ORIGINAL ARTICLE

The alignment of nursing actions to the characteristics of clinical judgement of undergraduate student nurses

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ABSTRACT

Objective: Clinical judgement has long been an important component of safe and effective nursing care. However, despite extensive research being conducted in this area it remains difficult to articulate and observe clinical judgement in action. Nursing actions could reflect the characteristics of clinical judgement, yet this alignment has not previously been reported in the literature.
Aim: The aim of the study was to identify whether the nursing actions performed could be aligned with the characteristics of clinical judgement.
Methods: The setting for this study was a simulation laboratory housing a high-fidelity manikin in a large Australian university. The study used a descriptive method collecting both qualitative and quantitative data. Data was collected using a Multiple-Choice Questionnaire (MCQ), a checklist of nursing actions and associated characteristics of clinical judgement and post simulation interviews were audio recorded.
Results: The nursing actions could be clearly aligned the 12 characteristics of clinical judgement. In this study it was difficult to differentiate between two of the characteristics: experiential knowledge and practical knowledge.
Conclusions: Aligning the nursing actions to the characteristics of clinical judgement could assist in educating students to develop their clinical judgement. The use of aligning nursing actions to the characteristics could be a more accurate way of observing clinical judgement in action.

Key Words: Clinical judgement, Undergraduate student nurses, Characteristics of clinical judgement, Nursing actions

1. INTRODUCTION

In the latter half of the 20th century nursing became more professionalised, and as nursing moved towards a more theoretically based discipline there has been more interest in understanding the cognitive processes used by nurses in their practice.[1–3] Four commonly used cognitive processes described in the literature are critical thinking, clinical reasoning, clinical decision making and clinical judgement. Clinical judgement was used in this study as it is synonymous with the other three cognitive processes sharing key characteristics.[4] The relationship between clinical judgement and the actions nurses take to identify a patient's condition or changes in their condition, intervene when necessary and evaluate their actions are not fully described in the literature. A project was initiated to determine the alignment of nursing actions to the specific characteristics of clinical judgement of student nurses. Two studies were conducted, the first study established consensus of the characteristics of clinical judgement in nursing.[4,5] This paper reports the second study describing the alignment of the nursing actions to the characteristics of clinical judgement of undergraduate student

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nurses using a scenario of a patient experiencing an exacerbation of Chronic Obstructive Pulmonary Disease (COPD) with respiratory difficulties.

1.1 Background

Clinical judgement has long been considered an important aspect of safe nursing care as it assists in the early identification of changes in the patient's condition and is associated with positive patient outcomes.[6–9] Tanner[9] defined clinical judgement as interpreting a patient's needs, deciding to act and modifying the action depending on the patient's responses. Various theoretical models of clinical judgement have been formulated.[10–12] These models are often difficult to operationalise in the classroom or in research.[13] The model most frequently used in research is Tanner's Clinical Judgement Model (CJM).[9] This model was generated from Tanner's research on the cognitive processes exhibited by expert nurses and provides general guidelines and principles underlying clinical judgement but requires a situational context to apply the model in practice. This model has four phases: noticing – with the nurse gathering pertinent information, outlining the initial grasp of the situation; interpreting - the nurse making sense of the data collected; responding - deciding on a course of action based on interpretation of available information and then putting the plan into action; and reflection - evaluating if the action taken was appropriate or not and then adjusting their actions as needed.

It could be argued that a more discrete look at the nursing actions and associated characteristics of clinical judgement in a particular clinical scenario may be a more accurate way of identifying whether student nurses as well as expert nurses are enacting clinical judgement in practice.

1.2 Aim

Utilising the results of our first study which identified and validated 12 characteristics of clinical judgement,[4, 5] the aim of this second study was to align the nursing actions of student nurses to the characteristics of clinical judgement.

2. METHODS

A descriptive study was conducted using qualitative and quantitative data. This provided the opportunity to describe the nursing actions of student nurses in a particular clinical scenario and the associated clinical judgement characteristics displayed by the students.

2.1 Setting

High-fidelity simulation (HFS) provides the context for this study. HFS is the creation of an event, situation or environment that attempts to replicate what nurses encounter in clinical practice.[14–16] In nursing education and research HFS utilises a manikin that has programmable software and has the capability to respond to nursing actions in real time.[17–19]

A large nursing school in an Australian university provided the setting for this study. The study was conducted in a simulation room (SimRoom) housing a High-fidelity manikin (Laerdal® SimMan) within a nursing skills laboratory. The SimRoom is configured to replicate as closely as possible a single patient room in a clinical setting. Participants were observed through a window from an adjacent control room, in which the interviews after the simulation were also conducted.

2.2 Participants

All students enrolled in the second or third semester of their six-semester three-year undergraduate nursing program were invited to volunteer for the study. Participants had all completed a basic anatomy and physiology subject in their first semester of the program. All the students had simulation ward experience where they were taught the skills of performing vital signs, and the initial assessment of a patient with respiratory difficulty. They had not been exposed to HFS and only the second-year (third semester) students had experienced two weeks' clinical practicum.

2.3 Recruitment

Recruitment of participants into the study was conducted by posting a flyer on the School learning management system and noticeboards located within the School. Eligible participants were invited to contact the principal investigator if interested in the study. An information sheet was provided to interested participants. A consent form and demographic survey was then completed by participants. Participants were free to withdraw their consent at any time without penalty to their nursing program. Approval for the project was granted by a Human Research Ethics Committee at the participating university for the study.

2.4 Simulation scenario

The patient scenario for the simulation was related to an 83-year-old female who presented in respiratory difficulty. The patient was experiencing an exacerbation of underlying Chronic Obstructive Pulmonary Disease (COPD). Prior to commencing the HFS scenario session participants were provided with medical and nursing notes that detailed the patient's current condition; a set of baseline observations, (blood pressure (BP) 150/75mmHg; heart rate 115 beats per minute; respiratory rate 36 breathes per minute, and oxygen saturation 88%) and information regarding her medical and social history. The patient's medical notes included the order to give oxygen if the patient's oxygen saturation was less than 92%. At the start of the scenario the simulated patient was

lying flat in bed, coughing and had the same physiological parameters as the baseline observations.

2.5 Procedure

The HFS session was conducted with individual participants. Prior to the HFS a multiple-choice questionnaire (MCQ) test was administered in the control room adjoining the simulation room (SimRoom) with the researcher absent from the room while the participant completed the test. There was no time limit on the completion of the test, and all participants took between 10-15 minutes to complete the task. Each participant was then taken into the SimRoom which contained one bed and a high-fidelity manikin and orientated to the room, equipment and the manikin. They were allowed time to familiarise themselves with the room and equipment with all participants taking between 5-10 minutes before indicating they were ready for the simulation session to commence.

Once the participant indicated they were ready the scenario commenced which was indicated by the simulated patient "coughing" and complaining of "not feeling well". The outcome of the nursing actions performed by the participants indicating clinical judgement can be seen in Table 1.

2.6 Data collection instruments

The instruments used for the data collection were a student demographics survey, a multiple-choice question (MCQ) test to identify theoretical knowledge related to patient with COPD, a data log to record time for commencement of each nursing action and a nursing action checklist used to record the presence or absence of the expected nursing actions related to specific characteristic of clinical judgement. Observational data were recorded as field notes and post simulation interviews were digitally recorded.

2.6.1 *Student demographic survey*

The survey was administered to all participants. They were asked to state their age, their year of study, if they had any previous experience of HFS and if so what that experience entailed. Finally, they were asked to record any previous clinical experience. The survey took between 5 to 10 minutes to complete.

2.6.2 *Multiple Choice Question Test (MCQ)*

The theoretical knowledge of the students in relation to COPD was measured using the MCQ test. The MCQ test was constructed by the researchers specifically for the study. Initially 15 items were formulated, which were reviewed by a panel of six academics including all four researchers, an expert in respiratory nursing and an expert in nursing education. Five of the items were excluded as deemed not relevant by the panel, which resulted in ten items administered to the students. The items were formulated using guidelines developed by the Lung Foundation of Australia COPDx.[20]

The final MCQ survey consisted of ten items which tested the students' knowledge of the underlying pathophysiology related to a patient with an acute exacerbation of COPD, the normal ranges for identified vital signs, the planning of care and evaluation of care given.

2.6.3 *Nursing actions associated with the characteristics of clinical judgement checklist*

Participants were observed for the presence or absence of the expected nursing actions associated with the specific characteristics of clinical judgement using a checklist. The checklist of the nursing actions associated with the characteristics of clinical judgement as provided in Table 1.

2.6.4 *Observer field notes and interviews*

Observation of the participant's performance of the expected nursing actions within the simulation session was recorded in field notes by the researcher. Following each HFS, an audio-recorded face to face semi structured reflective interview was conducted by the researcher with each participant. Participants were encouraged to provide rationales for their chosen actions, to reflect on the appropriateness of their interventions and to identify areas of deficit in their knowledge. The interviews for each participant continued until no new data was apparent which lasted on average around 10 minutes.

The time taken to initiate the nursing actions which reflected the Airway, Breathing, Circulation algorithm and Chronic Obstructive Pulmonary Disease treatment guidelines (listed in Table 1) as well as overall time in seconds in the scenario were recorded in the Laerdal® program and then entered onto an excel spreadsheet. These timings were used to identify the sequence of the actions performed.

2.7 Data analysis

Quantitative data were recorded on an excel spreadsheet, each participant was assigned a code to protect anonymity and data were aggregated for analysis. The data were checked for errors and missing values with nil missing data identified. Demographic data was tallied, and frequencies and percentages were calculated.

The debriefing interviews were transcribed verbatim by a professional transcription service and then checked for accuracy by the researcher against the original data recording. Once satisfied with the accuracy the data was thematically analysed to search for patterns and meanings among the participants.

3. RESULTS

3.1 Student demographics

The sample (N = 18 participants) were predominantly female accounting for 89% (N = 16) with a mean age of 29.9 (*SD* 10.4) years. First year participants comprised 44% (N = 8). Second year participants 56% (N = 10). Only one participant (0.06%) had previous experience with a simulation session, and this was as a medic in a simulation that focused on basic life support.

Alignment of nursing actions to characteristics of clinical judgement Table 1 outlines the number of students (%) who completed the relevant nursing actions aligned to the characteristics 1-12.

Table 1. Characteristics of CJ aligned to nursing actions as observed in the participants in the study

	Characteristic of CJ	Nursing action completed by the participants	% of Participants (No of participants) completing the action	Timing to initiate action in seconds
1	Context dependent	Set by the provision of patient notes and relevant paperwork	100% (N = 18) All participants read the relevant paperwork	
2	Theoretical Knowledge	Completion of multiple choice questions	See results Table 2	
3	Experiential knowledge	Completion of vital signs without prompting	100% (N = 18)	Vital Signs 67
4	Practical knowledge	Completion of vital signs without prompting	100% (N = 18)	Vital Signs 67
5	Data Collection of data/Interpretation of patient's needs/prioritizing data	Obtaining vital signs: oxygen saturation measurement of BP Respiratory rate – depth and rate of breathing, patient's colour	100% (N = 18)	Vital Signs 67
6	Culminates in a clinical decision	Positioning patient upright Administering oxygen Call for help	94% (N = 17) 94% (N = 17) 17% (N = 3)	Positioning patient 61 Administer oxygen 89 Call for help
7	Safe patient/client care	Positioning patient Administering oxygen Infection control – washing hands	94% (N = 17) 94% (N = 17) 39% (N = 7)	
8	Systematic process	Follow the ABC algorithm Checking airway Breathing Circulation	100% (N = 18)	
9	Pattern recognition	Obtaining vital signs – oxygen saturation, measurement of BP Respiratory rate – depth and rate of breathing, patient's colour and responding to the patient's initial statement of having difficulty breathing	100% (N = 17) 61% (N = 11)	
10	Reflection	Reflection-on-action – demonstrated during the interviews Reflection-in-action- reassessment of the oxygen saturation and then increasing oxygen flow rate when saturations remained low	78% (N = 14) 50% (N = 9)	
11	Evaluation of choices made	Reassessment of the oxygen saturation and then increasing oxygen flow rate when saturations remained low	50% (N = 9)	
12	Culminates in a management plan	Stating during the interviews of a plan for the patient going forward	28% (N = 5)	

Characteristic 1: Context

The context was set by the researcher with the development of a scenario and the provision of patient notes and relevant paperwork with all participants reading these prior to commencement of the scenario.

Characteristic 2: Theoretical knowledge

The results of the MCQ provide a summary of the theoretical knowledge of the participant group and is displayed in Table 2. In MCQ item 1 (physical assessment), 56% (N = 10) of the students chose the correct response. Item 2 (signs

and symptoms of hypoxia) 50% (N = 9) selected the correct response. Item 3 (pathophysiology), 44% (N = 8) of the student's responses chose the correct response. Item 4 (normal vital signs) all students 100% (N = 18) selected the correct response.

Table 2. Performance of the participants to MCQ questions related to characteristics of CJ, correct answer highlighted in bold

MCQ Question	% (No of participants) answering each questions	Characteristics of Clinical Judgement
During the admission assessment of Mrs Camden, the nurse should initially		Context dependent Interpretation of patient/client needs Knowledge based on experience Knowledge based on practice Knowledge based on theory Pattern recognition and synthesis
a) Perform a health history	28% (N = 5)	
b) Complete a full physical examination	17% (N = 3)	
c) Ask family members about the patient's history of respiratory problems	0%	
d) Perform a physical assessment of the respiratory system	56% (N = 10)	
The nurse assesses Mrs Camden for hypoxia. Which of the following are signs or symptoms of hypoxia		Context dependent Interpretation of patient/client needs Knowledge based on experience Knowledge based on practice Knowledge based on theory Pattern recognition and synthesis
a) Agitation, tachypnoea, restlessness	50% (N = 9)	
b) Agitation, bradycardia, restlessness	6% (N = 1)	
c) Bradycardia, restlessness, tachypnoea	33% (N = 6)	
d) Restlessness, agitation, bradycardia	11% (N = 2)	
On examination of Mrs Camden, the nurse recognises the dyspnoea that she is exhibiting is related to		Interpretation of patient/client needs Systematic process Knowledge based on theory
a) collapse of small airways	17% (N = 3)	
b) narrowing of small airways	44% (N = 8)	
c) narrowing of large airways	22% (N = 4)	
d) collapse of alveoli	17% (N = 3)	
What is the normal range of O_2 saturation measured via a pulse oximeter?		Interpretation of patient/client needs Systematic process Knowledge based on theory
a) 95% - 100%	100% (N = 18)	
b) 90% - 95%		
c) 85% - 90%		
d) 80% - 85%		
The nurse evaluates the effectiveness of the initial treatment provided to Mrs Camden. The finding that indicates she is improving is		Culminates in a clinical decision Culminates in a nursing management plan Evaluation of choices made, and actions taken Reflective process
a) increased respiratory rate	28% (N = 5)	
b) decreased respiratory rate	61% (N = 11)	
c) increase in heart rate	11% (N = 11)	
d) decrease in heart rate	0%	
Mrs Camden's respiratory rate is 36 breaths per minute. From this the nurse's understanding is that she has which of the following		Interpretation of patient/client needs Systematic process Knowledge based on theory
a) decrease CO_2 in the blood	11% (N = 2)	
b) an increased CO_2 in the blood	56% (N = 10)	
c) decrease O_2 in the blood	33% (N = 6)	
d) increase O_2 in the blood	0%	
As Mrs Camden is experiencing an acute exacerbation of COPD, she is severely short of breath as a result of airflow obstruction. The best action by the nurse is to		Culminates in a clinical decision Culminates in a nursing management plan Evaluation of choices made, and actions taken
a) administer bronchodilator medications	6% (N = 1)	
b) perform chest physiotherapy	0%	
c) administer oxygen at 5L/min	44% (N = 8)	
d) position the patient upright	50% (N = 9)	
Which oxygen delivery system Mrs Camden be most likely to be prescribed?		Interpretation of patient/client needs Systematic process Knowledge based on theory
a) Partial re-breather mask	11% (N = 2)	
b) Re-breather mask	11% (N = 2)	
c) Simple face mask	50% (N = 9)	
d) Venturi mask	28% (N = 5)	
The most common finding in patients such as Mrs Camden with COPD include		Context dependent Interpretation of patient/client needs Knowledge based on experience Knowledge based on practice Knowledge based on theory Pattern recognition and synthesis
a) cyanosis, shortness of breath and productive cough	50% (N = 9)	
b) marked dyspnoea, weight loss and anorexia	6% (N = 1)	
c) productive cough, fever and night sweats	11% (N = 2)	
d) wheeze on inspiration and nasal flaring	33% (N = 6)	
What observations should you implement following the application of oxygen delivery systems?		Reflective process
a) Arterial blood gases and breath sounds	22% (N = 4)	
b) Change in respiratory rate and level of consciousness	67% (N = 12)	
c) Breath sounds and reflexes	6% (N = 1)	
d) Pulse oximetry and heart sounds	6% (N = 1)	

Item 5 (evaluating treatment) 61% (N = 11) selected the correct response. Item 6 (pathophysiology), 56% (N = 10) chose the correct response. Item 7 (nursing actions), 50% (N = 9) selected the correct response (positioning a patient first). Item 8 (selection of mask) 50% (N = 9) of participants chose the correct response. Item 9 (signs and symptoms) 50% (N = 9) of participants selected the correct response and in the last item (oxygen delivery observations) 67% (N = 12) of participants' students selected the correct response (change in respiratory rate and level of consciousness).

Characteristic 3: Experiential knowledge

Participants were in the second or third semester of their Bachelor of Nursing program. All participants had simulated clinical skills experience on site at the university, however 56% (N = 10) also had clinical practicum (see student demographics). The experiences provided to the participants in this study had included 10 hours practicing the performance of vital signs which included pulse oximetry and three hours dedicated to the response required in caring for a breathless patient, positioning a breathless patient up and applying oxygen. They have not had a focus on the care of a patient with respiratory ill health.

Characteristic 4: Practical knowledge

All participants had received previous instruction in vital signs (measuring blood pressure, respiratory rate and pulse oximetry) and to identify whether these are within normal ranges. During the HFS session participants were observed to measure and accurately record the results obtained. Participants had been also been instructed in assessing patients using the ABC algorithm and as part of this they had been instructed in procedures to initiate for a patient is experiencing breathing difficulty.

Characteristic 5: Collection of patient data, interpretation of these and prioritising data

At the debriefing students were asked to identify why they decided the patient was experiencing respiratory difficulties with all participants (100% N = 18) identifying the appropriate patient data indicating respiratory distress (decreased oxygen saturation, increased respiratory rate, patient coughing and complaining of being breathless). One participant (AG) stated *"I could see that Mrs. Camden's vital signs were pretty high, the oxygen saturations were low, her blood pressure was high, and her pulse was high"*; another participant (EH) stated *"she had such a high heart rate and respiratory rate and obviously struggling to breathe"*.

Characteristic 6: Culmination in a clinical decision

With the expected nursing action of positioning the patient to alleviate the patient's discomfort 17 of the 18 participants performed these actions. The only participant who did not position the patient acknowledged that *"I should have sat them up"* (Participant HW).

Positioning the patient upright was the first priority for 11 of the 18 participants and a second priority for three participants and third priority for three participants. Administering oxygen was a first priority for two participants and a second and third priority for seven participants respectively. The decision to administer oxygen therapy was performed by 94% (N = 17), and of these 61% (N = 11), performed this as a first action. Participants took between18 seconds and 300 seconds and the participant who took 300 seconds initiated a respiratory assessment (listening to patient's chest) prior to applying oxygen. Five participants undertook measuring vital signs as their first priority, nine participants as their second priority and four performing these as their third. Only three participants called for help and this was their fourth priority (see Table 3).

Not all participants completed all the expected nursing actions related to this characteristic with only 17% (N = 3) making the decision to call for help once they had completed what they could do for the patient. In the debriefing the reason participants gave for not seeking assistance was they were not sure whether the patient needed a Medical Emergency Team (MET) or whether they should just mention it to their supervisor.

Characteristic 7: Safe practice

Positioning the patient, applying the oxygen mask and administering the oxygen without causing harm to the patient, demonstrated safe practice.

Characteristic 8: Systematic approach

All participants were observed to adopt a systematic process by following the ABC algorithm while collecting relevant data identifying the patient was having breathing difficulties before performing a set of vital signs. At debriefing students were asked to identify how they assessed the patient with one participant (JF) stated *"I'd be going through my ABC, basically, that whole list, I'd be like, airway, breathing, this is why I made the call"*.

Characteristic 9: Pattern recognition and synthesis

When questioned what indications there that were identified the patient was having breathing difficulties, 61% (N = 11) participants indicated vital signs as well as the patient's declaration of feeling breathless, identifying cyanosis (the manikin had a blue light shining in the corner of its mouth)

and observing for the depth respiration. One participant (NT) stated *"She's pale, she's cyanosis around the mouth — and that makes you think about it. And you know that if you don't get enough oxygen in you start to go blue"* and another participant (RGJ) stated *"use my previous knowledge of what I could do about it, since knowing it's a COPD. Like I have a little bit of an idea of what to do"*. Participant (JF) stated *"I would also be watching the level of consciousness and seeing if they're talking to me or not. And if they start losing consciousness then maybe they're getting too much of the O2 in their blood there and maybe we'll dial it back a little bit"*. Participant (TK) stated *"well the patient started coughing and just knowing that she had problems with previous respiratory issues in case notes"*, another participant (EC) stated *"And there have been times when I've been at work and I've noticed what's going on with people that have emphysema"*.

Table 3. Priorities of nursing actions performed by participants

Nursing Action	Priority of action undertaken	% of Participants (No)
Positioning patient	First priority	61% (N = 11)
	Second priority	17% (N = 3)
	Third priority	17% (N = 3)
Completion of Vital signs	First priority	28% (N = 5)
	Second priority	50% (N = 9)
	Third priority	22% (N = 4)
Administration of Oxygen	First priority	11% (N = 2)
	Second priority	39% (N = 7)
	Third priority	39% (N = 7)
Call for help	First priority	0
	Second priority	0
	Third priority	0
	Fourth priority	17% (N = 3)

Characteristic 10: Reflective practice

This characteristic was divided into reflection-on-action and reflection-in-action. In the HFS 74% of participants (N = 14) reflected on their actions during the debriefing phase and identified areas where they could improve, with one participant (AW) said *"I kept replaying what I was doing and then thinking about ways that I would swap or change, so that I wouldn't do that again"*, another (AG) stated *"I had a real think about what I could do if anything obviously happened potentially in the future"*. In response to why participant AA positioned the patient in a semi fowler's *"At a hospital situation I'd sit them completely up, 100% upright. But being that she's frail and older and I wasn't sure whether or not they get sat all the way up or if they just come up semi-fowlers until the doctor sees them. So that's why I did semi". Participant (TK) stated" Tried to stay close to the patient, too, to provide a bit of comfort. It can be very scary when you can't breathe"*.

Fifty percent of participants (N = 9) reflected-in-action by increasing the patient's oxygen flow rate to improve patient saturation. On questioning during the debriefing, the reason for increasing the oxygen flow rate one participant (AG) stated *"because her condition deteriorated, and I felt that she needed more oxygen. I needed to elevate the level of care I gave her"*, another participant (EH) stated *"It said six litres in the notes, but then I saw no improvement after a few minutes, so I put it up to seven"*.

Characteristic 11: Evaluation of choices made

Fifty percent (N = 9) were observed to alter the oxygen flow rate as the patient's oxygen saturation did not improve.

Characteristic 12: Formulation of a management plan

Only five participants during the debriefing identified a plan of care for their patient. These plans included *"getting a bronchodilator charted and administering these"* (participant FP), *"strategies that I could use to connect with the patient without them having to exert themselves and create any kind of discomfort"* (participant AG & EH), *"include chest auscultation"* (five participants FP, EC, EH, AG & JF) and *"call in the physio, maybe, to help her with postural changes and exercises"* (Participant FP).

4. DISCUSSION

This study has shown that the nursing actions participants enact during a HFS of a patient with COPD can be related to the 12 characteristics of clinical judgement identified by Jacobs et al.[4,5] However, it was difficult to differentiate whether the nursing actions were experiential knowledge or practical knowledge. Perhaps we can consider there are only 11 characteristics that pertain to clinical judgement, combin-

ing both experiential knowledge and practical knowledge. This is the first study to have identified alignment of nursing actions to clinical judgement. Aligning the nursing action/s to the characteristics of clinical judgement can be difficult in the context of nurse education today as often there are large groups of students within an education session and this makes it difficult to observe individual students' actions.

While historically nursing action (skills) protocols have been used extensively in nursing models (e.g. nursing diagnosis, nursing process and task orientated nursing models)[21–23] these have focused on generic skills of nurses and are not linked to specific characteristics of clinical judgement, which may help neophytes to improve this cognitive process. The results emphasise that novices in a profession such as nursing need rules to guide their practice.[24] Therefore, having protocols that align nursing actions to characteristics of clinical judgement may assist students to develop their clinical judgement.

Although positioning a patient was a priority for most students administering oxygen was less of a priority than completing vital signs. As suggested by Shinnick and Woo[25] novices in nursing are efficient at collecting data but often cannot initiate a nursing action to fulfill a clinical judgement. This was also evident in the fact that only three students called for help and as indicated in the interviews they were not confident to do so.

4.1 Limitation of the study

The small sample size for this study limits the generalizability of the results. While the sample size for the quantitative data was small it is a relatively large sample for the qualitative data. Difficulty was experienced in recruiting participants as they had little time out of class time due to outside commitments. Despite different methods of advertising the study, including posting the information sheet to the university's learning management system, posting hard copies throughout the clinical laboratories and providing reminders given in class, these methods only generated a small number of participants. Another possible reason to consider is that the participants were from diverse backgrounds and many students were time poor with financial pressures and commitments outside the university, such as family responsibilities and paid employment which may have affected their decision to participate in this study.

Using HFS made it difficult to visualise some changes in the patient's condition as it is only a simulation and hence there are limitations in terms of reality of the experience. For example, few participants noticed the blue tinge on the manikin lips indicating deoxygenation and therefore this indication of breathing difficulty may not have been easily recognised by participants. This demonstrates that when using HFS orientation of the students to the environment is important.

4.2 Recommendations

In teaching and developing clinical judgement in nurses and students, aligning specific nursing actions to characteristics of clinical judgement may be a useful education aid. The aid could also be incorporated into research that seeks to investigate the usefulness of teaching methods such as HFS in developing clinical judgement. The study has also shown that the participants demonstrated a beginning level of clinical judgement. This should therefore be developed early so that by the end of their educational program they have clinical judgement ability at the advanced beginner level.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

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