Using sense-making theories of decision making to aid understanding of the recognition, assessment and management of pain in patients with dementia in acute hospital settings: a UK multi-site study

Abstract

Background: The recognition, assessment and management of pain in hospital settings is suboptimal, and is a particular challenge in patients with dementia. The existing process guiding pain assessment and management in clinical settings is based on the assumption that nurses follow a sequential linear approach to decision making. In this paper we re-evaluate this theoretical assumption drawing on findings from a study of pain recognition, assessment and management in patients with dementia.

Aim: To provide a revised conceptual model of pain recognition, assessment and management based on sense-making theories of decision making.

Methods: The research we refer to is an exploratory ethnographic study using nested case sites. Patients with dementia (n= 31) were the unit of data collection, nested in 11 wards (vascular, continuing care, stroke rehabilitation, orthopaedic, acute medicine, care of the elderly, elective and emergency surgery), located in four NHS hospital organizations in the UK. Data consisted of observations of patients at bedside (170 hours in total); observations of the context of care; audits of patient hospital records; documentary analysis of artefacts; semi-structured interviews (n=56) and informal open conversations with staff and carers (family members).

Findings: Existing conceptualizations of pain recognition, assessment and management do not fully explain how the decision process occurs in clinical practice. Our research indicates that pain recognition, assessment and management is not an individual cognitive activity;

rather it is carried out by groups of individuals over time and within a specific organizational culture or climate, which influences both health care professional and patient behavior.

Conclusions: We propose a revised theoretical model of decision making related to pain assessment and management for patients with dementia based on theories of sense-making, which is reflective of the reality of clinical decision making in acute hospital wards. The revised model recognizes the salience of individual cognition as well as acknowledging that decisions are constructed through social interaction and organizational context. The model will be used in further research to develop decision support interventions to assist with the assessment and management of patients with dementia in acute hospital settings.

Keywords: Decision Theory**,** Pain Measurement, Pain Management, Dementia, Decision Making, Qualitative Research

Background

It has been estimated that approximately 50% of people with dementia regularly experience pain and a concomitant decrease in quality of life (van Kooten et al., 2015). A number of studies internationally have identified that pain is often substantially undertreated or untreated in geriatric patients (Daoust et al., 2014, Lukas et al., 2013, Morrison and Siu, 2000, Niruban et al., 2010), and that people with dementia are significantly less likely to receive analgesia than their cognitively intact counterparts (Closs et al., 2004, Hoffman et al., 2014, Morrison and Siu, 2000). There are particular issues with the management of pain for older patients in acute hospital settings (Atkinson and Almahdi, 2014, Carr et al., 2014, Chang et al., 2010, Lin et al., 2014, Niruban et al., 2010). Poor management of pain may lead to slower rehabilitation and a decrease in physical function with hospitals stays longer for a person with dementia than for others admitted for the same procedure (Alzheimer's Society, 2009).

There are particular challenges for clinical staff when caring for patients in acute settings who have dementia; for example, they may not be able to report their pain experiences verbally and are therefore at increased risk of having their pain inadequately assessed and managed (Sampson et al., 2015). In addition, behavioral symptoms associated with dementia, such as agitation, aggression and shouting, often arise as a result of underlying pain that, if mis-identified, may lead to the inappropriate prescription of antipsychotic medications (Ballard et al., 2011). A number of studies have highlighted particular issues faced by clinical staff when assessing and managing pain in older adults and those with dementia; communication with patients may be problematic if they are unable to express their pain experiences clearly (Coker et al., 2010, Manias, 2012), organizational issues may impact on when older adults receive pain relief (Manias, 2012, Manias et al., 2002), and trying to balance effectively

treating pain whilst simultaneously minimizing the side effects of analgesics has been reported as challenging (Manias, 2012). Nurses have been both observed and reported as not using validated tools for the assessment of pain when caring for patients with dementia in the acute hospital, preferring instead to rely on simple questioning and observation of non-verbal cues (Coker et al., 2010, Manias, 2012). This means that there is 'the risk of inaccurate judgements being made about patients' pain intensity' (Manias, 2012) [p.1252].

Existing models of pain recognition, assessment and management assume a clinical process which is sequential in nature and could be compared to a linear cognitive or judgment and decision making process (Figure 1), where the nurse accurately interprets the patient's pain experience (i.e. makes an *assessment or judgment* about their pain), and takes appropriate actions to decrease their pain (i.e. makes a *decision* about the most appropriate treatment to achieve this goal). This paper uses data from an ongoing study to examine these assumptions, highlighting the limitations of a theoretical approach which assumes a linear process to understanding the process of pain assessment and management in acute care settings. The aim of the paper is to re-evaluate the process of pain recognition, assessment and management, providing an alternative theoretical framework.

INSERT FIGURE 1 ABOUT HERE

Pain assessment as a judgement process

One of the most influential models of decision making is that of hypothetico-deductive reasoning (Dowding and Thompson, 2004, Elstein, 1978). Hypothetico-deductive reasoning suggests that individuals go through a series of stages when processing information to make a *judgment*, defined as 'an assessment between alternatives' (Dowie, 1993) or diagnosis. The

first stage, known as cue acquisition, is the gathering of clinical information about the patient. Following the collection of information, hypotheses are generated which provide a possible explanation for the information; the information collected is then interpreted in the light of the hypotheses, before a hypothesis is chosen that is favoured by the majority of the evidence or information. At this point the decision maker may choose to collect more information, if they feel that none of the original hypotheses fit the data.

The assessment of a patient's pain could be interpreted as a process of hypothetico-deductive reasoning; during the assessment of pain nurses collect information (cue acquisition) to determine the presence, nature and intensity of a patient's pain (hypothesis generation and evaluation). In order to assist with the assessment process a number of assessment tools have been developed. These include simple rating scales for self-reporting of pain as well as tools to structure the observation of behavioural cues as a method for identifying the presence of (and changes in) pain in patients with dementia and other cognitive impairments (Corbett et al., 2012, Lichtner et al., 2014). Despite the abundance of such tools (Lichtner et al., 2014), many studies have highlighted that nurses do not use them in practice, preferring to rely on simple questioning (Manias, 2012) and their "intuition" (Parke, 1998) or "feelings' that a patient may be experiencing pain (Parke, 1998)[p26].

Pain Management as a decision process

Once it has been ascertained that a patient is in pain, and the type and level of pain (they have made a judgment), the clinician then needs to make a *decision* ('a choice between alternatives') (Dowie, 1993) regarding what to do to manage that pain. The goal, relief of a patient's pain, is normally achieved through the prescription and administration of analgesia, on the basis of frameworks such as national guidance (American Geriatrics Society Panel on

the Pharmacological Management of Persistent Pain in Older persons, 2009, British Geriatrics Society, 2013) or the WHO analgesic pain ladder (Kapur et al., 2014, Vargas-Schaffer, 2010). Although not explicitly stated, an underlying rationale is that choices between different analgesic or other treatment options are based on both a) their probability of effectiveness and b) the utility or value associated with their effectiveness; a normative model of decision making known as subjective expected utility theory (SEUT) (Bell et al., 1988, Dowding and Thompson, 2009, Thompson and Dowding, 2009). There are very few studies that have explored nurses' decision making around the use of interventions for pain management in dementia; those that have been carried out highlight how the uncertainty of whether or not a patient is experiencing pain often leads to lower use of analgesia and a reluctance to use opioids (Gilmore-Bykovskyi and Bowers, 2013, Kaasalainen et al., 2007). Rather than the formal approach outlined by SEUT, nurses have been found to use a 'trial and error' approach to interventions, often with a focus on a patient's behavior to try and bring it back to some form of baseline, rather than targeting pain specifically (Gilmore-Bykovskyi and Bowers, 2013). This means it is difficult to identify whether specific interventions have been successful or not at relieving pain or distress.

In contrast to hypthetico-deductive and SEUT approaches to judgement and decision making, dual process theory (Table 1) suggests that individuals use both analytical and intuitive strategies when faced with a decision problem. System 1 processing which is experience based, unconscious and automatic (akin to intuition) is the default approach to thinking which doesn't require the use of working memory and can process large amounts of information rapidly (Evans, 2011). System 2 processing (conscious, controlled, rule based) provides a supervisory role, involving the use of working memory, and is characterized by slow, sequential processing, which appears to be conscious (Evans, 2011). What dual process

theory suggests is that *individual* decision makers are likely to use *both* intuitive, subconscious, and fast, and more deliberative, slow approaches to pain recognition, assessment and management.

INSERT TABLE 1 ABOUT HERE

One possible explanation for why pain assessment tools have produced a mixed picture in terms of improving pain recognition, assessment and management (Ang and Chow, 2010, Haller et al., 2011, Idvall and Ehrenberg, 2002, Purser et al., 2014, Rockett, 2010), particularly in patients with dementia, may be because they have been developed with a view that the process can be characterized in a sequential, linear fashion (system 2 processing) rather than acknowledging the prevalence of more intuitive subconscious approaches to judgment and decision making (system 1), characteristic of nurses' preferred mode of decision making (Parke, 1998). Additionally, assessment tools also only focus on one part of the pain recognition, assessment and management process (the assessment) assuming that once pain has been identified decisions regarding interventions and subsequent actions will be taken 'automatically'.

The aim of the wider study related to this paper is to develop a decision support intervention for the recognition, assessment and management of pain in patients with dementia in acute hospital settings. Initially, the study proposed to use the model outlined in Figure 1 as the theoretical framework for data analysis, anticipating that it would identify points in the judgment and decision process where the provision of decision support (beyond that provided by existing assessment tools, and tailored to the realities of how nurses actually make judgements and decisions), would enable nurses to process information more effectively,

linking it to better pain management decisions. However, after initial analysis, it was apparent that the theoretical conceptualization was not sufficient to explain the actual process of pain recognition, assessment and management in clinical practice. This paper reports the initial analysis and then discusses how the data have been used to reformulate the theoretical framework.

Research Aim

To provide a revised conceptual model of decision making for the recognition, assessment and management of pain in patients with dementia in acute care settings.

Methods

An exploratory study using ethnography was carried out using a nested case study design, where patients with dementia were considered as cases, nested in wards in four National Health Service (NHS) hospital organisations in England and Scotland, UK. Ethnographic non-participant observations were centred on the patients - their experience and expression of pain, their interaction with healthcare professionals and the care they received.

Setting and participants

Four case sites (hospitals) were sampled to provide varying settings for acute care: one in the south of England, two in the north of England and one in Scotland. In each site, a minimum of two wards were selected purposively to ensure the sample was a representation of a variety of clinical settings where patients with dementia were cared for.

Patients were eligible for inclusion in the study if they were over the age of 65 and had a diagnosis of dementia recorded in their notes. Participants for staff for interviews included all members of staff caring for patients in the study wards, together with the managers of those

wards and specialists from relevant hospital services. The families of patients participating in the study were approached to participate in interviews as carers.

Ethical approval was obtained for both English (REC reference: 12/YH/0363) and Scottish (REC Reference 13/SS/0006) sites. Patient recruitment was informed by the Mental Capacity Act 2005 and the Mental Health (Care and Treatment) (Scotland) Act 2003. Patients' consent to participate was subject to capacity assessment to consent, consultation with staff and agreement of a carer consultee where appropriate (Monroe et al., 2013). All interviewees were asked for their written consent. All data were anonymised at the point of data collection.

Data Collection

Data included non-participant observation of patients at the bedside, observations of the context of care (recorded in field notes), audits of patient hospital records, documentary analysis of artefacts, semi-structured interviews and informal open conversations with staff and carers.

Non-participant observation of health care professionals (HCPs) and health care assistants (HCAs) interacting with patients who had dementia was carried out using an observational protocol derived from the theoretical framework (Figure 1). Observations focused on identifying how information appeared to be identified and elicited in order to detect and manage pain and the care processes that are currently used to manage pain. Semi-structured interviews were carried out with staff (HCAs, nurses, doctors, other members of the MDT) and carers. Interviews lasted approximately 15 – 60 minutes, were recorded and transcribed verbatim (by a professional transcribing service), with the exception of those conducted in Case Site 3 which were recorded using handwritten notes.

Copies of existing policies and procedures for the assessment and management of pain that were in place in the ward and/or organization were also obtained. Patient notes were audited for information on the documentation of pain assessment, pain management interventions, pain reassessment and records of prescribed analgesia. Data collection at each site continued until the research team assessed that saturation had been achieved.

Data Analysis

Data were qualitative in nature and consisted of transcripts of observations and interviews, data from medical and nursing notes and field notes. Data were organized using specialist software (NVivo v10) and analyzed both inductively and deductively using a thematic approach. Dimensions of decision making, including information/pain cues used, pain assessment records and decisions/pain management interventions were used as initial categories for coding the data. Other themes emerged from the data during analysis.

The process of analysis was carried out across the research team; transcripts were read and re-read to identify initial themes, with the lead research fellow developing an initial coding structure. This structure was verified by 2 other research team members, and then used to code data by all three researchers. A sample of each subset of data was checked across researchers to verify consistency in coding and analysis. Analytic processes included the identification of negative cases or contradictory findings, with emerging themes compared and contrasted with the wider project team at team meetings. Repeated readings of field notes, interview transcripts and audit reports and contrasted throughout the analytic process across the research team.

Findings

Participant Characteristics

An overview of the data collected and participant characteristics are provided in Table 2. The patients included in the study had a mean age of 88 years (range 75 - 99), and had diagnoses of dementia with varying degrees of severity. The hospital wards (n=11) covered a variety of specialities including acute admissions, surgical wards (vascular and general surgery/orthopaedic), elderly medicine, rehabilitation and continuing care.

INSERT TABLE 2 ABOUT HERE

Data consisted of a total of 170 hours of direct observations with 31 patients, with field notes from 480 hours in the field. Interviews were conducted with 52 staff (including physicians, staff nurses, charge nurses, ward managers, support workers and specialist nurses) from all 4 sites and 4 carers from 2 sites.

Themes arising from the Data

In this paper three main themes arising from the data related to the clinical and decision processes for pain recognition, assessment and management in patients are reported.

The nature of pain and pain assessment in patients with dementia

The patient's pain experience was seen to be *complex and dynamic*. Participants discussed how pain may be intermittent and fluctuate, often only being present when patients are engaged in certain activities.

> *"often the doctors will go round and they'll ask the patient in their bed or in their chair, "Oh, are you alright? Any pain anywhere?", "No, I'm fine". As soon as we [physiotherapists] come, get them up on it, "Oh, oh, that really hurts"."* [H1, physiotherapist]

They also highlighted how pain may depend on, or be associated with distress and anxiety, from which it may be impossible to differentiate, and is often affected by the person's relations and surroundings.

> *"... [pain and anxiety] are very closely associated and it was both, she [the patient] did have pain but her pain perception was much worse and much heightened because she was so anxious"* [H1, nurse specialist/tissue viability]

As with other patients, one of the challenges faced by clinicians is the initial recognition of whether or not a patient may be in pain at all; for a variety of reasons patients (including those with cognitive impairment) may not be able to verbally express they have pain, and clinicians often find it challenging to interpret behavioural signals which may be 'atypical' in nature.

> *"he's like nervous or screaming or like with anxiety, we need to be there, maybe he's in pain. It depends also on the surgery he had, you know. But yes with the facial reactions and if you touch around the wound and he's like, you know, with a screaming reaction or...[....] and if he can't mobilise himself really well and normally he does, you know, it's kind of signs that you can see, the indications are telling you. The blood pressure as well, if it's high, it kind of seems like he's in pain. So everything together is like an assessment"* [H4, staff nurse]

Interviewees referred to the need to rely on their 'total assessment skills' to try and interpret whether either complaints of pain or alternately denials of pain could be taken 'literally'. In this context nurses often reported relying on non-verbal or behavioural assessment skills, their intuition and comparisons to what is usual or different to interpret patient signs to recognize them as pain. They also highlighted that they draw on a variety of sources including their own knowledge and experience to identify whether or not a patient has pain or what kind of pain. Once the possibility of pain has been established, then they embark on a process of 'trial and error' to test out whether or not they are correct, trying out different approaches to pain management.

"....It really is a common sense approach. If a patient is sat stable and content, but then starts to flap and make noises and are not themselves, then that would indicate that they are in pain. [....]... You need to identify the source and if it's a new thing." [H3, notes from interviews]

"...But if we went to turn them, they would maybe react to the pain as we're turning on to the bad hip or if we was going to move them. So we would read the body language and the signs that they'd give off if they wasn't able to actually communicate" [H4, staff nurse]

One of the key factors in assessing and managing pain is the ability to build a 'picture' or narrative of the patient case; which is used as the basis for the interpretation of cues, to try and 'make sense' of a situation. Participants highlighted the importance of building patterns of information cues and patient behaviour, to help inform their decision making. This narrative occurred over time (an issue which arose in other themes from the data), trying to link different events over the trajectory of a patient stay, to help test 'guesses' and form the basis of trial and error approaches to management.

"...then you're looking at your drug chart and you're linking it, you know, you're creating a picture ... we're like [...] trying to find out what's going on, you know, why the patient's here, why have they got this pain or where's it, what's going on here? You know, we're trying to build a picture, ..." [H1, staff nurse]

Overall nurses tended not to use pain assessment tools to aid their decision making, although one nurse reported using assessment tools as a way of ensuring that they *'don't rule out anything'* and consider pain as a possible explanation for the behaviour they are observing. In general, they appeared to distrust the scores given by a tool, preferring to rely on 'common sense' and their own experience to make assessments of patient pain.

"...if a patient's got dementia then it's not really much use asking the patient what their pain scale is. [...] I don't tend to go by it." [H1, doctor in training]

"I could assess a patient using my observation skills without looking at a score to know they were at a higher risk of something. So I think, in some way, we need to ensure that there's professional judgement, there's observation as well

as a bit of calculation and prompt but certainly linking to other documentation and getting people to make these connections, to help them make the connections." [H2, nurse manager]

The role of context in recognizing, assessing and managing pain

The nature of the ward and hospital context also appeared to have an impact on how nurses recognized, assessed and managed pain. The different wards catered for different patient populations or 'patient types' with an associated expectation for the likelihood that certain types of pain will be present or absent. In most of the surgical wards, for example, there appeared to be an expectation that individuals would be experiencing pain as a result of their surgical intervention, but that this pain would be acute in nature and for a limited time. As a result it appeared from the observation data that patients in surgical wards were often (but not always) routinely asked about pain and given pain relief medication.

"Anyway they have always painkillers prescribed at every six hours. So even if they don't tell anything, they will have those painkillers" [H4, staff nurse]

However, in some medical wards there appeared to be less focus on considering pain as a possible cause of patient distress. Across some of the wards where we collected data patients did not appear to be routinely asked about their pain, and the documentation of pain scores was rarely completed. This was explained by one medical consultant in terms of the expectation that elderly patients would have some degree of aches and pains (presumably due to their age), so that the routine charting of such pain would not be 'helpful' in terms of informing actions.

"And I particularly ask those people who, you know, you might expect to have pain so people who have got osteoarthritis or had fractures recently, that sort of thing than I'm likely to ask about any pain. [...] Somebody who's on a HDU, we might be worried about their pancreatic masses can cause lots of pain and so they might be charted for that reason. So for elderly medicine patients I think it's less useful to just routinely chart it, it's not very helpful really, it doesn't really tell us anything." [H1, Consultant]

The process of pain recognition, assessment and management appeared to be governed by the routine of the specific ward where the patient was located. The recognition of pain requires that the patient is able to communicate their pain, and that there is someone available to receive it. Patients were often asked if they had pain on wards where healthcare assistants carried out 'comfort rounds'. However, in other wards patient interactions with nursing staff were limited and often related to routine tasks (such as drug rounds, doctors' rounds). In all cases, given the fluctuating nature of pain, and the challenges of assessing pain in patients with dementia, the points in time when clinicians were available to listen to the patient may not have corresponded to the points when they were experiencing pain, which was problematic for those patients with dementia who were able only to report on 'here and now' experiences.

Pain recognition, assessment and management as a process distributed across individuals and over time

From the observations it appeared that pain recognition, assessment and management was carried out over time, by many individuals. Rather than being under the control of one specific nurse or other health care professional, it could be characterized more as a process of distributed work, which is time dependent. This is reflected in the comments in interviews, which highlight how there is a division of labour in the hospital ward; there numerous people with different professional roles who are all involved in the care of each patient, each with specific duties, responsibilities and powers. In turn, these roles often governed which part of the pain recognition, assessment and management process they participated in, and how they communicated their findings.

> *"I mean the student, the patient can tell the student they are in pain. And we will go and assess the patient with the pain, you know, and speak to them and get them to tell*

us how severe the pain is, because we are the ones who will have to administer the medication.
[...] But we all kind of assess patients' pain, you know. But it's then, it's normally left to the trained staff to manage the pain. And then if we can't, then we'll go to the next one and then ask the pain team to come in and see the patient" [H4, deputy ward manager]

"What I would then do is I would go to staff nurse, and I would say, "The lady that I was at is in pain," and then probably get assessed from there, find out where the pain's coming from and then the doctor would probably have to come and examine and find out initially where the pain's actually coming from" [H2, healthcare assistant]

The work of a hospital ward is organized in shifts; during each shift on the wards in this study a nurse had responsibility for the care of between 8 and 14 patients. Therefore often those individuals who assessed a patient are not necessarily those who reassessed them, and those who decided on a care plan or medication were not those who administered it.

The ability to build a picture of the patient, and the interpretation of whether they have pain, the nature of the pain and the best way to manage it occurs over time. It is both in the nature of the pain (which may be transient, fluctuating) and in the nature of the distributed information gathering process. As care of the patient is shared among people and professions, gathering this information for 'building a picture of the patient's pain' relies on effective communication and documentation. It was apparent from our interviews, that in general, clinicians found existing paper documentation tools, including the scores provided by pain assessment tools, was fragmented and therefore failed to provide the information they needed in order to carry out effective pain assessment and management.

"... [in a pain assessment form, with pain scores] you only know at ten past twelve when they did that, the person said they had some pain, doesn't tell you what it is, doesn't tell what somebody's doing about it, doesn't tell you whether that intervention has been beneficial or not. [...] there's no link to the management..." [H1, staff nurse]

Discussion

The findings of this study suggest that the process of pain recognition, assessment and management for patients who have dementia in hospital settings (and potentially for all hospital patients) does not appear to be a sequential linear process carried out by one individual nurse or clinician. Instead, conceptual frameworks for pain recognition, assessment and management need to acknowledge that pain assessment is carried out by a range of individuals over time and socially embedded within a specific organizational culture or climate (Lauzon Clabo, 2008, Manias, 2012). In this study health care staff (nurses, health care assistants, physicians) reported using intuition, experience and their ability to 'build a picture' of the patient to identify whether or not they were experiencing pain. This supports findings of previous studies exploring the process of pain management across settings (Manias, 2012, Parke, 1998). The management of pain was often also described as 'trial and error' ('guesswork') – with the use of pain medication as a way of seeing if symptoms or distress improved. Again this is similar to findings from studies exploring nurses' decision making strategies for pain management in nursing homes and long term care facilities internationally (Gilmore-Bykovskyi and Bowers, 2013, Kaasalainen et al., 2007). The process of pain assessment and management took place in a context which is reliant on effective communication; where the patient needs to be able to communicate their pain and where there is a nurse available to receive that communication. This provides particular difficulties for patients with dementia; depending on their level of impairment they may not be able to verbalise their pain, or communicate distress if it is not in the 'here and now' of experience. In this context, pain assessment tools by themselves, did not appear to provide the type of information nurses used to enable effective pain recognition and assessment. Organizational context was therefore a mediating factor in the recognition, assessment and management of pain (Lauzon Clabo, 2008, Manias et al., 2002). Particular 'types' of patient

(depending on the ward) were more likely to have their pain recognized and different ward routines provided varying opportunities for communication of that pain.

The need for a different conceptual framework

The conceptual model described in Figure 1, whilst potentially providing some explanatory power for aspects of individual cognition, is not supported by the findings of this study. In particular:

- Nurses use a mixture of type 1 (more subconscious, automatic processing) as well as type 2 thinking. This thinking is characterized by the process of building patterns or mental models of the patient (narratives over time), which are then used as the basis of recognizing if pain exists. These patterns or mental models are framed by the specialty of the ward where patients are located, and for dementia patients are reliant on nurses' ability to identify individual behavioural characteristics that may indicate pain is present.
- The process of decision taking is often based on an approach that could be characterized as 'guess-work' and 'trial and error' – a process where knowledge, and experience about the specific patient ('knowing the patient') provide potential solutions to a patients problem (their pain and/or distress), and nurses try different solutions until one appears to be successful.
- The 'work' of pain recognition, assessment and management is distributed across individuals and over time; it is less an individual cognitive activity, but more a collection of individuals carrying out components of that activity between them in a dynamic fashion.

Many of these characteristics of the process of decision making have been found in other areas of research; for example the Recognition-Primed Decision (RPD) Model (Klein, 2008)

suggests that individuals use their experience in the form of patterns, which "highlight relevant cues, provide expectancies, identify plausible goals, and suggest typical types of reactions in that type of situation" [p.457]. Using this model it could be hypothesized that nurses who work with surgical patients will have different patterns (or mental models) based on their experience in relation to pain, which means that they may focus on different cues, have different expectancies about a patient having pain, and will have different reactions to those cues than nurses who work on other wards. The RPD model also suggests that individuals use mental simulation to imagine how an action might be effective in a particular situation (Klein, 2008), akin to the 'trial and error' approach to pain management reported by the participants in this study. Klein suggests that the RPD model is a blend of intuition (type 1) and analysis (type 2) processing, with pattern matching being intuitive and mental simulation the deliberate analytic part. The RPD model may therefore be more representative of the pain recognition, assessment and management decision processes used by nurses when caring for patients with dementia in acute settings than the original framework outlined in Figure 1. However, it still fails to acknowledge the broader role of context and organization (beyond the role of experience in framing the patterns used to recognize pain in the first place), which was also a key issue in the study findings.

Theories of sense making recognize both the cognition of individuals and the interaction of those individuals within an organization or social culture, as being important for impacting on action or behaviour (Weick et al., 2005). During the process of sense making individuals identify certain cues or pieces of information, a process called noticing and bracketing (Weick et al., 2005) where noticing is paying attention to a signal among a noise of many, and bracketing is the singling out of this signal for interpretation. This process is guided by mental models based on experience (which is akin to the process of pattern matching described by the RPD model). Where theories of sense making differ is in their focus on how

individuals develop their mental models, which is seen to be through the continual, iteratively developed, shared understandings between individuals within a particular organizational or social culture. It is these shared understandings (such as the 'narratives' surrounding patients, the organizational culture within which actions occur) that provide a framework to inform the interpretation of information, and which form the basis of actions. Pain assessment is about gathering/seeking information and attributing meaning to this information. It is a process of sense-making where both the actions undertaken (e.g. to gather information, to perceive cues) and the process of interpretation are not only person but also context dependent

Organizational routines and boundaries of professional roles provide a framework within which sense making occurs. As Greenhalgh (2008) states, "Organisational members are active framers, *cognitively making sense of the events, processes, objects, and issues* that make up organisational life in a way that links with their personal and professional identity" [p.1271]. Routines provide guidance in clinical practice relieving individuals of the need to deliberate over every decision they take (Goodwin, 2014). Rules and routines are then a kind of decision support system. Routines are "generative systems that produce repetitive, recognizable patterns of interdependent action carried out by multiple participants" (Pentland and Feldman, 2008)[p.236]. Rules and routines reduce uncertainty and shape the behavior of people, they enable and/or constrain actions (Greenhalgh, 2008). In this way, routines enable individuals to make decisions subconsciously, without thought, enabling them to focus on the non-routine activities or events which require more cognitive power (Greenhalgh, 2008).

Through the lens of sense making, decision making is seen as the result of a complex interplay between individual cognition and social/organizational context, where decisions emerge over time, through multiple interactions across a number of individuals (Goodwin,

2014). In this approach, whether or not an individual patient is even identified as being in pain depends on the expectations and previous experiences of health care professionals (through the development of patterns or mental models) and the social/organizational context of the environment (with a specific organizational culture and patterns of behaviour, recognized routines for when and how pain assessment occurs, and the strategies used to manage that pain). The findings of this study, alongside other research, highlight the difficulties nurses' often have in attributing meaning to the information or behaviours they observe in patients with dementia (Gilmore-Bykovskyi and Bowers, 2013). In wards like the surgical ones, where the nurses' have developed 'mental models' to identify patients with (post-op, acute) pain, patients with dementia were identified as being asked if they had pain and provided with pain relief. However, without the development of such mental models, and with an organizational culture and routine that did not recognize pain as an issue, patients with dementia on other wards were less likely to have their pain either recognized or managed. In both types of ward overall, the organizational culture and routines for when and how pain assessment occurs were detrimental to patients with dementia being able to communicate their pain.

Figure 2 presents a revised conceptual model of pain recognition, assessment and management based on RPD and theories of sense making, which reflects the findings of this study. In this framework the patient situation (the patient experiencing pain) triggers cues (such as behaviours, vocalizations of pain, scores on formal assessment tools), that may or may not trigger mental models or patterns in individual clinicians to identify the experience as one of pain. This then feeds into mental simulations (what to do or actions to take) to affect the patient situation. All of these processes will be influenced by individual nurse, organizational and social processes.

INSERT FIGURE 2 ABOUT HERE

It should be highlighted that to conceptualize pain assessment and management in this way is not to say that this is always effective in producing the best outcomes for the patient. Indeed some of the reasons why there are cases of suboptimal pain management for patients with dementia in hospital can be found in individual inherent, inevitable biases used to make sense of patterns (intuition/system 1 modes of thinking), or in routines unfavourable to the gathering of the necessary information for accurately putting together a patient's picture (and patterns), rather than in problems with 'cue acquisition' or in the application of rules as in the traditional model. The use of pain assessment tools is only one of a number of ways that cues could be noticed, bracketed and interpreted about the patient, and they may not trigger a mental model or pattern in the individual using them; meaning that subsequent parts of the decision process (the triggering of mental simulations and actions) also do not occur, especially if the information they generate is not 'cumulative' – compared to previous points in time to build 'accurate pictures'.

Future research should focus on developing tools that enable nurses and other clinicians to develop patient specific patterns for patients with dementia, that mean they recognize patient behaviour and information cues from others (such as patients' carers) as being representative of pain, and that they have appropriate mental models (based on formal guidelines for pain management) to guide their mental simulations and subsequent actions. Organizational routines and culture will also need to be considered, to promote the development of this knowledge, and to enable the communication of narratives or patient stories between individuals over time, so that there is a 'shared sense-making' of a patient and their pain.

Conclusion

The theoretical lens of the RPD model and sense making provide a more expansive and comprehensive conceptual framework for exploring the nature of pain recognition, assessment and management, which is supported by previous research (Klein, 2008, Parke, 1998, Weick et al., 2005, Weick, 1995, Weick et al., 1999). The revised model recognizes the salience of individual cognition, as well as acknowledging that the knowledge and experience that guides that cognition is constructed through social interaction and organizational context. It moves beyond a model of pain recognition, assessment and management as being located within a sequential linear decision making framework, recognizing the importance of collaborative, co-constructed knowledge which develops over time. Future decision tools need to recognize the nature of the broader context in which such decisions are taken, the importance of shared understandings and communication, and the temporal nature of such decision taking. The assessment and management of pain is not only an individual cognitive activity; it is the product of a collaborative process between many individuals which occur over time and within a particular organizational culture.

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References

Alzheimer's Society, 2009. Counting the cost: Caring for people with dementia on hospital wards. . Alzheimer's Society, London.

American Geriatrics Society Panel on the Pharmacological Management of Persistent Pain in Older persons, 2009. Pharmacological management of persistent pain in older persons. Journal of the American Geriatrics Society 57 (1331-1346).

Ang, E., Chow, Y.L., 2010. General pain assessment among patients with cancer in an acute care setting: a best practice implementation project. International Journal of Evidence-Based Healthcare 8 (2), 90-96.

Atkinson, V.J., Almahdi, B., 2014. A prospective audit project into the adequacy of pain assessment in the medical and surgical wards in a North London District General Hospital. British Journal of Pain 8 (2), 78-83.

Ballard, C., Creese, B., Corbett, A., Aarsland, D., 2011. Atypical antipsychotics for the treatment of behavioral and psychological symptoms in dementia, with a particular focus on longer term outcomes and mortality. Expert Opinion on Drug Safety 10 (1), 35-43.

Bell, D., Raiffa, H., Tversky, A., 1988. Descriptive, normative and prescriptive interactions in decision making. In: Bell, D., Raiffa, H., Tversky, A. (Eds.), Decision making. Descriptive, normative and prescriptive interactions. Cambridge University Press, Cambridge, UK, pp. 9-30.

British Geriatrics Society, 2013. Guidance on the management of pain in older people. Age and Ageing 42 (i1-i57).

Carr, E.C.J., Meredith, P., Chumbley, G., Killen, R., Prytherch, D.R., Smith, G.B., 2014. Pain: a quality of care issue during patients' admission to hospital. Journal of Advanced Nursing 70 (6), 1391-1404.

Chang, S., Maney, K., Methta, V., Langford, R., 2010. Pain assessment and management in medical wards: an area of unmet need. Postgraduate Medical Journal 86, 279-284.

Closs, S.J., Barr, B., Briggs, M., 2004. Cognitive status and analgesic provision in nursing home residents. British Journal of General Practice 54 (509), 919-921.

Coker, E., Papaioannou, A., Kaasalainen, S., Dolovich, L., Turpie, I., Taniguchi, A., 2010. Nurses' perceived barriers to optimal pain management in older adults on acute medical units. Applied Nursing Research 23, 139-146.

Corbett, A., Husebo, B., Malcangio, M., Staniland, A., Cohen-Mansfield, J., Aarsland, D., Ballard, C., 2012. Assessment and treatment of pain in people with dementia. Nature Reviews Neurology 8, 264-274.

Daoust, R., Paquet, J., Lavigne, G., Sanogo, K., Chauny, J.-M., 2014. Senior patients with moderate to severe pain wait longer for analgesic medication in EDs. American Journal of Emergency Medicine 32, 315-319.

Dowding, D., Thompson, C., 2009. Using decision analysis to integrate evidence into decision making. Evidence-Based Nursing 12, 102-104.

Dowding, D., Thompson, C., 2004. Using judgement to improve accuracy in decision-making. Nursing Times 100 (22), 42.

Dowie, J., 1993. Clinical decision analysis: background and introduction. In: Llewelyn, H., Hopkins, A. (Eds.), Analysing how we reach clinical decisions. Royal College of Physicians, London, UK.

Elstein, A.S., 1978. Medical problem solving: an analysis of clinical reasoning. In, Harvard University Press, Cambridge MA.

Evans, J.S.B.T., 2011. Dual-process theories of reasoning: Contemporary issues and developmental applications. Developmental Review 31, 86-102.

Gilmore-Bykovskyi, A., Bowers, B., 2013. Understanding nurses' decisions to treat pain in nursing home residents with dementia. Research in Gerontological Nursing 6 (2), 127-138.

Goodwin, D., 2014. Decision-making and accountability: differences of distribution. Sociology of Health & Illness 36 (1), 44-59.

Greenhalgh, T., 2008. Role of routines in collaborative work in healthcare organisations. BMJ 337, 2448.

Greenhalgh, T., 2008. Role of routines in collaborative work in healthcare organisations.

Haller, G., Agoritsas, T., Luthy, C., Piguet, V., Griesser, A., Perneger, T., 2011. Collaborative quality improvement to manage pain in acute care hospitals. Pain Medicine 12 (1), 138-147.

Hoffman, F., van den Bussche, H., Wiese, B., Glaeske, G., Kaduszkiewicz, H., 2014. Diagnoses indicating pain and analgesic drug prescription in patients with dementia: a comparison to age- and sex-matched controls. BMC Geriatrics 14, 20.

Idvall, E., Ehrenberg, A., 2002. Nursing documentation of postoperative pain management. Journal of Clincial Nursing 11, 734-742.

Kaasalainen, S., Coker, E., Dolovich, L., Papaioannou, A., Hadjistavropoulos, T., Emili, A., Ploeg, J., 2007. Pain Management Decision Making Among Long-Term Care Physicians and Nurses. Nursing Research 29 (5), 561-580.

Kapur, B.M., Lala, P.K., Shaw, J.L.V., 2014. Pharmacogenetics of chronic pain management. Clinical Biochemistry 47 (13-14), 1169-1187.

Karrer, T., 2009. Share Best Practices - Patterns. In: eLearning Technology.

Klein, G., 2008. Naturalistic Decision Making. Human Factors 50 (3), 456-460.

Lauzon Clabo, L., 2008. An ethnography of pain assessment and the role of social context on two postoperative units. Journal of Advanced Nursing 61 (5), 531-539.

Lichtner, V., Dowding, D., Esterhuizen, P., Closs, S., Long, A., Corbett, A., Briggs, M., 2014. Pain assessment for people with dementia: a systematic review of systematic reviews of pain assessment tools. BMC Geriatrics 14, 138.

Lin, R.J., Reid, M.C., Chused, A.E., Evans, A.T., 2014. Quality Assessment of Acute Inpatient Pain Management in an Academic Health Center. American Journal of Hospice and Palliative Care.

Lukas, A., Mayer, B., Fialová, D., Topinkova, E., Gindin, J., Onder, G., Bernabei, R., Nikolaus, T., Denkinger, M., 2013. Treatment of pain in European nursing homes: results from the Services and Health for Elderly in Long TERm Care (SHELTER) study. Journal of the American Medical Directors Association 14 (11), 821-831.

Manias, E., 2012. Complexities of pain assessment and management in hospitalised older people: A qualitative observation and interview study. . International Journal of Nursing Studies 49 (10), 1243-1254.

Manias, E., Botti, M., Bucknell, T., 2002. Observation of pain assessment and management – the complexities of clinical practice. Journal of Clinical Nursing 11 (6), 724-733.

Monroe, T.B., Herr, K.A., Mion, L.C., Cowan, R.L., 2013. Ethical and legal issues in pain research in cognitively impaired older adults. International Journal of Nursing Studies 50 (9), 1283-1287.

Morrison, R.S., Siu, A.L., 2000. A comparison of pain and its treatment in advanced dementia and cognitively intact patients with hip fractures. Journal of Pain and Symptom Management 19 (4), 240-248.

Niruban, A., Biswas, S., Willicombe, S.C., Myint, P.K., 2010. An audit on assessment and management of pain at the time of acute hospital admission in older people. International Journal of Clinical Practice 64 (10), 1453-1457.

Parke, B., 1998. Gerontological nurses' ways of knowing. Realizing the presence of pain in cognitively impaired older adults. Journal of Gerontological Nursing 24 (6), 21.

Pentland, B.T., Feldman, M.S., 2008. Designing routines: On the folly of designing artifacts, while hoping for patterns of action. Information and Organization 18 (4), 235-250.

Purser, L., Warfield, K., Richardson, C., 2014. Making pain visible: an audit and review of documentation to improve the use of pain assessment by implementing pain as the fifth vital sign. Pain Management Nursing 15 (1), 137-142.

Rockett, M., 2010. Acute pain in medical patients - time to stop suffering in silence. Aneasthesia 65, 1051-1052.

Sampson, E., White, N., Lord, K., Leurent, B., Vickerstaff, V., Scott, S., 2015. Pain, agitation, and behavioral problems in people with dementia admitted to general wards: a longitudinal cohort study. Pain 156 (4), 675-683.

Thompson, C., Dowding, D., 2009. Essential decision making and clinical judgement for nurses. Churchill Livingstone, Edinburgh, UK.

van Kooten, J., Delwel, S., Binnekade, T.T., Smalbrugge, M., van der Wouden, J.C., Perez, R.S., Rhebergen, D., Zuurmond, W.W., Stek, M.L., Lobbezoo, F., Hertogh, C.M., Scherder, E.J., 2015. Pain in dementia: prevalence and associated factors: protocol of a multidisciplinary study. BMC Geriatrics 15, 29.

Vargas-Schaffer, G., 2010. Is the WHO analgesic ladder still valid?: Twenty-four years of experience. Canadian Family Physician 56 (6), 514-517.

Weick, K., Sutcliffe, K., Obstfeld, D., 2005. Organizing and the process of sensemaking. Organization Science 16 (4), 409-421.

Weick, K.E., 1995. Sensemaking in organizations. Sage, London, UK.

Weick, K.E., Sutcliffe, K.M., Obstfeld, D., 1999. Organizing for high reliability: processes of collective mindfulness. Research in Organizational Behavior 21, 81-123.

Figure 1: Correspondence between cognitive and clinical process for the recognition, assessment and management of pain

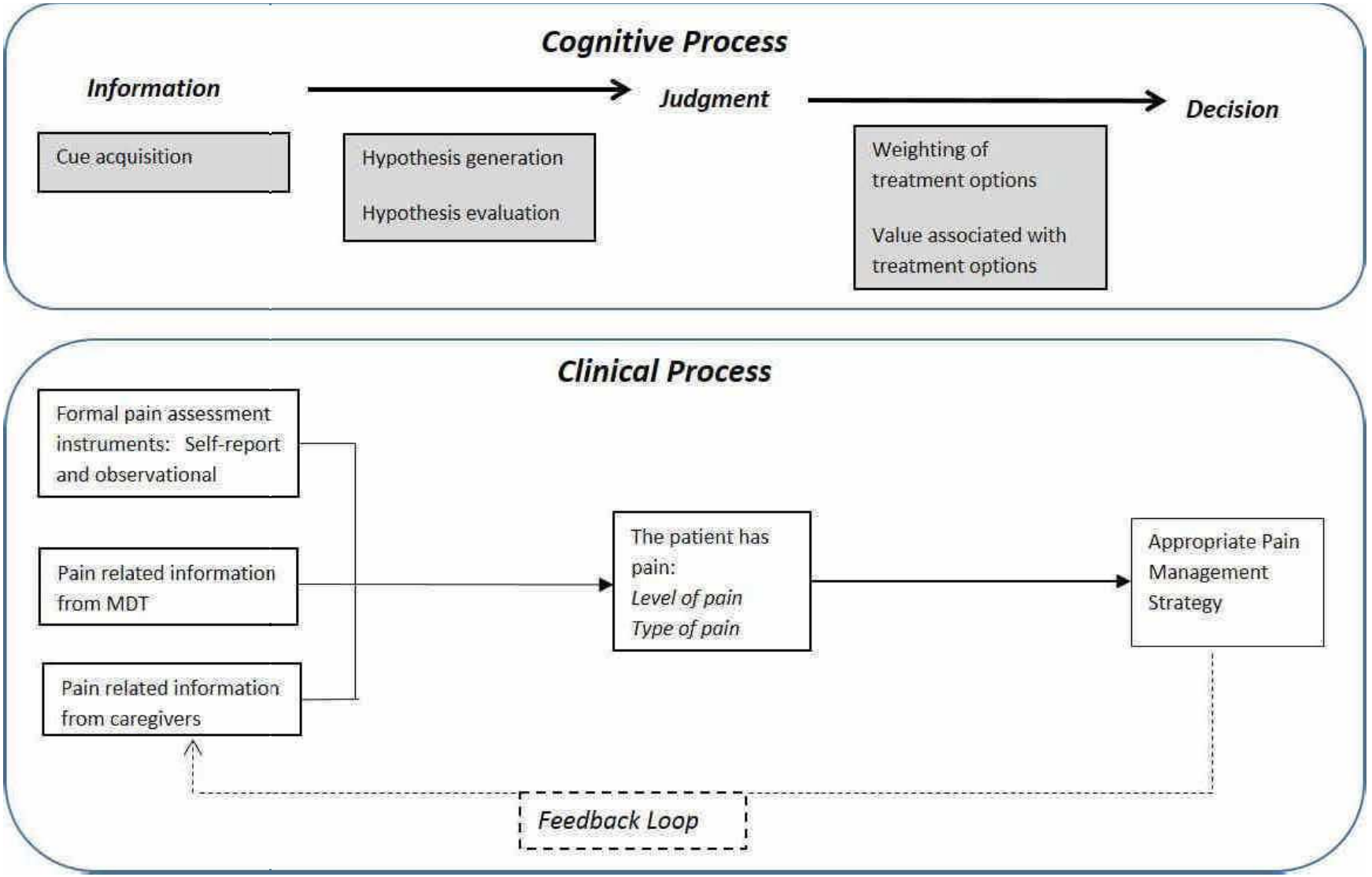

Table 1: Characteristics of Type 1 and Type 2 processing (adapted from (Evans, 2011))

Type 1 process (intuitive)	Type 2 process (reflective)
Fast	Slow
High capacity	Capacity limited
Parallel	Serial
Nonconscious	Conscious
Biased responses	Normative responses
Contextualized	Abstract
Automatic	Controlled
Associative	Rule-based
Experience based decision making	Consequential decision making
Independent of cognitive ability	Correlated with cognitive ability

Table 2: Overview of data collected and patient characteristics

	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Total
Ward Speciality (N)	Vascular (1) Elderly Medicine (1)	Elderly Medicine (1) Continuing Care (1)	Stroke Rehabilitation (1) Elderly Medicine (3) Surgical (1)	Surgical/orthopaedic (1) Acute admissions unit (1)	
Patients Observed (N)	8	7	9	7	31
Interviews with staff (N)	24	13	7	8	52
Interviews with carers	1	3	0	0	4
Total time spent observing patients (hh:mm)	71	45	22	32	170
Total time in the field (hh:mm)	161	167	73	85	480
Mean patient age (range)	83 (77-87)	84 (75-93)	88 (79-99)	85 (75-94)	88 (75-99)
Patient Gender	Male = 1 Female = 7	Male = 2 Female = 5	Male = 4 Female = 5	Male = 4 Female = 3	Male = 11 Female=20

Figure 2: Reconceptualized model of decision making in relation to pain recognition, assessment and management (adapted from (Karrer, 2009)).