



**DEVELOPING AND IMPLEMENTING A PEER MENTORSHIP PROGRAM TO ENHANCE NURSING TECHNICIANS' CLINICAL REASONING SKILLS: A MIXED METHODS STUDY**

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**Abstract**

Clinical reasoning represents a pivotal yet challenging skill for nursing technicians to develop in order to provide safe, high quality care. This mixed methods study implemented and evaluated an intensive 6-month peer mentorship program pairing experienced and novice nursing technicians across medical-surgical units at a tertiary hospital in Saudi Arabia. The curriculum comprised experienced mentors demonstrating clinical reasoning approaches during care, guiding practice, and engaging mentees in reflective discussions during 72 dedicated clinical mentorship sessions. Clinical reasoning skills were assessed pre and post-intervention using validated case vignettes with a 5-point analytic rubric. Qualitative interviews elicited participants' perceptions of the mentorship experience. Results showed significant reasoning skill gains from a mean of 1.9 to 4.1 on the rubric ( $p < 0.001$ ), progressing from novice to proficient levels. Interview themes emphasized enhanced reasoning, confidence, situational awareness, knowledge exchange, and deepened social connections from working closely with trusted peers. However, challenges coordinating busy schedules were noted. Study limitations include the single site and small sample. Overall, intensive peer mentorship shows promise as an applied skills development strategy to strengthen essential clinical reasoning capabilities within this integral healthcare provider group. Further research on efficacy and implementation factors can help refine programs tailored to nursing technicians' learning needs and practice environments.

**Keywords:** clinical reasoning, nursing technicians, peer mentorship, mixed methods

**Introduction**

In the fast-paced, often unpredictable hospital environment, nursing technicians must continually monitor patients, accurately gather and interpret clinical information, synthesize data to prioritize needs, and determine appropriate interventions using sound clinical reasoning skills (Bierman & Daliya, 2020; Levett-Jones et al., 2010). Clinical reasoning represents a defining capability of



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nursing practice that enables provision of safe, high-quality, patient-centered care (Simmons, 2010). It involves complex cognitive and metacognitive processes requiring formal development rather than relying solely on informal on-the-job learning which can foster inconsistent skills (Cappelletti et al., 2014). Structured education programs focused specifically on strengthening reasoning capabilities among nursing technicians grounded in their scope of practice represent a promising yet underexplored approach to equip this integral nursing workforce group with the experiential learning needed to hone such an essential skillset (Levett-Jones et al., 2010; Staun et al., 2010).

One innovative and applied education modality emphasizing hands-on participation, knowledge exchange between novices and experts, and collaborative reflection is peer mentorship (Chen et al., 2015; Dimitriadou et al., 2015). Peer mentorship entails pairing less experienced nurses with seasoned peers who provide coaching and guidance through modeling skills in the practice environment, supervised participation, and shared reflection, offering meaningful situated learning and constructive feedback (Chen et al., 2015). Peer mentorship can facilitate clinical reasoning development through social exchanges, co-learning, and graduated progress through participation in care activities. However, minimal research has examined peer mentorship programs tailored for nursing technicians. Implementing and evaluating a targeted initiative focused on peer mentor interactions and applied reasoning skill development represents a promising approach.

This mixed methods study developed, implemented and evaluated the impacts of a structured 6-month peer mentorship program that paired experienced nursing technicians as mentors with novice peers across medical-surgical units at a tertiary care hospital. The curriculum entailed mentors demonstrating and articulating clinical reasoning in practice, guiding hands-on participation in patient care while verbalizing thinking processes, and engaging mentees in reflective discussions on reasoning approaches during dedicated one-on-one clinical mentorship sessions over 72 shifts. Clinical reasoning skills were assessed through case vignettes before and after the peer mentorship program along with qualitative interviews examining participants' perceptions of the experience. The study aimed to provide insights into the potential benefits as well as design considerations for peer mentorship approaches to strengthen essential clinical reasoning capabilities within the nursing technician workforce integral to patient care delivery and outcomes.

## **Background**

### **Clinical Reasoning in Nursing Practice**

Clinical reasoning represents an essential way of thinking and decision-making that enables nurses to provide safe, high quality, evidence-based care tailored to patients' changing needs (Simmons, 2010). It moves beyond basic critical thinking to encompass the complex cognitive processes that nurses utilize to thoroughly gather, interpret and synthesize objective information and subjective insights about patients while also considering the context to determine the clinical

significance, plan effective interventions, and evaluate outcomes (Simmons et al., 2003; Victor-Chmil, 2013). Fundamentally, clinical reasoning allows nurses to identify patient care priorities and determine appropriate actions (Cappelletti et al., 2014).

Clinical reasoning is both a cognitive and experiential process centered on identifying, analyzing and addressing patient care problems that develops over time with practice in varied situations (Levett-Jones et al., 2010; Simmons et al., 2003). Proficient reasoning requires nurses to move fluidly between analytical processes assessing objective data to gain patient insights, intuitive or implicit understanding drawing on experiences, narrative thinking focusing on patients' subjective stories, and ethical aspects evaluating best options (Cappelletti et al., 2014; Levett-Jones et al., 2010). Through sound reasoning nurses are able to provide holistic, collaborative, patient-centered quality care (Simmons, 2010). However, clinical reasoning represents a cognitively complex skillset traditionally developed informally through nursing practice experience on the job without structured training, which can lead to inconsistent capabilities (Cappelletti et al., 2014; Levett-Jones et al., 2010). More formal reasoning-focused education programs grounded in nurses' scopes of practice are needed.

### **Relevance for Developing Nursing Technicians' Clinical Reasoning**

Nursing technicians comprise a central pillar of hospital nursing care, spending extensive direct time with patients that requires continually monitoring status, gathering and interpreting data, using discretionary judgement, reporting changes, and enacting interventions (Sellers et al., 2018; Wilson et al., 2015). Their frontline presence and responsibilities make nursing technicians' clinical reasoning abilities crucial for recognizing patient changes early, setting priorities, and engaging in appropriate and timely actions to promote positive outcomes (Bierman & Daliya, 2020; Staun et al., 2010). However, the task-oriented nature of many technicians' roles coupled with variable educational preparation beyond basic fundamentals can leave reasoning skills underdeveloped (Sellers et al., 2018; Wilson et al., 2015).

While clinical reasoning represents an essential nursing capability, literature examining reasoning skills and targeted reasoning education programs tailored for the nursing technician role remain sparse (Staun et al., 2010; Victor-Chmil, 2013). Staffing challenges further constrain time for intensive on-the-job coaching. Implementing structured supplemental development initiatives focused on applied reasoning skill-building can help fill this gap through situated learning grounded in techniques, conditions and challenges authentic to technicians' practice settings (Levett-Jones et al., 2010; Staun et al., 2010). Mentorship programs represent one emerging reasoning-focused education modality requiring further research on impacts and effective design for technicians.

### **Conceptual Framework**

This study was guided by Patricia Benner's influential novice-to-expert model describing progressive levels of clinical expertise developed through hands-on clinical experience moving

from reliance on abstract principles to concrete experience-based reasoning, along with tenets of social learning theory emphasizing exchanges between observers and models (Bandura, 1977; Benner, 1982). Technicians develop clinical reasoning skills over time through graduated participation in patient care scenarios imposing escalating cognitive demands, allowing tacit knowledge accrual, pattern recognition, intuitive links between interventions and outcomes, and fluidity in analytical and narrative thinking (Benner, 1982; Levett-Jones et al., 2010). Social exchanges with clinical experts who provide coaching and constructive feedback accelerate knowledge transfer and behavioral capability gains (Bandura, 1977). Peer mentorship draws on these theoretical foundations, facilitating graduated skill development through observation of and joint participation in care with seasoned peers while also offering an authentic social context for collaborative learning (Chen et al., 2015).

## **Methods**

### **Study Design and Setting**

This mixed methods study implemented and evaluated a structured peer mentorship program focused on developing clinical reasoning skills between experienced and novice nursing technicians. The study setting comprised four medical-surgical nursing units within King Abdulaziz Hospital, a 1000-bed tertiary academic center in Jeddah, Saudi Arabia. Approvals were obtained from the institutional review boards prior to initiating the study.

### **Intervention: Peer Mentorship Program Curriculum**

An intensive peer mentorship program was implemented over a 6-month period pairing 8 novice nursing technicians who had less than 6 months experience with 8 experienced peers who had a minimum 5 years of knowledge and demonstrated expertise. Dyads were matched based on aligned shift schedules and clinical specialty areas to allow optimal interactions. The curriculum entailed at least 72 hours of one-on-one dedicated mentorship sessions between pairs integrated into standard 12-hour shifts, providing sustained opportunities for joint learning and reasoning skill development. During sessions, mentor technicians modeled clinical reasoning by verbalizing their thinking processes while providing care, guided hands-on skill participation under close supervision, assigned graduated responsibilities to stretch mentees' expertise as appropriate, and facilitated reflective discussions before, during and after care activities using guiding prompts and questions to stimulate analytical thinking on decisions and reinforce learning. Additionally, mentors provided feedback on reasoning approaches, answered questions that arose, coached mentees through progressively more complex patient problems, reviewed challenging experiences to identify reasons behind actions, assigned mentees to research evidence informing care choices, and offered encouragement to stimulate confidence and self-efficacy. Mentorship sessions emphasized facilitating conceptual knowledge transfer regarding clinical reasoning and developing tacit skills through graduated guided participation in authentic patient care activities intensifying cognitive challenge.

## Sample

A convenience sample comprising 8 nursing technician mentors and 8 mentees for a total of 16 participants was recruited for the study across the participating nursing units based on the eligibility criteria. Nursing technicians were eligible to participate as peer mentors if they had a minimum 5 years of clinical experience as a technician, demonstrated habits of sound clinical reasoning per supervisor recommendations, and were interested in teaching/coaching peers. Nursing technicians were eligible as mentees if they had been in practice for 6 months or less following fundamental orientation. The sample size allowed for in-depth qualitative data while remaining feasible for an intensive longitudinal intervention within a hospital setting. The sample included predominantly female participants mirroring the nursing technician workforce demographics.

## Data Collection

Clinical reasoning skills were quantitatively evaluated prior to initiating the peer mentorship curriculum and again after the 6-month intervention using 5 simulated patient case vignettes developed through a standardized process guided by experts that incorporated common and escalating acuity scenarios relevant to medical-surgical nursing technicians. The vignettes required participants to explain their interpretation of the situation, priorities for care, and planned actions. Responses were recorded and graded by blinded assessors using a validated analytic rubric providing ratings from 1-5 corresponding to clinical reasoning expertise levels ranging from novice to expert (Levett-Jones et al., 2010).

Additionally, qualitative data was gathered through one-on-one semi-structured interviews approximately 30 minutes in length with each participant after completing the program to elicit perspectives on and experiences with the peer mentorship approach. The interviews were conducted using an exploratory question guide focused on perceptions of impact on reasoning skills, benefits and challenges of peer mentorship for learning, and recommendations. Dialogues were audio recorded and transcribed verbatim.

## Analysis

The clinical reasoning skills scores derived from the case vignette rubric were analyzed using descriptive statistics and paired t-tests to assess pre-post intervention differences at a significance level of  $p < 0.05$ . For the qualitative interview data, Braun and Clarke's thematic analysis approach guided coding and identification of overarching themes encompassing participant perspectives on peer mentorship for reasoning development using NVivo 12 software (Braun & Clarke, 2006). Data analysis stayed close to participants' own language and experiences.

## Ethical Considerations

Ethical approvals were secured from institutional review boards prior to conducting the study. All participants provided voluntary written informed consent. Principles of privacy,

confidentiality and respect were maintained throughout data collection and analysis. Participation in the peer mentorship curriculum was arranged to align with normal work schedules as possible to prevent undue burden. Identifiers were removed from transcripts and pseudonyms used for qualitative narrative examples to protect participant identities.

## Results

### Sample Characteristics

The sample comprised 8 nursing technician mentors and 8 nursing technician mentees for a total of 16 participants. Among the 8 peer mentors, the mean years of experience was 8.2 years, ranging from 5-12 years. The group of mentees as expected had minimal experience, with a mean of 3.5 months in practice, ranging from 6 weeks to 6 months. There were 14 female participants and 2 male participants, closely aligning with nursing technician workforce gender distribution.

### Clinical Reasoning Scores

Results from the simulated patient case vignette rubric ratings demonstrated notable gains in clinical reasoning skills among the mentees from baseline prior to the peer mentorship curriculum to post-intervention assessment. The mean clinical reasoning score increased from 1.9 at baseline, corresponding to a novice level of reasoning expertise, to 4.1 after the 6-month peer mentorship program, indicating progression to proficient clinical reasoning skills. Using a paired samples t-test, the pre-post score improvement was statistically significant ( $p < 0.001$ ). Additionally, the experienced peer mentors also described perceiving enhancements in their own reasoning skills through the activities of coaching, guiding, explaining and providing feedback to novice technicians.

### Qualitative Themes

Inductive thematic analysis of the qualitative interview transcripts yielded four predominant themes regarding participants' perceived benefits of the peer mentorship approach for developing clinical reasoning capabilities:

#### 1. Knowledge and skill gains from trusted experts

Both novice mentees and seasoned mentors noted that the opportunity to observe and jointly participate in care activities with nurses with extensive experience they knew and trusted facilitated significant gains in reasoning knowledge, analytical abilities, intuition, and overall clinical skills. The social connections enhanced openness to learning. As one novice mentee described:

“I learned so much practical knowledge from my mentor that classes didn't teach. Having someone experienced right with me showed how good reasoning helps make decisions.”

#### 2. Improved analytical skills through modeling

Mentees emphasized how mentors' real-time verbalization of their clinical reasoning while providing patient care enabled demystifying of the detailed thinking processes and provided a framework to emulate. Watching mentors synthesize subtle patient cues strengthened their own skills in analyzing and responding to changes. One mentee stated:

"Hearing how my mentor walked through each step of assessing what a situation means and what to do let me learn how to think more thoroughly before acting."

### **3. Confidence gains through guided practice**

Mentees reported substantially increased confidence in their reasoning abilities through the active practice, graduated responsibilities, and coaching guidance within a safe learning environment. Concrete experience with escalating reasoning demands alongside supportive mentors enabled mentees to tackle increasingly complex patient situations. One noted:

"My confidence grew so much. My mentor let me try making assessments and plans with support so I learned I can use good reasoning."

### **4. Deepened social connections and outlooks**

Both novice mentees and seasoned mentors described developing meaningful collegial bonds and two-way perspective exchange through the sustained immersive interactions. The relationships enhanced openness to giving and receiving feedback and fueled ongoing peer learning. As one mentor stated:

"Mentoring helped me further improve my own thinking by considering different angles brought up by mentees."

However, challenges coordinating busy patient care schedules for consistent sessions emerged as an implementation barrier requiring continued attention.

## **Discussion**

Clinical reasoning represents an essential way of thinking for nurses across all roles that enables delivery of safe, high quality care through sound judgement and actions tailored to patients' evolving needs (Levett-Jones et al., 2010; Simmons et al., 2003). Reasoning combines analytical objective data collection and interpretation with narrative thinking and intuition gained through clinical experience (Levett-Jones et al., 2010). However, literature on formally developing clinical reasoning has predominantly focused on registered nurses and nurse practitioners, with minimal evidence on interventions tailored for nursing technicians comprising a crucial segment of the healthcare workforce, representing an important knowledge gap (Staun et al., 2010; Victor-Chmil, 2013).

This mixed methods study provided initial evidence that an intensive 6-month peer mentorship program pairing novice technicians with experienced peers shows promise as an applied education modality to significantly strengthen clinical reasoning skills grounded in nursing

technicians' actual practice settings and responsibilities. The statistically significant improvement on the clinical case vignette ratings from novice to proficient levels reinforces that reasoning can be enhanced through immersive guided participation in authentic patient care scenarios that impose graduated cognitive demands within a supportive social learning context (Bandura, 1977; Benner, 1982). The qualitative themes further underscore peer mentorship benefits for reasoning including contextual knowledge transfer from trusted experts, improved analytical abilities through modeling, confidence gains enabling progressive autonomy, and two-way professional growth through sustained collaborative interactions and reflection.

However, study limitations included the small sample size from a single institution and the lack of a control group without the mentorship intervention. Self-reported perceived gains also have inherent subjectivity. Broader implementation studies are needed to substantiate results. Additionally, coordinating intensive daily mentorship amidst busy, unpredictable hospital workflows posed challenges indicating logistics require continued attention. Overall, this study provides preliminary evidence and a curriculum model that can guide additional research on peer mentorship programs as a promising dedicated education modality focused specifically on advancing the pivotal capability of clinical reasoning among nursing technicians integral to achieving safe patient outcomes. Fostering sound reasoning across all members of the care team through targeted initiatives can enhance nursing practice.

## **Conclusion**

Clinical reasoning represents an essential thinking and decision-making skill for nursing technicians to recognize changes in patient status early, determine priorities, and make judgments leading to prompt, appropriate interventions that prevent adverse events and enhance outcomes. However, reasoning skills have traditionally developed informally on-the-job without structured training potentially leading to uneven capabilities. This mixed methods study demonstrated that an intensive peer mentorship program pairing novice technicians with experienced peers shows promise for significantly improving clinical reasoning based on pre-post skill assessments and participant interviews emphasizing benefits of hands-on modeling, knowledge exchange, confidence-building, and deepened peer exchange. Peer mentorship grounded in nurses' actual practice environments enables socialized gradual skill progression from concrete experiences with escalating reasoning complexity alongside trusted experts. Study limitations indicate further research is needed. However, findings provide initial evidence and considerations to shape peer mentorship programs focused specifically on advancing this foundational capability within the large yet often inadequately supported nursing technician workforce. Tailored reasoning development initiatives hold meaningful potential to equip technicians with expertise that profoundly impacts patient care quality and safety.

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