Assignment 1: PICOT/Critiques

Matthew S. Nelson, RN

Minnesota State University: Mankato

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Norma Krumwiede, EdD, RN

Assignment 1: PICOT and Critiques

Deep vein thrombosis (DVT) is a preventable complication of critical illness as an emboli from DVT may cause a life-threatening stroke or pulmonary embolism. Intensive Care Unit (ICU) patients who are mechanically ventilated are at a greater risk for development of DVT due to immobility resulting from illness severity and mobility restrictions usually associated with mechanical ventilation (MV) (Hong et al., 2013, p. 1840). Hong et al. (2013) found that without prophylaxis, one in nine (11.1%) ICU patients develops a DVT within two days of admission. Being that greater than 10% of ICU patients will likely develop a DVT in just two days without intervention, it is of utmost importance to determine which interventions are the most effective, feasible to implement, and preferential to the patient. The purpose of this assignment is to consider literature on the relative efficacy and benefits of two such interventions – sequential compression device (SCD) therapy (a standard of care) and early mobilization.

**Theoretical Framework and EBP Model 8 points**

Florence Nightingale postulated that a patient’s inherent reparative powers are facilitated by the physical, psychological, and social environments (“Nursing Theories”, 2011). With its holistic nature, Nightingale’s nursing theory was ahead of its time. Early mobilization capitalizes on interaction with these three environments, while SCD therapy leaves the patient in a passive state. Through early mobilization, the patient interacts with their physical environment, is rewarded psychologically with at least a limited sense of control over their experience and is actively engaging socially with others.

The evidence-based practice (EBP) model chosen to inform this project is the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model (Melnyk & Fineout-Overholt, 2019, p. 413-414). This model begins with curiosity about best practices for addressing an issue. Identification of the issue triggers the process of forming a practice question, gathering and screening evidence, and translating evidence to practice, summarized by the acronym PET shown in Figure 1.

Figure 1

*Johns Hopkins EBP Process*

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| --- | --- | --- | --- |
| Initial | Term | Description | Actions |
| **P** | Practice | PICOT Question | Formulating the question, choosing a leader and an interdisciplinary team. |
| **E** | Evidence | Gathering, screening, summarizing, synthesizing | Evaluating the cumulative strength of evidence, then making one of four recommendations:  initiate change, pilot program, additional research, discontinue project. |
| **T** | Translation | Putting evidence into practice | Considering feasibility of recommended practices, making an implementation plan, and putting it into action. Evaluating and sharing results. |

This model follows a straight-forward process with ten accompanying tools to guide each stage of implementation (Melnyk & Fineout-Overholt, 2019, p. 413).

**PICOT Question/ PICOT Format-2 points**

Sequential compression device therapy is a standard of care for prevention of DVT. SCD use is often coupled with pharmacological prophylaxis, such as, subcutaneous heparin injections. Although they are effective in prevention of DVT, both measures come with undesirable effects. Heparin injections often cause bruising. SCDs add to the list of tethers that hinder mobility and comfort and may be refused by patients who don’t perceive any immediate benefit. For these reasons and others, patients may prefer other options. Early mobilization engages patients with their environment actively and has been shown to decrease ICU and hospital length of stay, duration of MV, and occurrence of delirium (Dirkes & Kozlowsi, 2019, p. 34). Early mobilization is proposed as another option for DVT prevention. The PICOT question is as follows:

In critically ill mechanically ventilated adult patients, how does early mobilization compared with sequential compression device therapy affect incidence of deep vein thromboses?

**Search Parameters/Article Retrieval 8 points**

For the purposes of this study, articles included were retrieved online from medical, nursing and psychology databases. Relevant search terms included: deep vein thrombosis, DVT, sequential compression device, early mobilization, and mechanically ventilated. Search was limited to full text, peer reviewed articles published within the last ten years. Scholarly databases searched include PubMed, CINAHL, Cochrane Database of Systematic Reviews (Cochrane DSR), and PsychInfo. The resulting number of relevant articles from the databases, relative to the tailoring process of search terms and filters utilized to find the most relevant results are depicted in Table 1.

Table 1

*Parameters for Evidence Search*

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| --- | --- | --- | --- | --- |
| **Keyword** | **PubMed** | **CINAHL** | **Cochrane DSR** | **PsychInfo** |
| Deep Vein Thrombosis OR DVT AND Sequential Compression Device | 161 | 8,318 | 8 | 215 |
| Full Text/English Language | 18 | 1,865 | 8 | 205 |
| Publication Date 2009-2019 | 10 | 1,252 | 2 | 151 |
| DVT prevention\*AND Sequential Compression Device | 6 | 201 | 1 | 37 |
| DVT Prevention\* (TI) AND Sequential Compression Device (TI) | 0 | 12 | 1 | 2 |
| DVT Prevention\*(TI) AND Early Mobilization (TI) NOT Sequential Compression Device | 0 | 0 | 6 | 2 |
| Mechanically Ventilated (TI) AND Early Mobilization (TI) [2009-2019, English, Full Text) | 6 | 4 | 0 | 0 |

**Article Critiques**

Three types of articles were reviewed – one qualitative, one quantitative, and one systematic review. They were critiqued for reliability of evidence and for relevance to the PICOT question. The critiques are depicted in the tables below.**2 points**

**Appendix A: Qualitative Article Critique/s 22 points**

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| Wang, K., Zhang, B., Li, C., & Wang, C. (2009). Qualitative analysis of patients’ intensive care experience during mechanical ventilation. *Journal of Clinical Nursing, 18*(2), 183-190. doi: 10.1111/j.1365-2702.2008.02518.x  Level of evidence: VI, a single qualitative study.  Author credentials include: associate professor of school of nursing (PhD), nursing science graduate student, hospital nursing department chief (RN), medical school professor (PhD, MD). | |
| Phenomena and Research Question | Perception of an event: “What is it like to experience mechanical ventilation treatment at an ICU?” |
| Purpose & Significance to Nursing | The authors’ stated purpose is to understand the patient experience of mechanical ventilation (MV) in the ICU.  The study is significant to nursing because understanding patients’ experience with MV can help us anticipate and eliminate or mitigate stressors that cause suffering. The authors point out that, despite a history of patient testimony regarding pain and fear with MV, little has changed to better alleviate suffering.  According to Slutsky (as cited by Wang, Zhang, Li, & Wang, 2009), psychological stressors associated with MV may play a significant role in patient outcomes; the authors state that the body of research dedicated to this relationship is limited. |
| Method/Design | Phenomenological/Hermeneutical method (Heidegger), that is, studying the narrative of patients’ lived experience (Melnyk & Fineout-Overholt, 2019, p. 196-197)). |
| Data Gathering, setting and time. | Eleven patients were interviewed one on one in their hospital room 3-14 days post transfer from ICU. There was no time limit to the interview, however, no interview lasted more than 40 minutes. Interviews were audio taped and transcribed verbatim.  Participants were asked the research question, followed by open-ended questioning for clarification/further discussion of their experience. Interviews were conducted by two researchers who had no direct patient care experience. |
| Participants/  Human subject protection | Inclusion criteria: N=11, three women, eight men, age range 33-78, duration of MV was 48-303 hours.  Patients had been critically ill, received MV for at least 48 hours and able to recall and completely share their experience.  Exclusion criteria: Not ICU, not on MV at least 48 hours, not able to reliably share their experience.  Subject protection: Hospital research ethics committee approval. Purpose, procedures, and voluntary nature of study were disclosed and informed consent was gathered. |
| Analysis | The data were analyzed according to four steps (identified as Giorgi’s method): Each transcript read in entirety, then read again searching for “meaning units”, meaning units were synthesized into common themes, finally these were organized into a description of the MV experience. |
| Findings | Authors identified five theme clusters: Being in an unconventional environment; Physical suffering; Psychological suffering; Self-encouragement; Self-reflection. |
| Critique | The authors were very transparent about their ethics and research methods, which were respectable. The study was limited by a rather small sample size. Giorgi’s analytic method was identified. The authors claim that the findings are in league with other research on the subject. |

**Appendix C: Quantitative Article Critique/s (Put on a separate page) 22 points**

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| Drolet, A., DeJuilio, P., Harkless, S., Henricks, S., Kamin, E., Leddy, E. A., Lloyd, J. M., Waters, C., & Williams, S. (2013). Move to improve: The feasibility of using an early mobility protocol to increase ambulation in the intensive and intermediate care settings. *Physical therapy, 93*(2), 197-207. doi: 10.2522/ptj.20110400  Level III: Quasi-experimental | |
| Purpose | **“**The purpose of this study was to determine the effectiveness of a **nurse-driven mobility protocol** to increase the percentage of patients ambulating during the first 72 hours of their hospital stay” (Drolet, et al., 2013, p. 197) |
| Design | Design: Quasi-experimental.  Setting: 313-bed acute care community hospital.  Site: a l6-bed adult medical/surgical intensive care unit (ICU) and a 26-bed adult intermediate care unit (IMCU) at a large community hospital.  Data collection: Three months of data were gathered prior to intervention as a baseline. Six months’ data obtained after implementation of the protocol.  No conceptual framework was identified. |
| Participants/Human subject protection | **Sample:** Samples were different prior and post study.  Pre: ICU N= 193; IMCU= 349  Post: ICU= 426; IMCU= 358  **Selection Criteria:** “patients 18 years of age or older who were hospitalized for 72 hours or longer” (Drolet, et al., 2013, p. 199).  **Exclusion Criteria:**  a. Respiratory Criteria:  Fi02 > 0.6; PEEP > 5 cm H2O; SpO2 < 88%; respiratory rate > 35; Acidosis: Arterial pH < 7.25  b. Circulatory Criteria:  Continuous infusion of a vasodilator medication; Addition of a new anti-arrhythmic agent within previous 24 hours; Unstable arrhythmia within previous 24 hours; New cardiac ischemia within 24 hours; MAP > 140 or < 65; New DVT/PE (first 24 hours); Compartment syndrome  c. Neurologic Criteria:  Acute stroke (first 24 hours); CSF leak  d. Orthopedic Criteria:  Acute fracture  e. Hematologic Criteria:  Hemoglobin < 7 g/dL; Platelet count < 20,000; INR > 5.0.  IRB: Approval for this pilot study was obtained from Medical Executive Committee, then institutional review board. The protocol was **mandatory** for all patients during the pilot. |
| Tools | Richmond Agitation Sedation Scale (RASS): use not described, mentioned in passing. Default sedation orders were changed from continuous drips to prn dosing so patients could be more alert for ambulation. |
| Variables | **Independent Variable:** implementation of nurse-driven early mobility protocol.  **Dependent Variable:** frequency of ambulation during first 72 hours since hospital admission. |
| Findings | ICU patient ambulation increased from 6.2% to 15.5%.  IMCU patient ambulation increased from 20.2% to 71.8%.  **----ICU patient ambulation more than doubled.** |
| Analysis | “two-tailed t test” utilized for comparison of pre- and post-implementation patient demographics (Drolet, et al., 2013, p. 200). |
| Critique | The article is useful to the study because it demonstrated a practical nurse-driven method for increasing ICU patient mobility. It included mechanically ventilated patients, but it also included non-ventilated patients and non-ICU patients; however, the results were presented separately so it still has value. It showed that mobility can be significantly increased in the ICU, even with ventilated patients. It's also useful because it is nurse-driven. |

**Appendix D: White Papers/Cochrane Report/Systematic reviews 12 points**

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| Li, Z., Peng, X., Zhu, B., Zhang, Y., & Xi, X. (2013). Active mobilization for mechanically ventilated patients: A systematic review. *Archives of Physical Medicine and Rehabilitation, 94*(3), doi: 551-561. 10.1016/j.apmr.2012.10.023  Level of Evidence 1 – a systematic review. | |
| Purpose | “To investigate the effectiveness and safety of active mobilization on improving physical function and hospital outcomes in patients undergoing mechanical ventilation for more than 24 hours” (Li, Peng, Zhu, Zhang, & Xi, 2013, p.551). |
| Analysis/  Strengths | Seventeen studies were included. Types of included studies are: RCTs, quasi-RCT, prospective cohort study, history controlled study, prospective cohort study, case series.  Included databases searched: PubMed, Embase, CINAHL, CENTRAL, Physiotherapy Evidence Database, SinoMed, and ISI Web of Knowledge.  Included studies originated from seven countries: United States, Italy, Belgium, Turkey, Australia, France, and Taiwan.  Risk of bias was discussed at length.  Comparative studies: “The PEDro scale included eligibility criteria  (not used to calculate score), random allocation, concealment of allocation, similarity at baseline, subject blinding, therapist blinding, assessor blinding, adequacy of follow-up, intention-to-treat analysis, between-group statistical analysis, and reports of both point estimates and measures of variability” (Li, Peng, Zhu, Zhang, & Xi, 2013, p.552).  Case series: CRD criteria.  Evidence was examined using PRISMA guidelines. |
| Analysis/  Weaknesses | No mention of the IRB. Unable to determine if/which articles were peer reviewed. |
| Summary | The authors concluded that although existing evidence points to early mobilization as safe (there were few adverse events associated with it) and that it improves outcomes of ventilated patients, the evidence quality is low, and sample sizes were generally small. “the heterogeneity between the studies, particularly with respect to participants, enrollment rate, and study intervention, was a challenge for this review” (Li, Peng, Zhu, Zhang, & Xi, 2013, p.560).  In conclusion, according to the evidence, mobilization of ventilated patients is safe and has positive outcomes, but the evidence quality is low and further study is needed with more homogeneity between studies and with larger sample sizes. |

**Summary 4 points**

When considering the PICOT question, review of the above articles results in the following conclusions. Active mobilization is one meaningful method to combat the feelings of imprisonment, lack of control and loss of humanity experienced by patients confined to bed and physically and/or chemically restrained while receiving MV. These qualitative factors lead to patient-perceived benefits beyond DVT prevention that may make mobilization the patient-preferred intervention when compared with SCD use. A nurse-driven protocol is a concrete method for implementing early mobilization. Mobilization is facilitated by objective criteria and clear expectations that empower the nurse. Allied health team concerns about the safety of mobilizing MV patients are not well supported by evidence. Mobilization has been shown to be safe and result in multiple positive outcomes.

At this point the PICOT question could not be answered fully. Further literature review needs to be performed to consider the relative efficacy of SCDs and mobilization in the prevention of DVT. What has been shown thus far is that mobilization has multiple benefits beyond DVT prevention, is safe, and occurs more frequently in the context of a nurse-empowering protocol.

**References 8 points**

Dirkes, S., & Kozlowski, C. (2019). Early mobility in the intensive care unit: Evidence, barriers, and future directions. *Critical Care Nurse, 39*(3), 33-42. doi: 10.4037/ccn2019654

Drolet, A., DeJuilio, P., Harkless, S., Henricks, S., Kamin, E., Leddy, E. A., Lloyd, J. M., Waters, C., & Williams, S. (2013). Move to improve: The feasibility of using an early mobility protocol to increase ambulation in the intensive and intermediate care settings. *Physical therapy, 93*(2), 197-207. doi: 10.2522/ptj.20110400

Hong, K. C., Kim, H., Kim, J. Y., Kwak, K. S., Cho, O. M., Cha, H. Y., Lim, S. H., & Song, Y. J. (2012). Risk factors and incidence of deep vein thrombosis in lower extremities among critically ill patients. *Journal of Clinical Nursing, 21*(13-14), 1840-1846. doi: 10.1111/j.1365-2702.2012.04112.x

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