

The Application of the Theory of Unpleasant Symptoms to the Education and Practice of Nurse Anesthetists

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Conceptual

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Abstract

Aim: A discussion of the applicability of a middle range theory to the education and practice of nurse anesthetists.

Background: The educational standards of nurse anesthetists is transitioning to a doctorate level by the year 2025, in response to the increased demands of more complex surgical services and increased patient comorbidities, which requires the need to apply nursing theory. However, the application of nursing theory to nurse anesthesia is very limited.

Design: Discussion paper

Data Sources: A literature search for the period of 1860 – 2016 was undertaken. This included searching the following databases: Cumulative Index for Nursing and Allied Health Literature (CINAHL), MEDLINE, PubMed, and Google Scholar.

Implications for Nursing: Educational programs for nurse anesthetists and CRNAs in practice could apply the Theory of Unpleasant Symptoms (TOUS) during their educational training and while caring for patients requiring anesthesia.

Conclusion: To further explore the application of the TOUS to the education and practice of nurse anesthetists to fulfill requirements of educational standards and to improve the quality of patient performance outcomes.

Keywords: Nursing theory; Middle range theory; Conceptual model; Nursing practice; Nurse anesthesia; Nursing education; Theory of Unpleasant Symptoms; Symptom management

Impact Statement

Nurse anesthesia education is not based on any overarching nursing theory. Rather the educational processes are an assembly of knowledge of disparate sciences, a range of psychomotor skills, and passing along of cultural attitudes, some of which have no link to evidence based practice. This makes research into the drivers of success in anesthesia education difficult if not impossible to measure. If nurse anesthetists are to be taught to the maximum extent of their scope of practice, some form of theoretical underpinning is crucial to provide a more uniform foundation for the analysis of

success and the causes of failure in educating future nurse anesthetists. Only then can CRNAs provide the best care to patients, and the strongest impact on health care.

Summary Statement

Why is this research or review needed?

- There is limited evidence concerning the use of nursing theory in the education and practice of nurse anesthetists.
- Educational programs for nurse anesthetists are required to transition to a doctorate degree by 2025 to expand knowledge and skills needed to care for more

complex procedures and patients with increased comorbidities.

What are the key findings?

- The paper highlights the need to utilize a conceptual framework that aims to assist the CRNA in formulating an individualized anesthetic care plan to prevent, treat, and ameliorate unpleasant symptoms.
- This discussion suggests that further insight is required into developing nursing theory that may be applied to nurse anesthesia.

How should the findings be used to influence policy/practice/research/education?

- There is a need for greater awareness of the level of education of nurse anesthetists and the contributions CRNAs have made in clinical practice.
- To improve patient performance outcomes by decreasing the experience of unpleasant symptoms in patients requiring anesthesia for surgical services.

Introduction

The quality of education in health care has waxed and waned for hundreds, if not thousands of years. The Flexner Report, published in 1910 by high school teacher and expert in pedagogy Abraham Flexner, was a milestone in converting medical education from a strict apprentice-based model to one of pre-clinical scientific education. This study subsequently enhanced and improved the apprenticeship model used to teach physicians how to care for patients [1]. Before Flexner, however, there was Florence Nightingale, whose innovations formed in the crucible of the Crimean War resulted in the greatest advances in health care in modern history. Nightingale, fifty years earlier than Flexner, noted and commented on the importance of education in nursing [2]. Nightingale (1860) [2] noted: The everyday management of a large ward, let alone of a hospital—the knowing what are the laws of life and death for men, and what the laws of health for wards—(and wards are healthy or unhealthy, mainly according to the knowledge or ignorance of the nurse)—are not these matters of sufficient importance and difficulty to require learning by experience and careful inquiry...?

As nursing and medicine advance only through “learning by experience and careful inquiry”, it is useful to review the backdrop of the education of the nurse anesthetist, and to see if scientific inquiry leads to a more useful way of learning. The birth of nurse anesthesia as a specialty came amid many challenges. Throughout their

history, nurse anesthetists have overcome challenges from those who have sought to limit their scope of practice [3]. Despite the important contributions nurse anesthetists have made to the US health care system as well as research evidence that validates their record of safety and cost-effectiveness, attempts to discredit and restrict their practice rights continue to the present day [3].

The practice of nurse anesthesia is recognized as a unique nursing specialty defined by its scope of practice and standard of care. Certified registered nurse anesthetists (CRNAs) are advanced practice registered nurses (APRNs) who practice both autonomously and in collaboration with a variety of health care professionals [4]. CRNAs administer anesthesia for patients in all acuity levels and across the lifespan in a variety of settings for procedures including, but not limited to, surgical, obstetrical, diagnostic, therapeutic, and pain management [4]. The role of the nurse anesthetist has often been defined in terms of functional abilities, which include a plethora of technical skills that are implemented when caring for patients requiring anesthesia. However, viewing their role solely in terms of technical skill sets is inadequate. CRNAs are graduate-prepared providers with an expert degree of clinical judgment skills and critical thinking capabilities [4].

Historically, nursing has struggled to assert itself as a profession [5,6]. The professionalization of nursing is focused on the interrelationship between nursing theory, nursing research, and nursing practice. Some have claimed that nursing exposes itself to external control due to its failure to articulate a distinct theoretical framework of which to be based upon in order to establish itself as a legitimate profession [5,6].

Theoretical frameworks are intended to provide guidance and rationale for professional clinical practice [7]. When reviewing the standards and scope of practice of nurse anesthesia, as well as nurse anesthesia educational programs, it is apparent that a theoretical framework is lacking. The profession tends to be defined as a skill set or a series of partially related terminal objectives rather than an integrated whole [8]. The classic hallmarks of a profession include: 1) systematic theory, 2) authority, 3) community sanction, 4) ethical codes, and 5) a culture [9]. One can add to this a sixth attribute, that of having a research-based germane to the profession [10]. While nursing anesthesia possesses attributes two through five, as well as some success with attribute six, the concept of a systematic theory undergirding the profession (established during and integral to the

educational process) is still fragmented. According to Greenwood (1957) [9], preparation for a profession involves considerable preoccupation with systematic theory, which is best obtained through education in the academic setting.

As both basic and continuing educational requirements for nurse anesthetists increase in depth and quantity, it is imperative that students be prepared with knowledge of nursing theory, and that this theory is applied to their didactic and clinical instruction, as well as providing a foundation for their research. In 2007, the AANA made a decision to transition the nursing requirement of nurse anesthetists from the master's level to the doctorate level by 2025 in response to realities of the requirements for more complex services, which in turn require expanded knowledge and technological capabilities [11]. Consequently, the Council on Accreditation of Nurse Anesthesia Educational Programs (COA), which governs the accreditation standards for nurse anesthesia programs, mandated that all students entering a nurse anesthesia program on or after January 1, 2022, must graduate with a clinical doctoral degree [11]. Their statement describing the need for both expanded knowledge and more technical abilities is both accurate and problematic. Accurate in the sense that as health care becomes more complex, the provision of better education to cope with its complexities is crucial. Problematic in that it gives the appearance that obtaining a "laundry-list" of discrete skills and blocs of knowledge will alone result in meeting this demand for DNP's possessing the requisite knowledge and skills. This, unfortunately, contravenes one of the most basic constructs of obtaining nursing knowledge, namely that nursing knowledge is obtained as a *gestalt*, with the specific areas of data and skills inserted into the mix to create a seamless whole. This is described as the C-T-E or Conceptual-Theoretical-Empirical model of nursing practice [12]. Indeed, Fawcett and Desanto-Madeya state that, "...the resulting C-T-E structure encompasses the nursing participant, the student, and the educator". Thus, the C-T-E model provides the conceptual structure of both the nursing content and adjunct knowledge and skills (e.g. pharmacology, physiology, physical assessment, etc.), the theory of teaching and learning through which the instruction is provided, as well as the theoretical foundations of the program and profession as a whole, and the empiricism needed to conduct and evaluate classroom instruction, clinical experiences, and formative and summative outcomes [12]. Therefore, with the current movement of nurse anesthesia education into higher levels of graduate programs, changes in curriculum are inevitable, and should be based upon unique nursing theories.

Using these concepts as a backdrop, it is clear that changing the basic education of nurse anesthetists to that of the clinical doctorate should include the application of nursing theory. Its inclusion results in meeting the AANA standards, which state that students must "learn and apply a variety of anesthesia techniques and monitoring modalities, test theory, hone critical thinking skills, and apply evidence-based knowledge to clinical problems" [11]. Likewise, the COA's standards of accreditation [13] mandate doctoral students to be prepared to advance theory and knowledge of the discipline in which the degree is awarded. Applying the Theory of Unpleasant Symptoms to the practice of nurse anesthesia helps to provide a framework that delineates a method to assess areas that influence a patient's symptoms and hopefully improve patient outcomes. Nurse anesthesia practice may benefit significantly from using this nursing theory to help define their role as a professional.

Background

Theory has been described as a set of logically interrelated concepts, statements, propositions, and definitions derived from philosophical beliefs of scientific data from which questions or hypotheses can be deduced, tested, and verified. The significance of theories is to account for or characterize a phenomenon. A plethora of theoretical frameworks aimed at the practice of nursing have been developed throughout history and have influenced nursing practice in many ways, including: developing standards for nursing practice, identifying purposes to be fulfilled by nursing practice, serving as a basis for clinical information systems, and directing the delivery of nursing services [7]. Nursing models were developed to move nursing away from ritualistic and task-oriented care (a hallmark of traditional anesthesia education and practice) to thoughtful, expert nursing practice [7]. Theorists anticipated that nursing models would enable practitioners to become more autonomous and accountable in their clinical decisions and organization of care, while boosting the development of nursing as a discipline [5]. Despite the advantages of utilizing nursing theory in practice, nursing models have been met with considerable opposition that has led to a gap between theory and practice.

Several nursing theories have been developed and used in the literature in different aspects of nursing practice. The most contemporary theoretical frameworks discussed in the literature include: Betty Neuman's Systems Model (1982), Dorothea Orem's Self-Care Deficit Framework (1971), Sister Callista Roy's Adaptation Model (1980), Benner's Model of Novice to Expert (1982), and Kolb's Theory of Experiential Learning (1984), to name

but a few. Each theory represents its author's philosophy of nursing, mission in society, and prescriptions for practice [7].

Indeed the role of nursing theory is to define and clarify nursing and the purpose of nursing practice, which helps to distinguish it from other health care professionals. However, the application of theory to nurse anesthesia education and practice in the literature has been very limited. Therefore, the aim of this paper is to describe the application of the TOUS to the practice of nurse anesthesia.

Data Sources

A literature search was undertaken to retrieve articles published between 1860 – 2016 using the following databases: Cumulative Index for Nursing and Allied Health Literature (CINAHL), MEDLINE, PubMed, and Google Scholar. Only papers written in the English language and available as a full-text article were retrieved. Keywords were used in combinations and included: nursing theory; middle range theory; conceptual model; nursing practice; nursing professionalism; nurse anesthesia; theory of unpleasant symptoms and nursing education. The aim was to identify evidence in the literature discussing the utilization of nursing theory in nurse anesthesia education and practice.

Discussion

The classification of nursing theory is based upon its scope of abstractness and type or purpose of the theory. The TOUS is considered a middle range theory. Middle range theories are based upon more concrete ideas that make them applicable to nursing practice. This specific type of nursing theory may provide a description of a

particular phenomenon, explain the relationship between phenomena, or predict the effects of one phenomenon on another [12].

The TOUS was developed by a group of nurses interested in a variety of nursing issues, including theory development, and nursing science. This theory was initially published in the mid-1990's and then updated a few years later [14]. The TOUS was based upon the idea that there are commonalities in experiencing different symptoms among different groups and in different situations. It was developed to integrate existing knowledge about a variety of symptoms to better prepare nurses in symptom management. The purpose of the TOUS was to improve the understanding of the symptom experience in various settings and to provide information that is useful for developing means to prevent, treat, or manage unpleasant symptoms and their negative effects.

The foundation of the TOUS rests upon three major components: (1) the symptom(s) that the individual is experiencing, (2) influencing factors that produce or affect the symptom experience, and (3) performance outcomes. The overall conceptual model is depicted in (Figure 1), which demonstrates that three interrelated categories of factors (physiological, psychological, and situational) influence predisposition to and manifestation of a given symptom or multiple symptoms and the nature of the symptom experience. Symptoms are described in terms of duration, intensity, distress, and quality. The symptom experience, in turn, affects the individual's performance, which is described in terms of functional status, cognitive functioning, or physical performance. Similarly, the performance outcomes form a feedback system that also influences the symptom experience itself, as well as to modify the influencing factors.

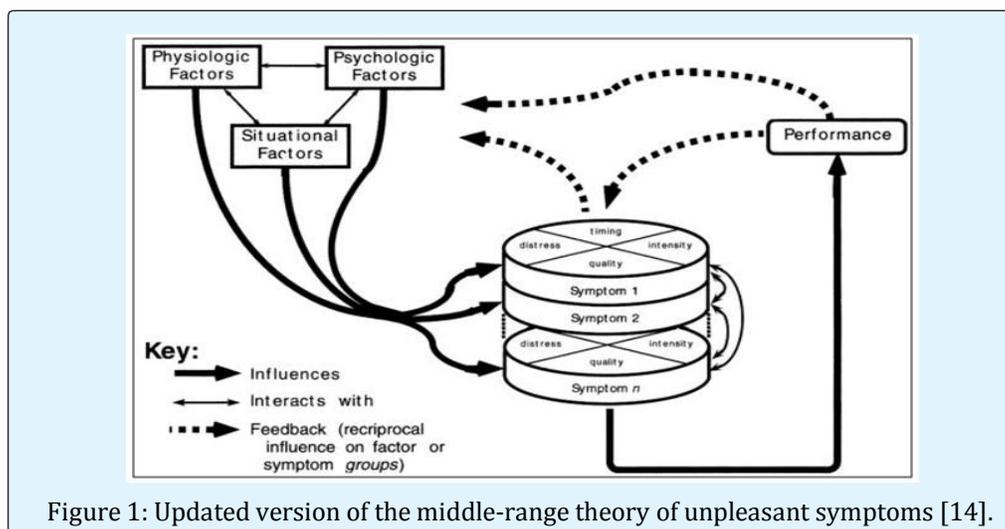


Figure 1: Updated version of the middle-range theory of unpleasant symptoms [14].

The TOUS helps nurses to recognize the need to assess multiple aspects of symptoms, including characteristics of the symptom(s) itself. This theory is clinically applicable to multiple patient situations because it triggers nurses to consider factors that might influence more than one symptom and the ways in which symptoms interact with each other [14]. The application of this theory to nursing practice has been described in several research studies. Motl and McAuley (2009) used the TOUS to examine symptom clusters of fatigue, depression, and pain as predictors of physical activity in patients with multiple sclerosis. Other works have applied the TOUS in patients with heart failure, inflammatory bowel disease, chronic pain, coronary heart disease, and COPD. Furthermore, the TOUS has also been applied to patients undergoing bariatric surgery and coronary artery bypass surgery [15].

Nursing Implications

Nurse anesthetists are APRNs that possess an exceptional level of clinical knowledge and skills that stem from their strong educational foundation and background as being first and foremost, nurses. The role of nurses across the spectrum of nursing specialties involves assessment, planning, implementation, and evaluation of the care of patients. However, the role of CRNAs differ significantly from other nursing specialties in that their primary focus includes: (1) pre-anesthetic assessment and evaluation, (2) formulating and implementing a patient-specific anesthesia care plan and adjusting it based upon the patient's physiological status, and (3) monitoring, evaluating and documenting patient's physiological condition [4]. In the same manner as the TOUS, these functions of CRNAs strive to support the homeostatic balance of the patient by inhibiting the symptoms the patient experiences.

Surgery results in several factors that contribute to morbidity and mortality including pain, stress response, hypoxemia, hypothermia, sleep disturbances, gastrointestinal dysfunction, fatigue, malnutrition, and immobilization [16-18]. Before any operation, a thorough pre-anesthetic physical assessment and evaluation of the patient is performed. Organ function should be optimized for patients with cardiac disease, chronic obstructive pulmonary disease (COPD), diabetes mellitus, and other disorders, according to current recommendations [17]. By using the TOUS, providers are able to explore the multiple factors affecting the care of patients and make appropriate interventions to prevent, treat, and

ameliorate symptoms and optimize individual performance outcomes.

As suggested by the TOUS, performance is affected by the alteration of symptom quality, intensity, timing, and distress. In addition, attention to influencing factors will affect the symptom's characteristics. By applying the TOUS to the evaluation of patients, the nurse anesthetist could ask questions, such as "What is the symptom experience like for you?" (quality, intensity, timing, and distress); "Are there other symptoms that occur when you are having this particular symptom?"; "What contributes to making the symptom better or worse?" (physiological, psychological, and situational factors); or "What affect does the symptom have on your everyday life?" (performance). These questions are key in devising an appropriate anesthetic care plan that is unique to the patient and also fulfills one of the primary functions outlined in the scope of practice for CRNAs.

The majority of actions performed by CRNAs are aimed at decreasing unpleasant symptoms. Prior to receiving anesthesia, patients often experience physical and emotional stress, anxiety, fear, and panic. It is not surprising that patients experience some degree of these symptoms as they are entrusting their well-being in the hands of an anesthesia provider whom they frequently have just met for the first time. Patients with higher levels of anxiety often experience greater levels of pain [19]. Thus, measures must be taken to help alleviate these unpleasant symptoms, which subsequently result in optimal patient homeostasis and improved outcomes. Strategies include supporting the patient and family by answering questions, providing a soothing environment, and administering medications such as anxiolytics. Moreover, coping mechanisms involving imagery, massage, breathing techniques, music intervention, and other relaxation techniques have also been used successfully to manage anxiety [20]. By managing pain and anxiety, anesthesia providers are able to help decrease the incidence of many common postoperative complications resulting in reduced recovery time and hospital discharge.

Another unpleasant symptom often experienced by patients undergoing surgery includes pain. Pain is a unique and personal experience that results from a dynamic interaction of multiple dimensions, including physiological, sensory, affective, cognitive, behavioral, and sociocultural aspects [19]. Physiologically, pain is induced by the activation of the peripheral and central nervous

systems (CNS) [16,17]. Unrelieved operative pain has negative consequences on physiological and psychological functions, and delays postoperative recovery and discharge from the hospital [19]. Multimodal approaches for pain relief include the utilization of nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, neuraxial blockade, and patient education with instruction on relaxation techniques to reduce anxiety and improve outcomes [16,17,21,22].

The majority of postoperative organ dysfunction and morbidity associated with major operative procedures may be related to changes induced by stress caused by the operation [16-18]. The activation of the neuroendocrine response leads to the release of various hormones that ultimately increase cortisol levels resulting in compromised immune function and predisposes the patient to postsurgical site infections [18]. Cardiovascular effects of increased sympathetic activity include hypertension, tachycardia, and increased vascular resistance [20]. In cases of ventricular dysfunction, increased workload may lead to reduced cardiac output and the respiratory system responds to the increased oxygen demand and CO₂ production with increased minute ventilation and volume [20]. Furthermore, the gastrointestinal system exhibits decreased motility in combination with increased gastric secretions, which increases the risk of gastric ulcer and aspiration pneumonia. Thus, it is essential to implement effective techniques to reduce this stress response. For instance, neuraxial blockade provides attenuation of the surgical stress response, thereby reducing postoperative organ dysfunction and allowing for early recovery [21]. Regional anesthetic techniques can reduce the pituitary, adrenocortical, and sympathetic responses to surgery [18,22]. Overall, the effects of these techniques demonstrate improved pulmonary function, decreased cardiovascular demands, reduced ileus, and improved pain relief [17].

Furthermore, mild hypothermia is extremely common during anesthesia and surgery. Heat loss occurs primarily from the skin of a patient to the environment through several processes, including radiation, conduction, convection, and evaporation [23]. Patients undergoing operations lasting over two hours often become hypothermic with a fall in core temperature of 2-4°C as a result of the cold environment of operating rooms, the inadequacy of clothing, and the effects of receiving anesthetics which dampen their homeostatic defenses to cold [17]. According to Becker & Diaz (2010) [24], the process of hypothermia occurs as core body heat

redistributes to the skin surface through an anesthetic-induced vasodilation and depression of the hypothalamic thermoregulatory centers. The physiological effects of being cold may have significant potential for detrimental effects on patient well-being. Patients may experience uncontrollable episodes of shaking and shivering, which are troubling events for the anesthesia provider [24]. Thus, temperature monitoring is a standard for patients undergoing general anesthesia, with the exception of very brief procedures (e.g., <15 minutes) [24]. Efforts to maintain intraoperative body core temperature higher than 36°C is central in reducing the stress of the surgical procedure and reducing the risk of organ dysfunction as well as improving the quality and safety of anesthesia care for patients [24,17]. These interventions include the application of warm blankets, administering warm fluids, adjusting the operating room temperature, and using convection warming devices to help maintain euthermia [24].

Lastly, PONV is a serious unpleasant symptom that is often experienced by patients undergoing surgery. The incidence of PONV after general anesthesia is up to 30% when inhalational anesthetics are used with no prophylaxis [25]. Risk factors associated with PONV include female sex, history of PONV, motion sickness, and nonsmoker status [25,26]. It is important to identify these risk factors in patients and to appropriately manage PONV to mitigate its adverse effects on surgical recovery. Strategies to prevent PONV include the administration of anti-serotonergic drugs, reduced use of opioid analgesic regimens, and the maintenance of anesthesia using total intravenous anesthesia with propofol [17,26]. In addition, where possible, regional anesthesia should be used, as it is associated with a significantly lower risk of PONV in adults than general anesthesia [25]. By implementing these strategies to prevent and treat PONV, anesthesia providers are able to decrease adverse symptoms, improve patient outcome parameters and increase patient satisfaction.

Ultimately, by recognizing the factors that influence patient's symptom experience, CRNAs are able to implement measures to prevent, treat, and ameliorate these unpleasant symptoms to optimize performance outcomes. Figure 2 shows the impacts of CRNA interventions to minimize the causes of adverse symptoms as well as the sites at which performance outcomes are enhanced. Essentially, these performance outcomes are defined as functional status, cognitive functioning, and physical performance.

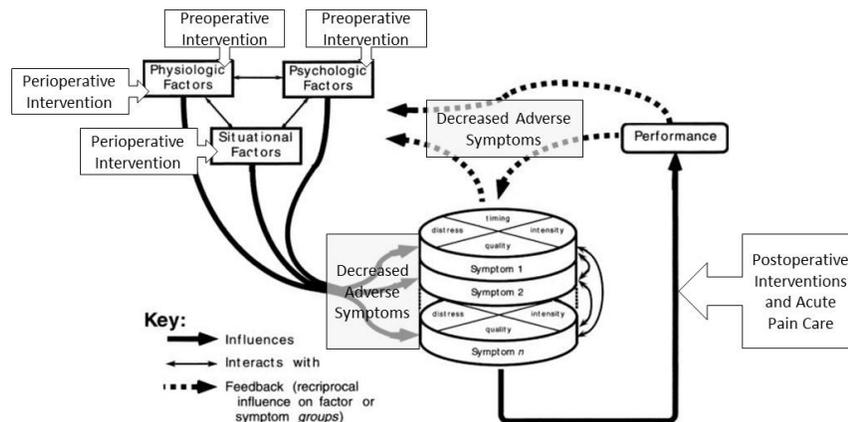


Figure 2: CRNA-based interventions at the preoperative, perioperative, and postoperative phases of care and their impact in the mitigation of unpleasant symptoms.

Conclusion

With the elevation of educational requirements for nurse anesthesia programs, it is fitting that theoretical frameworks be incorporated into the practice of nurse anesthesia. As demonstrated in this article, this task can be easily achieved and appropriately applied to the practice of nurse anesthesia. The TOUS is holistic, easy to understand and implement and is congruent with the standards of care of CRNAs. The primary obstacle with using nursing theory is not its complexity, but the reluctance of the practitioner to accept nursing theory as a vital part of professional development. Nursing theory has made several contributions in nursing practice and its application to the practice of nurse anesthesia may aid in further recognizing CRNAs as unique health care providers amongst a spectrum of nursing specialties.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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