

Abstract—Clinical judgment and decision-making is a required component of professional nursing. Expert nurses are known for their efficient and intuitive decision-making processes, while novice nurses are known for more effortful and deliberate decision-making processes. Despite taking longer to make decisions, novices still have trouble with effective decision-making. The aim of this paper is to review the factors that contribute to clinical judgment and decision-making of novice nurses. This was achieved by reviewing over two hundred articles produced by searches through PsycINFO. These articles used various meth

II. LITERATURE REVIEW PROCESS

An evaluation of the peer-reviewed literature generated from PsycINFO with various combinations of the terms “decision-making”, “judgment”, “clinical”,

(Dowding & Thompson, 2003; Aitken, Marshall, Elliott, & Mckinley 2011). Although experimentation has the benefit of controlling for nuisance variables (e.g., confounds) and showing causality, it runs the risk of oversimplification. And while reducing nursing environments to vignettes for the sake of experimentation might show the basic processes of decision-making, doing so can lose sight of the overall picture of applicability. It is the classic argument of *in vitro* versus *in vivo*—applied versus laboratory research. Therefore, regardless of the exploratory nature of nursing clinical decision-making research, these studies lay the groundwork for future experiments to confirm the critical factors that impact clinical judgment and decision-making.

Collectively, these three themes highlight two categories of variables that impact nursing clinical decision-making, individual factors (e.g., cue recognition, knowledge structure, ability to update working hypothesis, communication, current state of emotion, etc.) and environmental factors (e.g., task complexity, time pressure, interruptions, professional autonomy, etc.). Individual factors focus on the decision-maker and various properties of information processing. By contrast, environmental factors relate to the to-be-processed information. For example, a nurse's cue recognition ability will directly impact the efficiency and accuracy of their decisions—an individual factor. However, task complexity—an environmental factor—affects the presentation of cues and has an indirect impact on the decision-maker. The agreement on these factors in the literature is mixed. Some factors, such as task complexity, have repeatedly been shown to impact clinical decision-making (Corcoran, 1986a; Hicks, Merritt, & Elstein, 2003; Hughes & Young, 1990; Lewis, 1997). However, there has been less agreement on other factors, such as education level or experience (Sanford, Genrich, & Nowotny, 1992; del Bueno, 1983; Shin, 1998; Bechtel, Smith, Printz, Gronseth, 1993). Where appropriate, reasons for disparate results are discussed.

III. APPLIED DECISION-MAKING RESEARCH: METHODOLOGICAL DIFFICULTIES

As mentioned above, the majority of studies reviewed implement qualitative methods, varying primarily between either observational designs or think aloud protocols, although there are a substantial amount of studies that collect data through surveys. There are several issues with these methods that are worth mentioning. First, for qualitative research, regardless of the means of collection, data must be coded either descriptively or thematically. This requires multiple trained coders to ensure reliability in coding. Furthermore, statistics should be provided as to the amount of agreement between coders, also known as inter-rater reliability. Given that the majority of nursing research is qualitative (Cullum, 1997; Thompson, McCaughan, Cullum, Sheldon, & Raynor, 2004; Thompson, 1999a), reliable coding is imperative so results and conclusions are not contingent on researcher bias

or ambiguous constructs. However, nearly all articles reviewed either failed to include multiple raters or included multiple raters but provided no measure of inter-rater reliability. This issue is so prevalent in the nursing clinical decision-making literature that Thompson and colleagues published a paper calling on researchers to be more transparent in coding procedures (Thompson et al., 2004).

Employing questionnaires as a means of collecting data affords the luxury of obtaining a large sample, but information collected through this method is contingent on the decision maker's retrospective memory capabilities. These memories are particularly susceptible to a slew of memory biases (e.g., misattribution, suggestibility, hindsight bias, fluency effects, etc.). Caution should be given when interpreting results from studies that use questionnaires to investigate clinical decision-making (Aitken et al., 2011). To add to the problem, questionnaire response rates in some studies drop as low as 29%, raising the issue of selective sampling bias (Thompson, 1999a).

An additional method used to investigate nursing clinical decision-making is through constructed interviews or focus groups. These studies use an introspective approach to collect data: An interviewer guides nurses to explain the decision-making process and factors that affect it. The main concern with all introspective approaches is that it capitalizes on idiosyncrasies of the participant and the environment that surrounds them. Generalizability is very limited, unless the proper sampling techniques are used. For instance, factors that impact novice nurses in one hospital setting might be unique and not prevalent in other hospitals—a conclusion made by Bucknall and Thomas (1995). In complex areas of study, such as nursing, it is extremely challenging and very costly to implement appropriate sampling techniques and still control for nuisance variables.¹

Setting aside the issue of sampling and generalizability, introspective methodology is not necessarily an improper tool

plans can be classified as binary. Decisions are often considered on gradient scales. Take for example two decisions or action plans that reach the same conclusion. Despite no differences in outcome, the two decisions could differ in efficiency, resources needed, complexity required, and therefore ultimately differ in quality. One solution offered by Bucknall (2000) and King and Clark (2002) is to encourage researchers to conduct larger scale longitudinal studies. This is an admirable request, indeed, but also a rather costly and difficult paradigm to implement, hence only several studies use this technique (Casey et al., 2004; Standing, 2007; O'Neill

challenge of establishing a valid construct of intuition, but there are too many remaining issues surrounding the measurement scales that prevent their adoption in the literature (but see Pretz & Folse, 2011).

Despite the aforementioned challenges with conducting research on domain specific intuition, there is plenty of evidence that suggest the role of intuition in nursing clinical decision-making. Pretz & Folse (2011) administered several domain specific measures of intuition, as well as domain general (e.g., Myers–Briggs Type Indicator, Myers, McCaulley, Quenk, & Hammer, 1998; Rational-Experiential Inventory, Pacini & Epstein, 1999), to nurses of various experience (from nursing students through nurses with over 25 years of experience). The researchers sought to test the hypothesis that preference and the use of intuition increased with experience. Their battery of tests and surveys showed an overwhelming use of intuition and more experienced nurses placed a greater reliance on intuition when making clinical decisions, confirming their hypothesis. Additionally, King and Clark (2002) conducted an observational study on nurses ranging from advance beginner to expert nurses (according to Benner's classification; Benner & Tanner, 1987) and found traces of intuition in both expert and non-expert nurses, but

analyzed as a function of experience, time since last professional training, and knowledge structure—which was determined by a content analysis from open-ended questions and classified as either abstract or concrete. Nurses with less than two years experience used a questioning approach to collect patient data and nurses with 3-5 years experience used

equal.

One explanation offered for the discrepant results is that past experience can actually lead to systematic biases (Thompson, 1999a; Tanner & Hughes, 1984). Nurses are better able to generate and consider more hypotheses as they gain experience. However, as a byproduct, nurses can over sample recent experiences and neglect older, but still useful, experiences. Furthermore, nurses assess probabilities of the associations between cues and likely outcomes when interpreting cues—which is biased by past experience

problem. Preventative cue collection seems to play a large role in decision-making, but more research is required on the topic (Hoffman et al., 2009).

In contrast to the previous studies, Greenwood and King (1995) found that novice nurses actually collected *more* cues than did expert nurses. However, they attributed this finding to an inability to discriminate between salient and non-salient cues. Novices simply collected more cues regardless of whether the cues would be helpful or not. Despite the importance of cue recognition in decision-making there is a lack of research using novice nurses; most studies rely on experts or students as participants.

In a study using senior baccalaureate nursing students, Thiele et al. (1986) demonstrated the impact of cue recognition on decision-making. The experiment used a pre-test/post-test design with each test presenting new clinical situations that required participants to identify and sort cues, as well as link them together to make decisions. In between tests, the students engaged in computer-assisted learning simulations. They were presented information on effective decision-making and cue recognition. Although the experiment was not conducted on registered nurses, several of the experiment's conclusions are relevant for novice nurses.

First, the pre-test showed that participants were identifying nearly as many irrelevant cues as relevant ones. It should be no surprise, then, that the studeo-24.0 1 Tfo-2 o-2 ae (e) 1 Q q 0.ao-24. ET Q q 0.24 0 0 0.24 47.04005 429.42cm BT 017081 Tc 41 0 0 4

corroborated by other studies (Corcoran, 1986a, 1986b; Ebright et al., 2004; Ramezani-Badr, Nasrabadi, Yekta, & Taleghani, 2009). When discussing factors that led to adverse events, Ebright et al. (2004) noted that novice nurses too often “lose the big picture” and ignore new aspects of a patient’s condition. Essentially, nurses were not able to update their hypothesis when presented with additional information.

In complex decision tasks, novice nurses were described as taking too narrow of an approach, placing a limit on their abilities to update their hypothesis (Corcoran, 1986a). By contrast, expert nurses took a broader initial approach and then refined their hypothesis accordingly. Furthermore, Corcoran (1986a) reported that a source of erroneous decision-making was the inability to combine patient information with an alternative hypothesis (e.g., hypothesis updating). This issue is exacerbated in complex tasks: Corcoran noted that fewer alternative hypotheses were being evaluated, despite more

patient, the peer nursing staff, and the physicians. Much like what Radwin (1995) termed *knowing the patient*, Jenks (1993) concluded that decision-making was aided when nurses better communicated with patients and understood the idiosyncrasies of their conditions better. Furthermore, knowing the peer nursing staff provides an avenue for consultation and support system when nurses needed assistance on complex decisions. Jenks (1993) made it clear that communication plays an important role in clinical decision-making.

To study factors contributing to clinical decision-making, Ramezani-Badr et al. (2009) interviewed critical care nurses from Iran. The authors reported several findings that are prevalent in the nursing decision-making literature. Nurses primarily used a hypothesis-driven approach and updated their hypotheses by either collecting more information or by explicitly testing them through interventions and patient reactions. Additionally, nurses used familiarity approaches by recognizing cues that matched previous patients and situations, corroborating extant research (Cioffi, 2000, 2001). However, Ramezani-Badr et al. (2009) reported a factor that has been relatively under researched in applied decision-making: consultation and communication among colleagues.

All nurses reported that consulting with colleagues was an essential criterion for making decisions that involved proper patient care. As cases increased in complexity, greater depth of consultation was required. This finding supports previous research that showed nurses prefer to turn to colleagues under complex decisions tasks (McCaughan, Thompson, Cullum, Sheldon, & Raynor, 2005). Although this study interviewed experienced nurses (all nurses had more than three years of critical care experience), novices might consider new and unfamiliar tasks as being relatively complex—a situation that would require consultation from colleagues. While Ramezani-Badr et al. (2009) concluded that experienced nurses did not lack hesitation when needing assistance in decision-making, novice nurses may not share this attribute.

Lack of communication was a key factor involved in adverse events reported by novice nurses in Ebright et al. (2004). Specifically, novice nurses were poor communicators during handoffs and shift changes; they failed to report key information on the patient. Furthermore, major issues occurred when novices received handoffs from other novices. The reports provided fewer cues to assist nurses in their tasks and left the receiving novices unaware of pressing issues. This lack of communication compromised their subsequent decision-making and consequently led to inappropriate care to patients. Indeed, Miller (2001) linked poor communication in ICU to a 1.8 increase in risk-adjusted mortality.

Novice nurses did seek assistance under certain situations, however. But Ebright et al. (2004) described this theme as hindering decision-making because novices were assisting novices. In fact, one nurse interviewed reported being worried about the lack of experience when being assisted. It seems as though this finding in Ebright et al. is a special case—it is not often that novice nurses seek assistance from other novices.

In a related study, Manias et al. (2004) observed twelve

recently graduated Australian nurses with les-3 () -6 (g) -343 05 3rs e

random choice, with over selection of cues. On the surface, the conclusions of this study seem plausible, but the authors failed to regress CDMNS scores with decision-making scores on the simulation. Such a test would provide better support for the strong form of their argument.

In the survey study conducted by Casey et al. (2004), newly graduated nurses answered a battery of questions pertaining to their confidence in making clinical decisions. The results revealed a U-shaped function such that nurses between zero and three months of experience started out confident, which then declined until roughly a year of experience, and finally increased thereafter. This pattern is interesting because it could be interpreted as a learning curve of applied nursing. That is, newly entering nurses are naïve and overly confident but once they

personal values and beliefs (Field, 1987; Woolley, 1990; Mahon & Fowler, 1979; Berggren, Bégat, & Severinsson, 2002; De Casterlé, Izumi, Godfrey, & Denhaerynck, 2008; Dreyer, Forde, & Nortvedt, 2011; Monterosso et al., 2005). Nurses have been shown to introduce their own personal beliefs and biases in their decision-making. Bucknall & Thompson (1997) reported that 22% of their surveyed nurses indicated that, at least once a week, their decision-making was conflicted with personal values. Despite this large proportion of responses, nurses stated that the majority of their peer nurses held the same personal values. The confliction with personal values arose from the separation in values and beliefs from doctors and physicians.

Woolley (1990) wrote a report on factors that influence clinical reasoning and termed one factor as subjective responses. She describes several studies that have reported biased treatment because of personal belief. Webb (1985) surveyed thirty nurses about beliefs of early termination of pregnancy and found that all expressed negative attitudes—one nurse expressed that those seeking termination should be punished for their mistake by putting them through pain and trauma! While these views are grossly extreme, and can be argued as less relevant today due to societal changes, it does speak to the issue that personal values are present in clinical decision-making (for more examples, see Stockwell, 1972; Jeffery, 1979).

Environmental Factors

increase arousal, and reduce the number irrelevant cues processed by the decision-maker. As a result, decisions are made quicker and with little or no loss of task-relevant cues; accuracy is not sacrificed.

By contrast, complex decision tasks place a much higher cognitive load on the decision-maker. They must attend to more he d

involves the nurse's freedom to act in the best interest of the patient, and therefore more emphasis is placed on the patient care. This assumption may be premature because autonomy could be viewed as a social phenomenon, which is influenced by different perceptions of nursing held by Greek and English nurses.

Several factors have been correlated with autonomous practitioners. Schutzenhofer & Musser (1994) surveyed over

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