, cognition; §D, deliberation; ¶L, logical; ††INF, inference; ‡‡H, heuristics

9 | Figure Legends

Figure 1 The VIPS-model framework.

10 | Appendices

APPENDIX 1

CODING SCHEME BASED ON THE VIPS DOCUMENTATION MODEL AND THE NURSING PROCESS MODEL

VIPS model	Nursing Process code	Description
Nursing history and nursing status	*Assessment.*	Gathering data or information. Thoughts or expressions of the resident's or significant other's descriptions of reason for care, expectations to care and treatment, current health situation and living conditions in the nursing home as basis for assessment and nursing care planning. The resident's, significant others, or the nurse's description of: • Function, physical or psychosocial. • Discomfort. • Influencing factors/circumstances (environment, internal resources, values, expectations, perceptions).
Nursing diagnose assessment and formulation	*Diagnosing.*	Information interpretations. Identification and prioritization of needs, problems, or risks, suggesting possible causes and symptoms influencing functioning in daily life, formulation of nursing diagnoses in three levels: • Basic description of problem or need. • Problem description based on closer analysis or observed behaviour. • Includes descriptions of aethology or related factors and possible consequences for or responses from the resident.
Setting expected resident outcome or nursing goal	*Planning.*	Thoughts of expected outcomes or resident-goals, long og short term, that can be measured. Thoughts related to functional ability and health status of the resident, self-care and disease, management of health promotion, lifestyle alterations, resident's satisfaction, and well-being.
Implementing or planning nursing interventions	*Implementation.*	Thoughts of planned and/or implemented nursing interventions to promote the resident's health and prevent illness, thoughts on how to maintain or retain health and well-being of the resident.
Evaluation from nursing perspectives	*Evaluation*	Thoughts in relation to evaluation of the nursing care, signs of change, stability or achieved patient outcomes or coals, the nursing care's effect on the resident's: • Ability to function and status of the health • Experience of well-being • Coping of self-care • Coping of disease and other health-issues • Will and motivation

Information-Exchange		Thoughts of how the information is exchanged, formulations, managing of information in the electronic healthcare record-system.

APPENDIX 2

CODING-SCHEME ATTRIBUTES OF CLINICAL REASONING BASED ON CLINICAL REASONING THEORY

Attribute code	Cognitive process	Description
Analysis	Interpreting information	Systematically and rationally weighing of generated alternatives against clinical data or outcomes that can be validated.
Deliberation	Rumination	Narrative thinking, that is trying to understand the case or making sense of the experience by pondering, considering evidence, negotiating or persuading, interpreting human concerns, intents and motives.
Heuristics	Informal thinking strategies or mental shortcuts	Informal thinking strategies, recognizing patterns, describing, explaining, judging value, based on experience.
Logic	Argument	Arguments or inferences following a rule, e.g. a rule that state when particular conditions are met or certain rules (formal/informal) in the nursing home (culture) that one are expected to follow.
Inference	Speculation	Speculation, that is forming conclusions or opinions or an educated guess based on observations, can be logical or illogical.
Metacognition	Reflective thinking	Reflective thinking, that is reflecting over own documentation process, or critiquing data collection processes and results or reviewing personal biases or limitations in knowledge depth, breadth, and organization.
Cognition	Perception or awareness	Perception/awareness of information or a situation, remembering information or observed data, connecting information, and planning.
Information processing	Organizing data	Organizing data, acquiring, recording, retrieving, displaying, and disseminating resident information and data through computer-based operations.
Intuition	Insight independent of reasoning	A “hunch” or a “gut feeling”, immediate knowing without reason, cannot be verbalized in the sense that the source of knowledge cannot be determined.

11 | Impact Statement

11.1 What does this paper contribute to the wider global clinical community?

- This study shed light on the importance of clinical reasoning in nursing practice.
- This knowledge can be used to develop electronic health record systems that support the workflow of registered nurses and disseminate relevant information.
- This understanding will help facilitate better coordination and cooperation between nurses and other members of the healthcare team.