Nurse Education Today 78 (2019) 37–43

Contents lists available at ScienceDirect

Nurse Education Today

journal homepage: www.elsevier.com/locate/nedt

Do prelicensure nursing students' backgrounds impact what they notice and interpret about patients?

Kathie Lasater[a,*], Kathy Holloway[b], Samuel Lapkin[c], Michelle Kelly[d], Belinda McGrath[e], Ann Nielsen[a], Sydnee Stoyles[a], Nathan F. Dieckmann[a], Molly Campbell[a]

[a] Oregon Health & Science University, 3455 SW Veterans' Hospital Rd., Portland, OR 97239, USA
[b] Victoria University of Wellington, Level 7, Clinical Services Block, Wellington Hospital, 6242, New Zealand
[c] Faculty of Science Medicine & Health, School of Nursing, University of Wollongong, Northfields Ave, Wollongong, NSW 2522, Australia
[d] School of Nursing, Midwifery and Paramedicine, Curtin University, Kent St, Bentley, Perth, Australia
[e] School of Health, Whitireia Polytechic, Porirua, New Zealand

ARTICLE INFO

Keywords:
New graduate nurse
Clinical judgment
Simulation
Learning activity

ABSTRACT

Background: Academic educators are challenged to foster the development of clinical judgment in diverse learners. The impact of nursing students' backgrounds on clinical judgment has not previously been studied.
Aims:

1. Determine what identifiable background variables influence what students notice and how they interpret what is noticed;
2. Identify some implications for pedagogical approaches that may foster clinical judgment development among diverse learners.

Sample: Prelicensure/preregistration students, representing three international English-speaking programs in 3 countries, comprised the sample (N = 532). All were enrolled in the first course in which perioperative content was taught.
Data collection: An online learning activity was designed to elicit responses to a simulated case study of an expert nurse role model caring for an older adult patient experiencing delirium several days post-operatively.
Data analysis: Dyads of coders did three rounds of coding. Logistic and multinomial logistic regression models used background variables to look for patterns in student responses.
Findings: The data strongly suggest that background variables impact clinical judgment, however, not in interpretable patterns.
Conclusion: Nurse educators must acknowledge that prelicensure students' backgrounds impact their clinical judgment and assist them to learn to think like nurses.

1. Introduction

Acute care settings have never been more demanding of nurses caring for patients with multifaceted, complex diagnoses and challenging social situations. Yet new graduate nurses (NGNs) are not fully practice-ready, particularly in their ability to make clinical judgments (Kavanagh and Szweda, 2017; Lasater et al., 2015; Parker et al., 2014). Growing nursing and workforce challenges and a looming worldwide nursing shortage demand that NGNs use the highest levels of clinical judgment to provide safe, quality patient care. Clinical judgment is defined as "an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (Tanner 2006, p. 204); clinical reasoning is the process used for developing the judgments.

There is also significant disparity between academic educators' perceptions of NGNs' readiness for practice and those of nurse executives (Berkow et al., 2009; Wolff et al., 2010). Wolff et al. noted challenges for new graduate nurses: (a) a lack of practice experience; (b) a wide range of practice experiences that do not allow for theory

* Corresponding author.
E-mail addresses: lasaterk@ohsu.edu (K. Lasater), Kathy.Holloway@vuw.ac.nz (K. Holloway), Samuel.Lapkin@health.nsw.gov.au (S. Lapkin), Michelle.Kelly@curtin.edu.au (M. Kelly), Belinda.McGrath@whitireia.ac.nz (B. McGrath), nielsena@ohsu.edu (A. Nielsen), stoyless@ohsu.edu (S. Stoyles), dieckman@ohsu.edu (N.F. Dieckmann), campbemo@ohsu.edu (M. Campbell).

https://doi.org/10.1016/j.nedt.2019.03.013
Received 26 June 2018; Received in revised form 12 January 2019; Accepted 12 March 2019

integration; (c) minimal socialization of new graduate nurses; and (d) diverse baccalaureate criteria among a variety of programs. Specifically, Lasater et al. (2015) found that NGNs and even those in their second years of practice were lacking fully developed clinical judgment. Monagle et al. (2018) uncovered that NGNs' scores in health reasoning did not significantly increase in the first year of practice, confirming the findings of the Lasater et al. study. One possible reason for the disparity of clinical judgment in NGNs may be that diverse students develop clinical judgment in unique ways.

2. Theoretical model, significance, and study aims

Tanner (2006) advanced a research-based model of clinical judgment and asserted that what nurses notice is largely determined by the context of care, nurses' relationships with patients, and nurses' backgrounds. In fact, Tanner emphasized, “clinical judgments are more influenced by *what the nurse brings to the situation* than the objective data about the situation at hand” (p. 205). Tanner was clear that experienced nurses use their nursing backgrounds to grasp a situation; however, the impact of students' backgrounds on noticing and interpreting patient data has not been studied. Interpreting what is noticed importantly sets the stage for responding to patients' needs. Three recent studies linked student background variables to outcomes: academic choices among participants from 6 nursing programs in Belgium (Van Hoek et al., 2019), student quality of life in 9 international programs (Cruz et al., 2018) and compassion in one Australian program (Pitt et al., 2014). However, none linked background variables to clinical judgment development.

Nursing students have a wide array of life experiences—socio-cultural, multiethnic, professional/previous healthcare experience, and family, often distinct from their faculty (Kelly et al., 2016). Apart from their learning in programs of nursing, these life experiences or backgrounds may impact what they notice and how they interpret what they notice before responding (Tanner, 2006) in patient care. Diverse students care for a broad range of patients in a variety of clinical settings, challenging faculty to promote and evaluate student thinking (Kelly et al., 2018). A wide array of pedagogical approaches is available to nurse educators, including case-based learning, simulation, and reflection. If nurse educators can gain insight into how student backgrounds impact what they notice and their interpretation, they can select the best pedagogical approaches to promote clinical judgment in individual students or groups.

Using the Tanner model, Lasater (2007) presented a trajectory of student development of clinical judgment in the form of a rubric, including three dimensions of effective noticing: (1) focused observation; (2) recognizing deviations from expected patterns; and (3) information seeking and two dimensions of effective Interpreting: (1) prioritizing the data and (2) making sense of the patient data. Subsequent studies have validated the Lasater Clinical Judgment Rubric (Adamson et al., 2012; Mariani et al., 2013; Victor-Chmil and Larew, 2013).

Expert role models have been used in previous studies to positively impact students' learning (Johnson et al., 2012; Lasater et al., 2014). Observation of expert role models helps learners to transform their observations into mental symbols that later produce behaviors from what is recalled (Bandura, 1997). In the current study, an expert role model was used so participants could focus on *Noticing* and *Interpreting*, undistracted by less-than-expert nursing practices. The study aims were to:

1. determine if there are identifiable background variables that influence what students notice and explore how they interpret what is noticed;
2. identify some implications for pedagogical approaches that may foster clinical judgment development among diverse learners.

Another part of the study involved a third aim: to explore the effectiveness of using a pre-recorded patient simulation scenario of an expert nurse role model with the diverse students as a learning activity to promote clinical judgment; these findings will be reported in a separate paper.

3. Design and methodology

The research design involved a survey, examining participants' responses to a single videorecorded high-fidelity patient simulation scenario. It featured an expert nurse role model, a human patient simulator representing an older adult female, and an embedded actor as the patient's granddaughter. The scenario focused on the patient's post-operative course, specifically several days after a hip repair when she began to develop delirium. The scene opens with the patient yelling and partially out of bed.

Each university program had adopted and integrated the Tanner Model of Clinical Judgment as a conceptual element in its curriculum, and each applied for and received institutional review board (IRB) approval for the study. All students in the designated courses were offered participation, and all were in baccalaureate degree pre-registration programs. Risk to participants was deemed negligible since no identifiers were collected. A learning activity engaged participants in the simulated patient scenario, followed by completion of an online survey.

3.1. Sample

The convenience sample was drawn from three large urban nursing programs, one each in Australia, New Zealand (NZ), and the United States (US). Sites represented a range of ethno-cultural diversity. Participants were enrolled in courses that introduced perioperative care, thereby allowing them to understand the simulated patient's care priorities. Because these courses were generally early in program, participants' backgrounds were less influenced by their nursing education experiences than previous life experiences. Participants in Australia and NZ were required to complete the learning activity but had the choice of including their responses in the study. Students in the US could choose to independently complete the learning activity as one option for extra credit. A course designer made a list of names of those who completed the activity for course faculty, not including students' answers, and removed names from the final dataset so researchers had no access to participant names.

3.2. The learning activity/data collection procedures

The videorecording was funded by a previous US study (Johnson et al., 2012; Lasater et al., 2014). Before use in the present study, site coordinators in Australia and NZ reviewed the recording for language and procedural appropriateness.

The learning activity required approximately 50 min of uninterrupted time.

Participants: (1) read a brief patient history/report and medication record before watching the patient case scenario video; (2) completed a survey of open-ended and demographic questions; and (3) re-watched the same video with added teaching narration. All were embedded in a link to an online survey tool, used to collect responses into one data file at the US site; it automatically assigned unique identifiers to participants on submission so their identities were protected. No data were handled by course leaders or embedded in the course.

Before data collection began, the learning activity was piloted with a US cohort (n = 28) to identify misinterpretations, including how easy the directions were to understand. Small adjustments were made, based on feedback and affirmed with all researchers. These pilot data were not included in the final sample. The final online survey instrument required participants to complete: (1) case study questions and provide information regarding (2) background variables.

3.2.1. Case study questions

The seven open-ended case study questions focused on the five LCJR dimensions of effective *Noticing* and *Interpreting* as defined by Lasater (2007). Participants were asked to respond in one sentence or less to each question to maximize later identification of codes for such a large sample. The study collected first impressions of the participants, limiting their responses to a sentence yet inviting their original responses (rather than selecting from predetermined possibilities). There were no right or wrong answers.

3.2.2. Background variables

The researchers, also experienced educators, chose seven background variables focused on the diversity of participants and variables which might impact clinical judgment, including: Age; Ethnic/cultural Background; Primary Language; Program; and Type of Outside Care Experience and Length of Outside Care Experience that may have occurred prior to or during their programs. Contrary to the open-ended case study questions, participants were presented with categorical options for responses to background variable questions as well as open text boxes, should they want to explain.

3.3. Data analysis

3.3.1. Response rates

The complete dataset was organized in an Excel spreadsheet. The response rate for the entire study was 78% (532/683 possible respondents). The following paragraphs describe the analysis process for the data collected.

3.3.2. Case study responses

Responses to open-ended questions were coded. The initial codes emerged from a subset of the data–60 randomly selected sets of responses with 20 participants from each of the three countries. The PrincipaI Investigator (PI) used these responses to identify preliminary codes (represented by a number, e.g., Pain (1), Mental Status (2)) for each of the seven questions to devise a code book. To foster trustworthiness of the data, three dyads of two coders, each from different programs, completed the first round of coding, each working with the same mixed subset. The coders suggested new codes when the pre-determined ones did not fit (Hseih and Shannon, 2005). The PI revised the code book and sent the data subsets back to the coders for a second round. For these two rounds, the coders did not know with whom they were paired. After the second round, the data were cleaned, and the analysis team recognized that consensus for case study question 5 was < 50%. It was determined the question may have been vague or poorly worded so there was no further analysis of it. The agreement for the other six questions was > 66% at this point so the datasets were returned to the coders for a third round to resolve disparities. The dyad partners were presented with a strategy for resolving the disparities, using a sequential revisiting of each disparate coded datum, followed by email or a Skype meeting to reach final consensus.

3.3.3. Background variables

Responses were entered into a statistical software database (R Core Team, 2016). The number of codes for many of the variables was too extensive to have generalizability so some of the variables were condensed. For example, participants selected from 16 different languages or *Other*; for the latter, 22 languages were written in to total 38 languages. All three programs required English proficiency; participants were grouped into primary English language speakers and other primary language speakers for the analysis.

For Type of Outside Care Experience, participants identified a number of formal roles while others wrote in more informal roles, such as family caregiver or hospital volunteer. To address these variations and condense another extensive list of codes, participants were grouped by roles that (a) require formal certification, registration or licensure, (b) non-licensed, customer service, volunteer, and informal caregiving roles, and (c) no experience.

Table 1
Background variables by program.

	Australia (N = 217)	New Zealand (N = 166)	United States (N = 149)	
Characteristic	% of sample	% of sample	% of sample	p-value[e]
Gender				
Female	79.7%	88.0%	89.3%	0.019
Male	20.3%	12.0%	10.7%	
Age				
18–24 years old	72.4%	61.4%	20.1%	< 0.001
25–24 years old	19.4%	21.1%	62.4%	
35–44 years old	4.1%	11.4%	15.4%	
≥ 45 years old	4.1%	6.0%	2.0%	
Length of Outside Care Experience				
None	48.8%	54.8%	26.2%	< 0.001
< 1 year	39.6%	22.9%	30.9%	
1–3 years	8.3%	15.1%	32.9%	
≥ 4 years	3.2%	7.2%	10.1%	
Type of Outside Care Experience				
Certified/Licensed	42.7%	29.6%	29.7%	< 0.001
Other	9.0%	13.8%	43.9%	
None	48.2%	56.6%	26.4%	
Ethnicity				
Asian[a]	56.7%	12.7%	6.0%	< 0.001
Pacific Islander/ Māori[b]	1.8%	25.3%	0.7%	
White/Caucasian[c]	34.6%	56.6%	81.9%	
Other[d]	6.9%	5.4%	11.4%	
Primary language				
English	49.3%	73.5%	91.9%	< 0.001
Other	50.7%	26.5%	8.1%	

[a] Asian includes participants who indicated Chinese, Filipino, Indian, Korean, Nepalese, Southeast Asian, Thai, Vietnamese and 'Other Asian'.
[b] Pacific Islander/Māori includes participants who indicated Australian Torres Strait Islander, Cook Island Maori, Fijian, Māori, Niuean, Other Pacific peoples, Samoan, Tokelauan, Tongan, and Torres Strait Islander.
[c] White/Caucasian includes participants who indicated Australian European, European, New Zealand European, and White/Caucasian.
[d] Other includes participants who indicated African, African American/ Black, American Indian/Alaska Native, Hispanic/Latin American, Middle Eastern, Multi-ethnic, and 'other' (not specified).
[e] p-values calculated using Chi-square test of proportions.

The list of Ethnic/Cultural Identities was lengthy and often mixed with racial designations offered by the participants. We created groups, based on participants' responses and similarities, a typical approach for surveys of this type (Table 1). The research team conferred to affirm the groupings, but in the end, realized that the groupings, often mixtures of race and ethnicity, were likely a disingenuous attempt at best so this variable was deleted from the analysis.

3.3.4. Statistical methods

The number of code categories ranged from 8 to 13 for each question. Once coding consensus was reached, the PI and research assistant, both nurses, condensed the codes through a process of individual consideration, followed by a face-to-face discussion for consensus. The final codes appear in Table 2.

For analysis purposes, responses that represented < 5% of answers were removed (nine responses for question 1 and 24 responses for question 2). Codes for uninterpretable answers, "I don't know" responses, or answers that did not specifically answer the question (e.g., participants were asked for the *most* important aspect but gave more than one answer without prioritizing) were removed from the analysis.

Questions 1 and 2 were modeled using logistic regression while questions 3, 4, 6, and 7 used multinomial logistic regression with

Table 2
Survey questions and final codes aligned with LCJR dimensions/Tanner model aspects.

Aspects of Tanner model (2006)	LCJR dimensions (2007)	Open-ended survey questions	Final codes	N (%)	Background variables significantly associated with final codes (LRT p-values)
Noticing	Focused observation	1. What was the most important aspect of Mrs. Gorski that you noticed?	Confusion/mental status[a]	357 (67.1%)	Gender (0.020)
			Other post-op complications	67 (12.6%)	Length of Outside Care Experience (0.038)
			Other aspects of care[b]	9 (1.7%)	Type of Outside Care Experience (0.044)
			Don't know/more than one answer/can't interpret answer[b]	99 (18.6%)	
	Recognizing deviations from expected patterns	2. How was this different than what you expected (referring to question #1)?	Confusion/mental status[a]	68 (37.4%)	Age (0.034)
			Post-op complications	181 (34.0%)	Length of Outside Care Experience (0.029)
			Attention needed from nurses/family[b]	24 (4.5%)	
			Don't know/more than one answer/can't interpret answer[b]	128 (24.1%)	
	Information seeking	3. What one bit of information did you wish you had that you didn't?	Cause of confusion/mental status[a]	68 (12.8%)	Program (< 0.001)
			Previous behavior/health history	121 (22.7%)	
			Other assessment information	280 (52.6%)	
			Don't know/more than one answer/can't interpret answer[b]	63 (11.8%)	
Interpreting	Prioritizing data	4. In your opinion, what was the highest priority in the care for Mrs. Gorski?	Confusion/mental status[a]	177 (33.3%)	Program (< 0.001)
			Pain	95 (17.9%)	Age (0.038)
			Monitoring activities	83 (15.6%)	Primary Language (0.045)
			Prevention activities	109 (20.5%)	
			More than one answer/can't interpret answer[b]	68 (12.8%)	
		5. Why was this your highest priority (referring to question #4)?		Not analyzed	
	Making sense of data	6. What is required next for Mrs. Gorski?	Minimize confusion[a]	61 (11.5%)	No significant associations found
			Assessments (nurse or physician)	315 (59.2%)	
			Nursing interventions	129 (24.2%)	
			Can't interpret answer[b]	27 (5.1%)	
		7. Why is this the next care requirement for her (referring to question #6)?	Need to minimize confusion[a]	132 (24.8%)	Program (< 0.001)
			Need to treat or rule out infection	120 (22.6%)	Gender (0.027)
			Other post-op improvement needs	233 (43.8%)	
			Can't interpret answer/answer doesn't fit[b]	47 (8.8%)	

[a] Reference category for logistic or multinomial logistic regression models.
[b] Category left out of logistic or multinomial logistic regression models.

participants' coded responses as the dependent variables in each model. All predictors were added simultaneously and assessed using likelihood ratio tests (LRT) by removing one predictor at a time. If a predictor was significant, effect sizes were represented as odds ratios, and specific contrasts were assessed using a Wald test and reported with 95% confidence intervals. All analyzed questions included a code relating to confusion and/or mental status and served as the reference for all models.

Independent variables were consistent across all questions and included Gender (female as reference), Age (18–24 as reference), Length of Outside Care Experience (none as reference), Type of Outside Care Experience (certified or licensed as reference) and Primary Language (English as reference). Three age categories were condensed into a single category of 45 or older given the small number of older adults. Length of Outside Care Experience was also condensed to new categories of none, less than one year and greater than one year, also related to the small number of responses exceeding one year.

4. Findings

One explanation for many of the imperceptible or non-responses, and the "I don't know" responses may have been rooted in how early in program participants were. In other words, many participants were new enough to healthcare that the vocabulary of the case study or the survey may have been too advanced. Therefore, participants may not always have understood the language of the video or what the survey was asking of them. Likewise, it may also have been too early in students' clinical judgment development to recognize the nuances that indicate clinical reasoning from the case study.

Due to the large amount of data generated from the study, the findings are reported and discussed one question at a time. The questions are listed along with the codes that were analyzed (also see Table 2).

4.1. Question 1: what was the most important aspect about Mrs. Gorski that you noticed?

The analyzed codes for this question were *confusion/mental status* and *other post-operative complications*.

Gender, Length of Outside Experience, and Type of Outside Experience were significantly associated with responses to question 1 (LRT p-values of 0.020, 0.038, and 0.044 respectively). The odds of male participants answering *other post-op complications* versus *confusion/mental status* were 2.5 times the odds of female participants while holding all other covariates constant (95% CI: 1.2–5.3). The odds of a participant with no outside care experience answering *other post-op complications* were 3.4 times the odds of a participant with outside care experience of less than one year (95% CI: 1.1–10.6) and 5.3 times the odds of a participant with at least one year of outside experience (95% CI: 1.4–20.0) while holding all other covariates constant. This would suggest that participants without previous outside care experience chose *other post-op complications* as a catchall response. However, contrasts between participants with certified/licensed experience were not significantly different from either those with other experience or those with no experience when assessed using Wald tests for individual contrasts.

4.2. Question 2: how was this different than what you expected?

The analyzed codes for this question were *confusion/mental status* and *other post-operative complications*.

Age and Length of Outside Experience were significantly associated with responses (LRT p-values of 0.034 and 0.029 respectively). The odds of participants aged 35–44 answering *other post-op complications* versus *confusion/mental status* were 3.4 times the odds of participants aged 18–24 (95% CI: 1.4–7.9), suggesting that those with more life experience had more possibilities to consider. However, the odds of participants aged 18–24 were not significantly different from participants aged 25–34 or participants at least 45 years old so significance related to Age may be coincidental. The odds of participants with less than one year of outside experience answering *other post-op complications* were 2.6 times the odds of participants with no experience (95% CI: 1.1–5.8). However, the odds of those with at least one year of outside experience were not significantly different from those with no outside experience when assessed using a Wald test. Significance did not follow a consistent pattern.

4.3. Question 3: what one bit of information did you want to have that you didn't?

The analyzed codes for this question were *cause of confusion/mental status, previous behavior and health history,* and *other assessment information*.

Program was the only variable significantly associated with the responses (LRT p- value < 0.001). The odds of a participant answering *previous behavior and health history* were not significantly different from the odds of a participant answering *cause of confusion/mental status* between programs in either Australia and NZ or Australia and the US. The odds of a participant in NZ answering *other assessment information* over *cause of confusion/mental status* were 2.2 times the odds of an Australian program participant (95% CI: 1.1–4.4). The odds of a US program participant answering *other assessment information* over *cause of confusion/mental status* were 6.7 times the odds of a program participant in Australia (95% CI: 2.5–18.1). One might hypothesize that the ways in which different programs teach assessment and/or clinical judgment may account for these differences. Zooming out, it is possible that scopes of practice and professional roles in the three countries may also be dissimilar enough to account for these differences.

4.4. Question 4: in your opinion, what was the highest priority in the care for Mrs. Gorski?

The analyzed codes for this question were *confusion/mental status, pain, monitoring activities,* and *prevention activities*.

Program, Age, and Primary Language were all significantly associated with responses (LRT p-values of < 0.001, 0.038 and 0.045 respectively). The odds of something other than *confusion/mental status* were not significantly different between participants in Australia and NZ programs. The odds of a participant from the US program answering *confusion/mental status* versus *pain* were 2.8 times the odds of a participant in an Australian program (95% CI:1.1–7.4), and the odds of a US program participant answering *prevention activities* over *confusion/mental status* were 2.6 times the odds of a participant in Australia (95% CI: 1.2–5.8). The odds of a participant from the US answering *monitoring activities* were not significantly different than the odds of an Australian program participant. Age groups 25–34 and over 45 did not show a significant difference in odds from the 18–24 year old group so life experience did not seem to be a factor. The odds of a participant aged 35–44 answering *pain* over *confusion/mental status* were 2.2 times the odds of a participant aged 18–24 (95% CI: 1.1–9.8). The odds of a participant aged 35–44 answering *monitoring activities* over *confusion/mental status* were 3.1 times the odds of a participant aged 18–24 (95% CI: 1.1–8.7). The odds between these two groups answering *prevention activities* over *confusion/mental status* were not significantly different. Again, teaching differences among programs and/or professional role differences in countries may account for Program being a significant variable.

4.5. Question 6: what is required next for Mrs. Gorski?

The analyzed codes for this question were *minimizing confusion*, *assessments*, and *nursing interventions*. No variables were significantly

associated with responses.

4.6. Question 7: why is this the next care requirement for her?

The analyzed codes for this question included *minimizing confusion*, *possible infection*, and *other necessary post-operative improvements*.

Program and Gender were significantly associated with responses (LRT p-values of < 0.001 and 0.027 respectively). The odds of a participant from the NZ program answering *dealing with a possible infection* over *minimizing confusion* were not significantly different from the odds of an Australian program participant. The odds of a NZ program participant answering *other necessary post-op improvements* over *minimizing confusion* were also not significantly different from the odds of an Australian program participant. The odds of a US program participant answering *dealing with a possible infection* over *minimizing confusion* were 3.2 times the odds of a participant in Australia (95% CI: 1.4–7.5). The odds of a US participant answering *other necessary post-op improvements* over *minimizing confusion* were not significantly different from the odds of an Australian program participant. The odds of a female participant answering *dealing with a possible infection* over *minimizing confusion* were 2.3 times the odds of a male participant and nearly significant (95% CI: 0.95–5.7). There was not a significant difference in the odds of female and male participants answering *other necessary post-op improvements* over *minimizing confusion*.

5. Discussion

This international study illustrates that background variables likely impact what students notice and how they interpret what they notice. However, it was impossible to detect a pattern in the responses or clearly interpret them. Type of Outside Care Experience was a significant factor; in most cases, it was noted that these participants referred to a broader range of possible interpretations. This seems logical as participants could draw on backgrounds in caregiving that such variables could present. Similarly, Age was significant in two of the six questions. One could hypothesize that Age, like Type of Outside Care Experience, might present participants a broader range of interpretations.

Program was also a significant factor for three of the six clinical judgment dimensions, suggesting either (a) that the way clinical judgment is taught or (b) the role of the professional nurse within a given country for the program, that is scope of practice, may be important influences. It should be noted that Program and participants' country of origin are not necessarily the same. For example, 50.7% of participants in Australia were not primary English language speakers, implying they were international students or first or second generation immigrants. Interestingly, Primary Language only appeared significant for one of the case study responses.

As Tanner (2006) asserts, background plays a role in what nurses notice. Proficient and expert nurses learn from and draw on their clinical experiences. Logically, the concepts and strategies that are stressed in a nursing education program influence student backgrounds. Elements of program and curricular differences that were difficult to control for include the amount, type, and quality of programmatic clinical experiences participants had prior to participation in the study or in the course focused on peri-operative nursing. Health priorities, patient demographics, and scope of practice in each of the three countries where the programs were located may have influenced participants' responses. Gender appeared significant in two of the six questions. However, males were underrepresented in the full sample so it would be problematic to generalize the meaning of this finding.

One of the aims of this study was to identify pedagogical approaches that could be useful for different backgrounds. However, since there were no identifiable patterns from the data, we cannot specify particular approaches by demographic group. There are a plethora of different approaches to foster clinical judgment: to name a few, simulation (Kelly et al., 2016; Mariani et al., 2013); concept-based learning activities (Gonzalez, 2018; Nielsen, 2016); individual coaching (Jessee and Tanner, 2016); case-based learning (Cato et al., 2009; Monagle et al., 2018) and preceptors/mentors (Nielsen et al., 2016). Nurse educators must be familiar with and use a range of pedagogical approaches to meet the needs of individual learners.

In summary, it is difficult to link significance of specific variables to dimensions of clinical judgment. However, what can be concluded from these data is the importance of recognizing that learning to think like a nurse is a unique developmental process for each learner, based on their individual backgrounds, rather than assuming that prelicensure nursing students develop in predictable patterns. This has particular implications for educators who work with students in clinical settings (Nielsen, 2016). Like nurses' knowledge of patients benefiting their patients (Tanner et al., 1993), it would behoove clinical faculty or preceptors to be cognizant that students' also have unique backgrounds and life experiences that impact what they notice and how they might interpret what they notice as they develop their clinical judgment.

6. Limitations and strengths of the study

The 532 participants comprised a convenience sample. A study engaging more than one program in each of the three countries and/or other English-speaking countries would likely offer more generalizable findings. A larger study including participants at different levels in their programs would provide a more defined focus on the independent variables.

The survey method did not allow researchers to determine specifically why participants responded to the case study questions as they did. To fully explore participants' answers would require in-depth qualitative approaches, using interviews or focus groups, impractical for a large-scale study. Some of the evaluation questions reported in the learning activity paper indicated that wording of some of the questions or dialogue in the pre-recorded simulation were not always fully understood by students. Many languages were represented across the full sample (31.2% of primary languages other than English). The three site coordinators who reviewed the videorecording and the survey questions before the study have international connections with faculty in other countries and are not as culturally diverse as participants. In retrospect, it is likely that differences in language, terminology, and accents contributed to participants' uncertainty when responding to survey questions following the videorecording. Perhaps students at this stage of learning need more concrete directions or guidance with regard to noticing. Including participants from all three countries in the pilot study may have uncovered them. Providing participants with a written script of the video could have been helpful to clarify words and expressions. There are many other background variables that could have been included. Some include constellation of families of origin, religious faith or affiliation, political position, and a history of adverse childhood events (http://www.childtrends.org/wp-content/uploads/2014/07/Brief-adverse-childhood-experiences_FINAL.pdf). However, these were determined to be disincentives for participation, therefore left out. In retrospect, participants could have been offered the option to answer these questions, or of course, to opt out.

Several strengths of the study are noteworthy. The use of the same learning activity and data collection procedures across multiple international sites allowed for evaluation of a large number of participants while controlling for the human variables and provided internal validity. In addition, all programs' use of the same model (Tanner, 2006) for teaching clinical judgment also conveyed internal validity and allowed for comparisons among programs. The programs offered an extremely diverse sample of student profiles.

7. Conclusion

This study explored the relationship of nursing students'

backgrounds to clinical judgment development. The results suggest that students' backgrounds do impact what participants *Notice* and how they *Interpret* their noticing. However, the results are inconclusive. The process of making clinical judgments is complex as are patients' needs. This first study of student backgrounds' impact on clinical judgment seems to confirm that complexity; Program was a significant variable, suggesting that programs must seek ways to socialize students into their professional roles, congruent with an individual country's scope of practice, demographics, and health priorities. Without the unifying factor of the professional role, backgrounds could be even more diffuse and disparate. Type of Outside Care Experience and Age were factors for some variables but not in ways that indicated patterns. Students' Primary Languages were not generally significant in impacting clinical judgment.

Clinical judgment is not a one-size-fits-all proposition, and clinical judgments are made by nurses with unique backgrounds with individual patients. With this situatedness in mind, it is especially critical that nursing educators and preceptors are aware that students' backgrounds are more influential in their learning than perhaps acknowledged. Indeed, educators and preceptors' backgrounds equally influence their own nuanced practice. Hence, these perspectives in addition to those of the patients and their families, need to be taken into consideration when facilitating students' development of clinical judgment to 'think like a nurse'.

Acknowledgements

The authors gratefully acknowledge the support of an Innovation Grant from Oregon Health & Science University, School of Nursing, Portland, OR, USA.

Special acknowledgement and appreciation for James Heller, MS, who assisted in creating the survey instrument and the data files, as well as the nursing students from Australia, New Zealand, and the US who participated in this study.

References

Adamson, K., Gubrud-Howe, P., Sideras, S., Lasater, K., 2012. Inter-rater reliability of the Lasater clinical judgment rubric: three approaches. J. Nurs. Educ. 51 (2), 66–73. https://doi.org/10.3928/01484834-20111130-03.

Bandura, A., 1997. Self-Efficacy: The Exercise of Control. Freeman, New York.

Berkow, S., Virkstis, K., Stewart, J., Conway, L., 2009. Assessing new graduate nurse performance. Nurse Educ. 34 (1), 17–22. https://doi.org/10.1097/01.NNE.0000343405.90362.15.

Cato, M., Lasater, K., Peeples, A.I., 2009. Student nurses' self-assessment of their simulation experiences. Nurs. Educ. Perspect. 30 (2), 105–108.

Cruz, J.P., Felicilda-Reynaldo, R.F.D., Lam, S.C., Contreras, F.A.M., Cecily, H.S.J., Papathanasiou, I.V., Fouly, H.A., Kamau, S.M., Valdez, G.F.D., Adams, K.A., Colet, P.C., 2018. Quality of life of nursing students from nine countries: A cross-sectional study. Nurse Educ. Today 66, 135–142. https://doi.org/10.1016/j.nedt.2018.04.016.

Gonzalez, L., 2018. Teaching clinical reasoning piece by piece: a concept based clinical reasoning learning method. J. Nurs. Educ. 57 (12), 727–735. https://doi.org/10.3928/01484834-20181119-05.

Hseih, H.F., Shannon, S.E., 2005. Three approaches to qualitative content analysis. Qual. Health Res. 15 (9), 1277–1288. https://doi.org/10.1177/1049732305276687.

Jessee, M.A., Tanner, C.A., 2016. Pursuing improvement in clinical reasoning: development of the clinical coaching interactions inventory. J. Nurs. Educ. 55 (9), 495–504. https://doi.org/10.3928/01484834-20160816-03.

Johnson, E.A., Lasater, K., Hodson Carlton, K., Sideras, S., Siktberg, L., 2012. Geriatrics in clinical simulation: role modeling and clinical judgment effect. Nurs. Educ. Perspect. 33 (3), 176–180.

Kavanagh, J.M., Szweda, C., 2017. A crisis in competency: The strategic and ethical imperative to assessing new graduate nurses' clinical reasoning. Nurs. Educ. Perspect. 38 (2), 57–62. https://doi.org/10.1097/01.NEP.0000000000000112.

Kelly, M.A., Hopwood, N., Rooney, D., Boud, D., 2016. Enhancing students' learning through simulation: dealing with diverse, large cohorts. Clin. Simul. Nurs. 12, 171–176. https://doi.org/10.1016/j.ecns.2016.01.010.

Kelly, M.A., Ashokka, B., Krishnasamy, N., 2018. Cultural considerations in simulation-based education. The Asia Pacific Scholar 3 (3), 1–4. https://doi.org/10.29060/TAPS.2018-3-3/GP1070.

Lasater, K., 2007. Clinical judgment development: using simulation to create an assessment rubric. J. Nurs. Educ. 46, 496–503.

Lasater, K., Johnson, E.A., Ravert, P., Rink, D., 2014. Role-modeling clinical judgment in an older adult simulation. J. Nurs. Educ. 53 (5), 257–264.

Lasater, K., Nielsen, A., Stock, M., Ostrogorsky, T., 2015. Evaluating clinical judgment of newly hired staff nurses. J. Contin. Educ. Nurs. 46 (12), 563–571. https://doi.org/10.3928/00220124-20151112-09.

Mariani, B., Cantrell, M.A., Meakim, C., Prieto, P., Dreifuerst, K.T., 2013. Structured debriefing and students' clinical judgment abilities in simulation. Clin. Simul. Nurs. 9, e147–e155. https://doi.org/10.1016/j.ecns.2011.11.009.

Monagle, J., Lasater, K., Stoyles, S., Dieckmann, N.F., 2018. New graduate nurse experiences in clinical judgment: what academic and practice educators need to know. Nurs. Educ. Perspect. 39 (4), 201–207. https://doi.org/10.1097/01.NEP.0000000000000336.

Nielsen, A., 2016. Concept-based learning in clinical experiences: bringing theory to clinical education for deep learning. J. Nurs. Educ. 55 (7), 365–371. https://doi.org/10.3928/01484834-20160615-02.

Nielsen, A., Lasater, K., Stock, M., 2016. A framework to support preceptors' evaluation and development of new nurses' clinical judgment. Nurse Educ. Pract. 19, 84–90. https://doi.org/10.1016/j.nepr.2016.03.012.

Parker, V., Giles, M., Landry, G., McMillan, M., 2014. New graduate nurses' experiences in their first year of practice. Nurse Educ. Today 34 (1), 150–156. https://doi.org/10.1016/j.nedt.2012.07.003.

Pitt, V., Powis, D., Levett-Jones, T., Hunter, S., 2014. Nursing students' personal qualities: a cross-sectional study. Nurse Educ. Today 34, 1196–1200. https://doi.org/10.1016/j.nedt.2014.05.004.

R Core Team, 2016. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria Retrieved from. https://www.R-project.org/.

Tanner, C.A., 2006. Thinking like a nurse: a research-based model of clinical judgment. J. Nurs. Educ. 45 (6), 204–211.

Tanner, C.A., Benner, P., Chesla, C., Gordon, D.R., 1993. The phenomenology of knowing the patient. Image J. Nurs. Sch. 25 (4), 273–280.

Van Hoek, G., Portzky, M., Franck, E., 2019. The influence of socio-demographic factors, resilience and stress reducing activities on academic outcomes of undergraduate nursing students: A cross-sectional research study. Nurse Educ. Today 72, 90–96. https://doi.org/10.1016/j.nedt.2018.10.013.

Victor-Chmil, J., Larew, C., 2013. Psychometric properties of the Lasater clinical judgment rubric. Int. J. Nurs. Educ. Scholarsh. 10. https://doi.org/10.1515/ijnes- 2012-0030.

Wolff, A.C., Regan, B., Pesut, S., Black, J., 2010. Ready for what? An exploration of the meaning of new graduate nurses' readiness for practice. Int. J. Nurs. Educ. Scholarsh. 7 (1), 7. https://doi.org/10.2202/1548-923X.1827.