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Los Angeles

Palliative Care and Mortality Risk Screening in the Intensive Care Unit

A dissertation submitted in partial satisfaction of the  
requirements for the degree  
Doctor of Nursing Practice

by

Cecile Kokozyan

2022

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## ABSTRACT OF THE DISSERTATION

Palliative Care and Mortality Risk Screening in the Intensive Care Unit

by

Cecile Kokozyan

Doctor of Nursing Practice

University of California, Los Angeles, 2022

Professor Carol Pavlish, Chair

**Background:** A 282-bed community-based hospital in Southern California with a newly established palliative care program has experienced low rates of medical orders for palliative care consultations. Many intensive care unit (ICU) patients have elevated mortality risk and nearly 20% of all patients in the United States die in an ICU. New palliative care programs experience underutilization of services and consultations occur late in the course of patients' hospitalization when the full benefits of palliative care cannot be realized. Various studies have explored introduction of screening tools to help identify patients who could benefit from palliative care services. **Objectives:** This DNP project examined incorporating a mortality screening tool to determine if mortality risk upon patient admission to the ICU impacts the

number and timing of medical orders for palliative care consultations. The project also explored ICU nurses' knowledge and attitude regarding palliative care and nurses' self-efficacy of using the SOFA screening and discussing results in ICU multidisciplinary rounds after taking a palliative care learning module. **Methods:** A pilot project was initiated that included nurses completing a Sequential Organ Failure Assessment (SOFA) score upon patient admission to the ICU and discussion of findings during ICU rounding. The number and timing of palliative care consultation orders were collected for 7-weeks prior to the intervention and for 7-weeks post intervention. ICU nurses took a 51-minute online educational session on the goals and benefits of palliative care and the use of SOFA and completed a demographic questionnaire and a brief survey regarding their attitudes and knowledge about palliative care. **Results:** Twenty-one nurses took the educational module and had improved attitude about palliative care and gained self-efficacy in performing a SOFA assessment and discussing results in ICU rounds. In the pre-intervention period, there were a total of 199 patient admissions and 224 in the post intervention period. Incorporation of a mortality screening tool did not increase the number of palliative care consultation orders but did improve the timeliness of orders. In the pre-intervention period, the mean medical order for a palliative care consultation was placed 12.8 days after ICU admission and post-intervention, this was reduced to 5.5 days. A random sample of patients received SOFA scoring, 43 patients in the pre-intervention period with average SOFA score of 6, and 54 patients in the post intervention period with average SOFA score of 3.8. **Conclusion:** Palliative care is often underutilized or employed late in the course of hospitalization resulting in decrease in potential benefits of the service. Incorporation of a mortality screening tool could help clinicians identify patients who have the highest risk of death during the period of hospitalization and shorten the time for patients to receive palliative care consultation. Nurses were competent in

using a mortality screening tool and leading discussions of mortality risk in multidisciplinary rounds advocating for palliative care consultation for patients. Mortality screening upon admission to ICU empowered nurses to advocate for high-risk patients. Research on whether improving the timeliness of palliative care can help improve patient care, reduce costs of care and reduce burnout in ICU clinicians (by transitioning patients to more appropriate levels of care) is needed.

The dissertation of Cecile Kokozyan is approved.

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To my loving parents, Hyrapet and Silvana Kyuregyan, your hard work and sacrifices have not only given me the opportunities for higher education but your unconditional love instilled within me has been a foundation for all of my achievements.

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- Rahimian, S., Chung, K., **Kokozian, C.**, Knighten, M., Flores, J. & Alcantara, M. (2018). Educating Latino terminally-ill patients using Spanish-language hospice video: Increasing hospice enrollment. *Innovations in Aging*, 2(1), 653. [Poster] The Gerontological Society of America, 2018 Annual Scientific Meeting <https://doi.org/10.1093/geroni/igy023.2436>

## CHAPTER ONE: INTRODUCTION

Unrelieved and distressing symptoms are present in the intensive care unit (ICU) for many patients, especially individuals with an increased risk of dying during the hospitalization (Mercadante, et al., 2018). Palliative care is a medical specialty with the aim to optimize quality of life and decrease distressing symptoms at all stages of illness. In the ICU, palliative care teams support patients and families by assisting in goals of care discussions, decision making, and improving pain and suffering and sometimes by referring patients to hospice care (Mercadante, et al., 2018). Hospice care is a medical benefit for individuals with a prognosis of 6 months or less and patients in the ICU with an increased mortality risk will qualify for this service if they pursue comfort care (Centers to Advance Palliative Care, 2021). The benefits of palliative care are well documented, and include improved patient satisfaction, symptom management, and decreased length of stay, but the specialty remains underutilized or requested late in the trajectory of intensive care hospitalization (Seaman et al., 2017). The perception of the public and misunderstanding of palliative care concepts by primary and specialty care providers have been identified as reasons for suboptimal use of palliative care services, especially in newly formed palliative care programs (Grant, et al., 2021; Seaman et al., 2017). A palliative care program at a 282-bed community hospital in Southern California implemented in the fall of 2019, has experienced low numbers of palliative care referrals.

Various scoring systems and triggers have been used in both inpatient and outpatient settings for the identification of palliative care patients and to generate automatic referrals, however, there is no single recognized tool that exists to identify patients who would benefit from palliative resources (Hua et al., 2018). Palliative care takes place in different care settings and with various disease processes, therefore there is no particular tool that is sensitive in

identifying patients in the different settings. The use of screening tools in the acute care setting has resulted in increased utilization of palliative care services (Orr, 2019). Mortality screening tools have been proposed as a method for identifying patients with the highest mortality risk and presumably the greatest palliative care needs (Mercadante, et al., 2018). The Sequential Organ Failure Assessment (SOFA) is a tool that is both reliable and feasible to use in the critical care areas to guide end-of-life discussions (Orr, 2019). The site of the Doctor of Nursing Practice (DNP) project desires to increase palliative care resources targeted to patients with high mortality risk during the course of their hospitalization thereby making the SOFA scoring tool an appropriate choice in this setting. There is also concern regarding the timeliness of palliative care therefore mortality screening will be initiated upon ICU admission with the goal of improving the timeframe from admission to medical order for palliative care consultation.

### **Problem Statement**

In the last two decades, there have been significant increases in the availability of palliative care programs in inpatient and outpatient settings across the United States. According to the Center to Advance Palliative Care (2021), 94% of hospitals with 300 or more beds have palliative care programs in place. The presence of palliative care services is dependent on location, size, and type of hospital. Evidence suggests that early involvement of palliative care is recommended for hospitalized patients to achieve optimal benefits (Ma, et al., 2019; Zalenski, et al., 2017).

A 282-bed community-based hospital in Southern California has experienced low rates of palliative care consultations. This organization initiated the palliative care program because of high inpatient mortality rates, high length of stay (LOS), and with the goal of improving patient satisfaction with the care provided. Many ICU patients with elevated mortality risk receive full



resuscitative efforts that were likely futile as end-of-life discussions had not occurred. Palliative care services remained underutilized which frequently occurs with new programs. The hospital has retained services of SupportiveCareNetwork to provide the formal consultation and medical management once a provider writes an order for a palliative care consultation. When a consultation is requested, it is often done late in the course of hospitalization when the full benefits of palliative care cannot be realized (Naaktgeboren, et al., 2020). The incorporation of the SOFA scoring tool into the ICU admission process will help identify patients who have the highest risk of mortality early in the course of their hospitalization in the ICU, therefore, enabling timely involvement of palliative care, allowing for patients, families, care providers and the hospital to experience the full benefits of the program.

An educational module was developed and included material on concepts of palliative care in the ICU and introduction and use of SOFA screening tool. The educational module was a narrated PowerPoint presentation that was 51 minutes in length and was made available to all ICU staff nurses via the hospital's online learning management platform. A brief demographic information, knowledge/attitude on palliative care and self-efficacy assessment was measured prior to and after the educational session. For nurses who did not complete the educational module, traveler and registry nurses, a total of 9 in-services were conducted with instructions on how to perform SOFA scoring, determine mortality risk and incorporate the results in daily rounding. The unit charge nurses also received education on background information, SOFA scoring and discussion in ICU rounding during a separate meeting that is held on a regular basis with all charge nurses, ICU educator and unit director. The number of medical orders and the timeframe from ICU admission to order for palliative care consultation were compared in the pre-intervention period to the post-intervention period.

## **PICOT Statement**

The PICOT question to guide this project is: Are intensive care unit nurses who receive training on palliative care and SOFA risk assessment (P), and perform a SOFA scoring within 24 hours of admission and discuss the results in ICU rounds (I), compared to the standard admission process (C), able to impact the number and timing of medical orders for palliative care (primary outcome) and change nursing attitudes/knowledge and self-efficacy on mortality screening (secondary outcome) (O) within 7 weeks (T)?

## **DNP Essentials**

The DNP Essentials helped guide the preparation and implementation of this project. Although all eight essentials were used, the project relied heavily on Essential I, Scientific Underpinnings for Practice and Essential II, Organizational and Systems Leadership for Quality Improvement and Systems Thinking (American Association of Colleges of Nursing, 2006). The development of the interventions discussed, utilized and integrated existing knowledge from a variety of disciplines including nursing, medicine, physiology and ethics and was applied to impact the quality-of-care ICU patients receive in the end of life. The data was collected and analyzed to determine how this project affects various outcomes to determine its applicability to the other hospitals within the system. The outcome analysis looked at inpatient mortality, hospice discharges, and the number and timing of medical orders for palliative care. This data will be used to create a dashboard in the Electronic Medical Records (EMR) for identification of high-risk mortality patients early in the course of hospitalization and incorporate palliative care service to assist patients, families, healthcare providers and healthcare institutions.

## CHAPTER TWO: THEORETICAL FRAMEWORK

Palliative care is an individualized discipline. Care varies greatly from one person to the next, as patient needs are different depending on the patients' illness, symptoms, location on the illness trajectory and goals of care. The care provided is holistic, focusing not only on the physical wellbeing, but also based on an individual's psychological, emotional, and spiritual needs and family and caregiver needs; therefore, palliative care is rendered with a team of clinicians specializing in various domains of care (Venis & Dodek, 2020). Given the nature of this service, the Relationship-Based Care (RBC) Model is well suited to help in the transformation of practices related to palliative care. The patient and family remain at the center of the components that make up the model, which includes leadership, professional nursing practice, teamwork, patient care delivery systems, resources, and outcome measurements (Stewart, 2018). The RBC model can provide the framework for the desired intervention outcome, in this case increasing timely palliative care services in the ICU.

The RBC model was developed in the United States by Creative Health Management and is based on Watson's Human Caring Theory, Swanson's Mid-Range Caring Theory, and Dingman's Care Model, focusing on patient's values and expectations while promoting their well-being and preserving their dignity in delicate situations (De Barbieri, et al., 2020). Additionally, emphasis should be on having supportive interdisciplinary communication and building healthy working relationships, to enhance respect and team accountability as this translates into an individualized plan of care for patients (Cropley, 2012). Compassion and care should be conveyed when "one human connects to another" through "touch, a kind act, through competent clinical interventions, or through listening and seeking to understand the other's

experience” (Steward, 2018, p. 532). This model focuses on three types of relationships, including the care provider’s relationships with patients/families, relationships with self, and relationships with colleagues. The domains of professional nursing practice, teamwork and patient care delivery systems of the RBC model are most applicable to this project.

The professional nursing component involves nurses taking responsibility for one’s position and accountability for their role, working within the scope of the nursing practice, with an understanding of the human condition, and using caring as the essence of nursing. The nursing role encompasses that of a guide, healer, collaborator, teacher and leader (Steward, 2018). Again, nurse-patient, nurse-other colleagues, and nurse-self relationships are of great importance in this element of the RBC model. The nurse forms a relationship with a patient that guides the care that is provided. The professional nurse assesses patients’ symptoms related to pain, nausea, existential suffering, isolation, and unresolved personal relationships the patient may have at the end of life. The nurse is able to care for the patient through medication administration, a healing touch, prayer, and the involvement of other disciplines. Sometimes the patient is sedated or unable to communicate, and family members speak on behalf of the patient, therefore the nurse-family relationship becomes important as well. The relationship nurses have with one another also allows for continuity of care for patients. Palliative care can help guide nurses in areas of symptom management and communication with patients and families to align treatments with goals of care while addressing any unresolved issues with team members and other specialists. Nurses’ relationship with self also guides professional nursing practice as self-awareness is an important component of personal growth and improving clinical performance (Rasheed, et al., 2018).

Teamwork is another pillar of the RBC model as it is one of the predictors in quality of care, which values the contributions of all members as interprofessional teams share a common purpose with group synergy leading the way for excellence in patient care (Stewart, 2018). Given the nature of palliative care, this aspect of the RBC model fits well with the interdisciplinary team approach offered by this discipline. With the focus on the nurse-patient relationship, nurse-self, and nurse-colleagues, a plan of care can be adapted and communicated that serves the best interests of the patient. Interprofessional teams work to meet patient needs, allowing for the delivery of exceptional care.

Patient care delivery, another component of the RBC model, supports the professional and personal growth of caregivers, collegial relationships among them as well as ensuring the plan of care is organized based on the nurse-patient and nurse-family member relationship (Stewart, 2018). Patient care delivery includes patient assessment and treatment. In ensuring access to palliative care services, nurses advocate for improved pain and symptom management and alignment of patient's goals of care with the treatment plan. The nurse-patient relationship is important in this case to ensure support of patient who is facing the realities of their illness, often limited survivability, existential suffering, and isolation brought on by their condition. In these cases, through the relationship the nurse has with the patient as well as with their colleagues from multidisciplinary backgrounds, the delivery of care can be adjusted to meet the needs of the patient. Nurses' relationship to self is also very important as self-awareness not only improves a nurse's ability to develop therapeutic relationships but advances critical thinking and clinical decision making thereby improving patient care delivery (Rasheed, et al., 2018).

### CHAPTER THREE: REVIEW OF LITERATURE

A literature search was performed using search engines PubMed, Embase and CINAHL with the search terms identifying the population, intervention and outcome. For population, the key terms used included ICU patients, critically ill patients, ICU nurses, hospitalized patients and for the intervention the terms of SOFA score, mortality risk tool, mortality screening tool, and mortality prediction were used. The terms palliative care, hospice and end of life care were searched for outcome. The search terms were limited to full text articles in the English language published within the past 5 years for the purpose of obtaining literature related to current practice. Using the combination of the following terms “ICU patients,” “ICU nurses” OR “ICU” AND “mortality prediction tool” OR “SOFA” OR “Sequential Organ Failure Assessment” OR “Mortality Prediction” AND “palliative care” OR “End of life” OR “hospice” yielded 4,152 articles on CINAHL, 419 on Embase and 343 on Pubmed. Articles were reviewed, duplicates removed and those with highest level of evidence and most pertinent to the current research question were selected.

Seaman et al. 2017 studied the pattern of palliative care consultations in the ICU. This was a retrospective study using data obtained from the EMR in two tertiary care units in the Mid-Atlantic region. During this study, patients were selected to participate based on a positive screening on a mortality rating system, Acute Physiology and Chronic Health Evaluation (APACHE) III. All patients who were included in the study had a 24.7% or higher risk of mortality during their hospitalization. A total of 723 patients met the criteria based on the screening tool. Patients who died during the hospitalization were also included in the study. A total of 73 patients received a palliative care consultation: for 13% of patients the consult was placed the day before discharge; 21.9% the day of discharge/death or transfer; and the remainder

received a consultation approximately 4 days before death/discharge. On average, medical orders for palliative care consultations were requested 8.89-days post-hospitalization. Palliative care services should be the established standard in the ICU, and particularly for those individuals at high risk of death, often services are not requested or placed late in the course of the hospitalization. This suggests a need for early identification of patients at high risk of death and earlier integration of palliative care services to address unmet patient needs. The selection of this study is significant as early assessment of palliative care needs is essential. Unfortunately, when palliative care consultations occur late in the course of the ICU stay, patients are discharged or die with unmet palliative needs.

Palliative care providers are often asked to see patients in the ICU after a period of prolonged mechanical ventilation. Bier-Laning et al. (2020) tried to identify if the use of mortality screening tools would be beneficial to palliative care providers to judge prognosis for patients who become ventilator-dependent during the course of the hospitalization. This was a retrospective study done in the Veteran's Affairs (VA) hospital system where 94 individuals had a tracheostomy and gastrostomy tube placement during their hospitalization due to prolonged period of mechanical ventilation. Logistic Organ Dysfunction System (LODS), as well as SOFA scoring, was completed using the first available laboratory values upon admission and survival data was obtained from the VA system. The average time interval between admission to tracheostomy procedure was 12.6 days. Approximately, 19% of patients died during their hospitalization, 7.4% of the patients were discharged home, 5.4% were discharged to hospice care and the remainder were transferred to a long-term care facility. The average LODS score was 4.9 and the average SOFA score 5.8, with higher scores indicating poorer prognosis. Both LODS and SOFA scores had a statistically significant association between inpatient deaths with

$t=-2.59(92)$  for LODS and  $t=-2.69(92)$  for SOFA with  $p$  value of 0.011 and 0.008 respectively. Both scoring systems were predictive of 90-day mortality, however, only LODS was predictive of 180-day mortality. At 90-days, the statistical significance was  $t=-2.67(92)$  with  $p=0.009$  for LODS and  $t=-2.20(92)$  with a  $p$  value of 0.031. Typically, mortality screening tools are administered upon admission and daily thereafter, however, a single measure was used for this study and determined to be reliable in predicting mortality risk. Authors suggest that these tools can be used to provide prognostic information to families at the time of discussion regarding tracheostomy placement.

In this single-center, retrospective, cohort study, Tan, et al. (2018) investigated the use of APACHE II, Simplified Acute Physiology Score (SAPS) II, Mortality Probability Model (MPM), and SOFA scoring systems on medical oncology patients admitted to ICU beds in a tertiary care hospital in Australia. All patients had metastatic disease and 89% of the patients were receiving palliative treatment including chemotherapy and immunotherapies at the time of hospital admission. A total of 96 patients were enrolled in the study and various factors including the scoring systems and patient outcomes were evaluated. Patients were followed for six months after hospital admission. The majority of the admissions were related to the management of infections, and other reasons including the development of arrhythmias, gastrointestinal bleeding, intracranial mass effect, acute renal failure, and oncological emergencies. End-of-life discussions were held for 11% of the patients in the ICU. About 5% of patients died while in the ICU and 22% while in the hospital. Only APACHE II and SOFA scores were predictive of inpatient mortality. APACHE II with an odds ratio of 1.11 and  $p$  value of 0.03 and SOFA score with an odds ratio of 1.29 and  $p$  value of 0.01. Additionally, 30-day mortality was only predicted by SOFA scoring with a  $p$  value of 0.01. Six-month mortality was not predicted by any of the



tools used, as they were all validated for hospitalized patients. This study was selected as it validates the SOFA scoring tool as an indicator of inpatient and 30-day mortality upon admission to the ICU for medical oncology patients with metastatic disease, which is a common patient population admitted to the ICU where this project was implemented.

In a post hoc analysis, Chang, et al. (2017) conducted a study in a tertiary hospital in Taiwan looking at various predictive tools in the ICU, in relation to post-operative, Coronary Artery Bypass Grafting, patients. This study used various tools including Society of Thoracic Surgeons (STS) mortality risk, European Systems for Cardiac Operative Risk Evaluation (EuroSCORE), APACHE II, and SOFA scoring to determine which tool was a better predictor of mortality. The scoring systems were utilized in the immediate post-operative period and a total of 483 patients were evaluated in this post hoc study. Both SOFA and APACHE II scores had appropriate utility in discerning inpatient mortality risk. This study also validates the use of the SOFA tool for post-cardiac surgery patients. The Southern California hospital where this project was implemented has an open-heart surgery program, thus this study is applicable for the patient population.

Barkley, et al. (2019) evaluated the timing of palliative care consultations, 30-day readmission and patient mortality risk. This was a retrospective, observational study comparing patients who received palliative care consultations to patients who did not. This study utilized a large sample size, 6043 patients who were seen by the palliative care team and 43,463 patients who were not. A significant reduction in inpatient mortality was seen in the palliative care group as long as the consultation was placed days 0-6 of the hospitalization. If consultation was placed on day 7 or later, there was a statistically significant mortality increase. The 30-day readmission rate was reduced by 26.3% in the 0 to 2-day palliative consultations group and readmission was

19.3% lower in the palliative care group regardless of the timing of the consultation. This study supports that earlier consultation results in improved readmission rates and inpatient mortality. Mortality rate reduction is one of the goals for this project site, therefore earlier palliative care consultation in the course of hospitalization is important to reach desired outcomes.

Another study to assess the impact of timing on palliative care consultations in the ICU was conducted by Ma, et al. (2019). This was a cluster-randomized crossover trial at a single center that compared patients who received a palliative care consultation within the first 48 hours of admission compared to the usual care group. Patients who received a palliative care consultation within the first 2 days of admission had significantly higher transfers to hospice care, few ventilatory days, had fewer tracheostomies performed, and had lower pharmacy and ICU associated costs. This study supports that when comparing groups of patients who receive a palliative care consultation, the patients with earlier palliative intervention had improved outcomes.

ICU nurses care for approximately 20% of all patients who die in the United States, however limited information is available on their knowledge and attitudes regarding palliative. Kim, et al. (2020) conducted a cross-sectional, descriptive, correlational design study to determine nurses' attitudes, knowledge, confidence level and educational needs by administering the Palliative Care Quiz for Nursing along with collection of demographic data in a tertiary hospital in Seoul, Korea. In total, 102 nurses participated in this hospital-wide study with exclusion of oncology nurses and 96.1% of the nurses were female with an average age of 32.4 years and 53.9% of participants were ICU nurses. Ward nurses had higher knowledge of palliative care concepts compared to ICU nurses using independent t-test analysis ( $t=2.93$ ,  $p=0.29$ ). The mean knowledge was  $9.73 \pm 2.10$  on the range of 0-20 with palliative care

philosophy and principles having the lowest score of  $1.58 \pm 0.83$ . The questions related to pain management and psychosocial support for family members of patients were answered nearly all correctly by the nurses who reported previous education on palliative care, hospice or end of life care. Pearson's Correlation was used to determine the relationship of total knowledge to attitudes related to palliative care and a positive correlation was seen ( $r=0.29$ ,  $p=0.003$ ). Also, for nurses who reported need for more education, they had the lowest level of confidence ( $r=-0.21$ ,  $p=0.061$ ) signifying the need for structured palliative care education (Kim, et al., 2020).

### **Synthesis of Literature Review**

The majority of the studies selected were retrospective in nature and a few had very small sample sizes (Bier-Laning, et al. 2020; Tan, et al., 2018). McCarroll (2018) looked at the incorporation of a nursing-led screening tool to increase the rate of palliative care consultations in a single-site ICU. The tool was instituted and the 3-month post and preintervention palliative care consultation numbers were measured and were found to be significantly higher after the incorporation of the tool. This was a single-center study with only 10 admissions in the pre-intervention period and 10 patient admissions in the post-intervention period, therefore the applicability of findings to other locations is limited due to the small sample size.

Seaman et al. (2017) had a larger sample size of 1440 patients and this retrospective study was completed with the use of Electronic Medical Records (EMR). The study attempted to understand the patterns of palliative care use in hospitalized patients. Incomplete documentation is one of the limitations of using retrospective data, however, the study did determine that palliative care consultations occur late in the period of hospitalization and patients would benefit from early assessment and incorporation of palliative services, which are findings that are supported by other studies (Barkley, et al., 2019; Heitner, et al., 2020; Ma, et al., 2019).

In a large retrospective, observational study, Barkley and colleagues compared patients who received palliative care consultation but were divided by the timing of the consultation, with early being in the first 2 days of the hospitalization, middle being 3-6 days of hospitalization, and late between 7-30 days. These subgroups were compared to each other and non-palliative consult groups. This study determined that the earlier the consult was placed, the better the outcomes of 30-day rehospitalization and inpatient mortality rates were (Barkley, et al., 2019). Ma, et al. (2019) also found a statistically significant difference in the intervention group who received early palliative care consultation as compared to standard practice in the facility. The intervention group had lower pharmacy and ICU costs along with higher rates of transition to hospice, fewer ventilator days, and decreased rates of tracheostomies. Both studies support that palliative services should be involved from the beginning of the hospitalization to provide higher levels of benefit.

Tan et al. (2018) and Chang et al. (2017) used a similar method of evaluating EMR and collecting data to validate various screening tools that measure mortality risk. Although both studies were done for critical care patients, patient populations varied, one including post-cardiac surgery patients and the other medical oncology patients. The sample size was more robust in the study conducted by Chang and colleagues, but adequate for statistical analysis in Tan and colleagues' study. Both studies validated the SOFA tool as an indicator of inpatient and 30-day mortality which will be important to determine as these patients will need palliative care services.

The SOFA mortality screening tool has not been traditionally used to identify palliative care patients, especially with a single measurement upon admission to an ICU. In a study by Orr (2019), the SOFA mortality screening tool was found to be both acceptable and feasible as part

of a practice to increase prognostic prediction and conduct end-of-life conversations in a timely manner. Bier-Laning et al. (2020) determined the admission SOFA score predicted mortality for a varied population of patients admitted to a medical ICU requiring intubation and mechanical ventilation. The researchers recommend its use for goals of care discussions as it predicted mortality for 30-days of admission. Chang, et al. (2017) had similar findings for patients who underwent coronary artery bypass grafting surgery using initial post-surgical data to calculate a SOFA score. Tan, et al. (2018) studied SOFA scoring for patients with metastatic cancer admitted to the ICU and recommended the use of the mortality screening tool for this patient population and palliative care involvement for patients at elevated risk of death during the hospitalization.

The ICU nurses are at the forefront of caring for high mortality risk patients and there is limited awareness of what nurses' attitudes, knowledge and comfort level is in caring for patients (Kim, et al., 2020; Subih, et al., 2022). Prior education in hospice, palliative and end of life care was positively correlated with increased knowledge and comfort in concepts related to end of life care (Kim, et al., 2019; Subih, et al., 2022). Subih, et al. (2022) studied nurses in Jordan while Kim, et al. (2020) surveyed nurses in Korea. Both studies suggest that formalized palliative care education is required for nurses to have adequate knowledge while caring for dying patients. Further studies are needed in the United States to determine if the findings of the above research articles are applicable in this country.

## CHAPTER FOUR: METHODS

### **Ethics / IRB Statement**

University of California, Los Angeles's (UCLA) Institutional Review Board (IRB) reviewed this project and determined it met the qualifications for a quality improvement project

and did not require IRB approval. The hospital where the project took place agreed to accept the guidance from UCLA IRB. Hospital policy was followed to ensure patient privacy was maintained during ICU rounds. Data collection did not use any patient identifying information, only the date of patient's admission to the ICU, date of medical order for palliative care consultation. The SOFA scores for a random sample of patients were obtained without the use of any personal identifying information. The mortality rate, number of admissions, and the number of hospice discharges was collected without any personal identification. All data on nurses' survey omitted information on nurse's identity and all findings were reported in summary format.

### **Project Design**

Palliative care studies are often retrospective or pre-post comparison in nature as it is difficult to perform randomized controlled trials given ethical considerations related to withholding of services that can be beneficial to patients (Barkley, et al., 2019). In this project, the primary goal was to increase the number of medical orders for palliative care consultations and decrease the timing from patient admission to palliative care consultation, allowing for a greater number of patients to have the benefits that are offered by palliative care services and on a timelier basis. The secondary goal was to increase nurses' knowledge about the goals and benefits of palliative care for ICU patients and increase self-efficacy of performing mortality screening and discussing results in ICU rounding. The primary outcome utilized a quasi-experimental, two-group comparison design with a convenience sample, as all adult patients being admitted to the ICU received the intervention. A random sample of SOFA scores were done for the two groups of patients to help determine if the pre and post intervention groups had similar level of illness severity. The secondary outcome used a quasi-experimental single group,

pre and post test to determine the change on nurses' knowledge and attitudes regarding palliative care and self-efficacy in performing the SOFA assessment tool after completion of the educational module.

### **Setting**

The hospital where the DNP project took place is a 282-bed, Southern California hospital that is recognized as a comprehensive stroke center, a ST-elevation myocardial infarction (STEMI) receiving center, Level II trauma, with an open-heart program and a dedicated 7-bed burn/pediatric ICU. The unit where the project was implemented is a 34-bed combined medical and surgical ICU that cares for adult patients with varying illness severity and prognoses.

### **Sample**

The SOFA assessment tool was completed upon admission for every patient admitted to ICU between March 13, 2022 to April 30, 2022. There were a total of 224 admissions in the post intervention period. A total of 199 patient admission occurred in the pre-intervention group between January 9, 2022 and February 26, 2022. The hospital administration requested a paper version of the SOFA scoring as this was a pilot project and did not want to add it to the Electronic Medical Records (EMR) at the start of implementation. A paper version was developed to be kept in patients' charts during the course of the hospitalization which is presented in Appendix A. The common associated mortalities are included in the hospital form that nurses completed and placed in patients' chart and a more complete table is presented in Appendix B.

An on-line learning module on Palliative Care was created by the DNP student and was offered to all ICU staff nurses who were awarded 1-continuing education unit (CEU) upon

completion. All ICU nurses were invited to view the educational module. Nurses were paid for this CEU if they had not exceeded the 30-hour annual educational benefit that is offered as part of the employment package. At the time of implementation, the unit employed a total of 73 nurses, however only 21 completed the learning module. For staff nurses who did not complete the module and for registry nurses, a total of 9-in-services were held by the DNP student to conduct education on the mortality screening tool. The in-service only covered the topics of SOFA scoring and presentation of mortality risk in ICU rounding.

### **Intervention**

The intervention was completed in two phases. First, ICU nurses were educated on the goals of palliative care and SOFA scoring for early patient identification. At the time of implementation, the unit had 12 traveler nurses in addition to a total of 73 staff nurses and occasionally utilized nursing registries during periods of staffing shortages. The module was a 51-minute video with a PowerPoint presentation that covered the following topics: a) definitions of palliative and hospice care, b) benefits of early palliative care involvement in the ICU, c) background of SOFA score, d) completion and interpretation of the scoring system on four sample patients, and e) discussion on the particular palliative interventions that would be appropriate for the patients presented. All staff nurses were asked by the unit director and unit educator to complete the educational module which was uploaded to the online educational platform used by the hospital system. The completion rate was approximately 29% with 21 of the staff nurses finishing the module and completing the pre and post questionnaires that were included. At the beginning of the course, there was a brief demographic survey along with a questionnaire on attitudes/knowledge about palliative care and self-efficacy about SOFA scoring



(Appendix D and E). Immediately after the completion of the survey, nurses repeated the attitude, knowledge and self-efficacy survey and were awarded 1 hour of CEU credit.

The education module was uploaded and available for 6 weeks prior to the implementation of SOFA scoring. As many nurses had not completed the training, a total of 9 in-services were held at change of shift in a 2-week period immediately prior to the implementation. Approximately 10-15 nurses attended each session of the provided in-services. A separate in-service was provided for the charge nurses who were the super-users during the go-live phase. This was done during a regularly scheduled meeting where the unit director and unit educator meet with all nurses who serve the role of “charge nurse.” All 6 nurses who serve in this role attended the meeting and received the training. All charge nurses were provided with DNP student’s contact information if any questions would arise. The first 2 days of implementation, the DNP student was available on the unit for approximately 8 hours per day to answer any questions and help with discussion and incorporation of SOFA scoring during ICU rounds and thereafter on a weekly basis to ensure any new nurses were educated on the SOFA scoring tool.

Second, after the educational intervention, nurses were directed to complete SOFA forms on all patients who were admitted to the ICU and discuss these scores during interdisciplinary rounds. Since the SOFA scoring tool uses only objective data such as laboratory test values, type and dosage of vasopressor medications and a Glasgow Coma Scale (GCS) from the patient assessment that the nurse completes (Appendix A), assessing scoring reliability was not included in the educational module.

## **Instruments/Measures**

The SOFA score tool was developed in 1996 and initially titled Sepsis-related Organ Failure Assessment with the purpose of describing a range in organ dysfunction, not just the presence of organ failure and to associate the varying degrees of dysfunction to morbidity and mortality in sepsis patients (Vincent, et al., 1996). At the time, it was thought that the scoring system could be applied to all critical care patients, not just sepsis patients, however, this was not researched. Recent studies have evaluated the use of the scoring system with different patient populations, including patients who are mechanically ventilated, metastatic cancer patients as well as post-cardiac surgery patients. The SOFA tool has been validated in these groups and the acronym has been changed to Sequential Organ Failure Assessment rather than sepsis specific (Bier-Laning et al., 2020; Chang et al., 2017; Tan et al., 2018). The measurement is meant to assess the risk of death.

Prior data exists on the feasibility of incorporating a palliative care screening tool in the ICU (McCarroll, 2018; Orr, 2019). These tools are often completed upon admission and either daily or per nursing shift thereafter. One particular study looked at the feasibility of incorporating different mortality screening tools in the ICU, however, the instrument was completed by providers instead of nursing (Orr, 2019). This study deemed the SOFA tool was the most feasible and acceptable instrument for the use in ICU compared to other instruments including the Mortality Probability Model III, APACHE IV and SAPS III (Orr, 2019). McCarroll (2018) implemented a nursing-led palliative care screening tool in the ICU, in a similarly designed study, and determined that the project was both feasible and resulted in an increased number of palliative care consultations. The tool used in that study was specifically designed for

the hospital and patient population. The SOFA scoring instrument has been verified to be a sensitive and specific tool for inpatient and 30-day mortality for patients admitted to the ICU (Bier-Laning et al., 2020; Chang et al., 2017; Tan et al., 2018).

A demographic form was developed by the DNP student to gather information on nurses who participated in the learning module. The first question gathered information on the age of the nurse. Participants selected if they were under the age of 30, 30-40, 41-50 or above the age of 50. Next question asked regarding educational status and nurses selected if they had an Associate's Degree in Nursing (ADN), a Bachelor's Degree in Nursing (BSN), a Master's Degree in Nursing (MSN) or were doctorly prepared nurses. The last demographic question asked regarding years of nursing experience and participants selected if they had less than 2 years, 3-5 years, 6-10 years or greater than 11 years of nursing experience.

The survey on nurses' knowledge and attitudes regarding palliative care can be found in Appendix D. Questions 2, 3 and 6 were to test change in knowledge. Questions 2 and 3 were adapted from a tool known as Palliative Care Quiz for Nursing (PCQN). The PCQN was developed in 1996 by Ross, et al. for the purpose of measuring and comparing the knowledge of different groups of nurses regarding concepts of palliative care. An advisory group was formed to consult with specialists in the field and the literature to test different domains of knowledge on the subject of palliative care which led to the development of the PCQN. No other standardized tools have been developed in this area since. Kim, et al. (2020) used the PCQN to survey nurses and determine that formalized education is necessary as nurses score higher if they have had prior palliative care education. The 6th question is from a tool known as Palliative Care Knowledge Questionnaire for physicians and reliability and validity testing for this tool was

conducted by Yamamoto, et al. (2013). Although this tool was specific for physicians, this topic was addressed in the nursing educational module, therefore it was included. Questions 1, 4 and 5 were developed by the DNP student in an attempt to measure nurses' attitudes related to palliative care, because no valid and reliable tools were found after a thorough search of the literature. The self-efficacy scale was developed by the DNP student and is based on Bandura's Theory of Self-Efficacy (Bandura, 2006).

### **Procedures for Data Collection**

The DNP student tracked the total number of medical orders for palliative care consultations, total weekly ICU admissions, hospice discharges, deaths and the time frame between ICU admission to medical order for palliative care consultation for a period of 7 weeks prior to the implementation of SOFA scoring and compared that data to the period of 7 weeks after implementation of SOFA scoring. In this project setting, medical orders for palliative care consultations are placed in the EMR or a call is placed to the SupportiveCareNetwork's intake number and an on-call provider responds to the consult. SupportiveCareNetwork has a spreadsheet with all patient referrals to the group which was used to determine the total number of palliative care consultation requests. After determining the patient and the date of the consultation, the hospital EMR was accessed to determine the date of ICU admission. All palliative care requests during the specified pre and post-intervention periods were included in the study. Five of these palliative care requests were for patients with admission dates prior to the specified pre or post intervention period beginning dates, but were included in the study because the requests occurred within the specified periods. The unit where the project was implemented keeps a handwritten log of all ICU admissions that is recorded by the secretary as

soon as a patient is admitted and updated with discharge disposition as patients leave the ICU. This ICU log was used to track the total number of ICU admissions on a weekly basis, deaths and hospice discharges that occurred on the unit.

Data were collected on a weekly basis. Early results appeared to show a decline in the number of medical orders for palliative care consultation, and therefore, the project lead decided to collect additional data to explore whether there were potential difference in illness severity between the 2 patient populations. In order to compare the pre and post intervention groups' severity of illness, SOFA scoring was completed by the DNP student on a random sample of pre and post-intervention patients admitted to the ICU on a weekly basis. The DNP student used the patient log kept by the ICU to perform a SOFA scoring for the first patient admitted for each week of this project followed by every fifth patient on the list thereafter in both pre and post-intervention groups. The EMR was accessed in order to perform a SOFA screening for each random patient in both the pre and post-intervention groups identified from the ICU log. The information that compares illness severity between the pre and post-intervention patient groups is presented in Appendix C.

The 2-week period when the in-services were held was excluded from data collection as use of the SOFA scoring tool was inconsistent. The dates for this period were between February 27, 2022 and March 12, 2022.

During the educational phase, demographic and survey data on nurses' knowledge about palliative care and SOFA self-efficacy were collected immediately before and after nurses viewed the online education module.

## **Analysis**

The independent variables in this project included the education on palliative care and SOFA scoring and the rollout of the SOFA scoring system accompanied by nurses' discussion of patient specific SOFA score in ICU rounds. The dependent variables were the nurses' knowledge and attitudes on palliative care and SOFA scoring self-efficacy, the number of medical orders for palliative care consultation and the timing of the medical orders for palliative care consultation.

Data were collected for 7 weeks before the SOFA scoring intervention and 7 weeks post-intervention, including the total number of monthly admissions and the total number of palliative care consultation medical orders. A 2-sample Wilcoxon test was used to evaluate statistically the difference in the timing of medical orders for palliative care consultations.

In addition to the number and timing of medical orders for consultations, the number of deaths, discharge to hospice care and random sample of SOFA scores were also collected for both pre and post intervention groups. A 2-sample Wilcoxon test was used to determine if the SOFA scores in the 2 samples were statistically different.

To determine the impact of the educational module on nurses' attitudes and knowledge on palliative care, and on self-efficacy of SOFA scoring system, data were collected immediately before and after the educational intervention. During the online learning module, nurses provided demographic information along with self-assessment scores on 6 knowledge and attitude questions and 5 self-efficacy questions. Non-parametric tests were used to analyze this data including a 2-sample Wilcoxon test and permutation test. These tests were selected as the sample size was small and the results were not normally distributed.

## CHAPTER FIVE: RESULTS

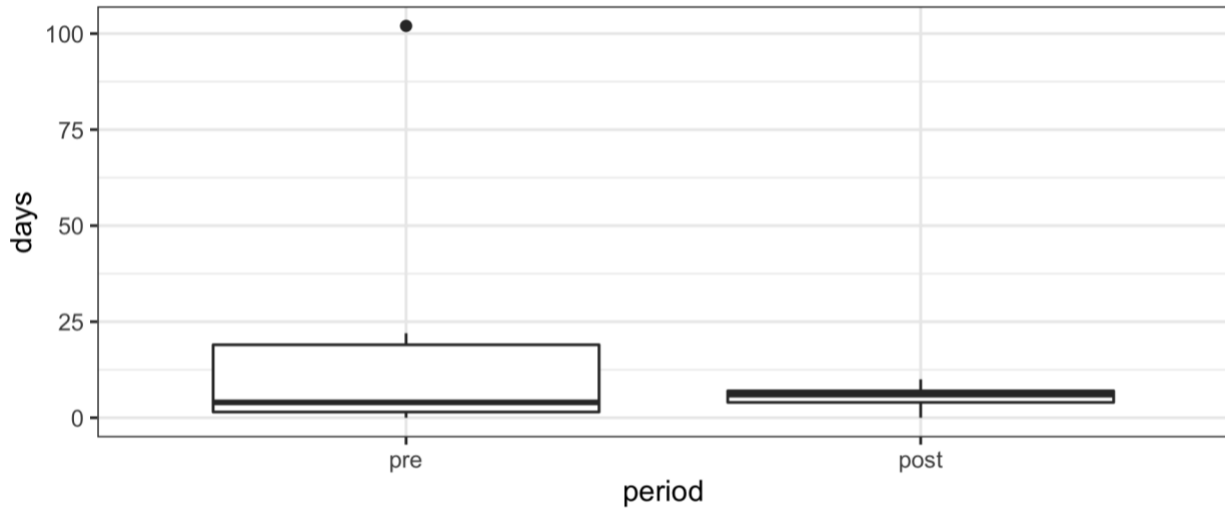
### **Number and Timing of Medical Orders for Palliative Care**

In the pre-intervention period, there were a total of 19 requests for a palliative care consultation and there was a decrease in the number of medical orders for palliative care consultations in the post-intervention period, with a total of 13 medical orders for palliative care consultation. In order to understand these unexpected results, the project lead assessed illness severity between pre-post patient samples by conducting SOFA scoring on a random sample of pre and post-intervention patients. In the pre-intervention period, random sampling was done on 43 patients and in the post-intervention period, 54 patients. The SOFA scores can be found in Appendix C and on average the pre-intervention period had a SOFA score of 6 compared to 3.8 in the post intervention period, which was rounded to 4. Although there was no statistical significance to this finding, there was also a higher death rate in the pre intervention period, 17.6% compared to 14.7%, likely signifying higher severity of illness in the pre-intervention group.

An important consideration for palliative care in the ICU is when in the course of the hospitalization is a medical order for palliative care placed. Timing of consultations greatly affect outcomes of services; therefore, the goal was to initiate palliative care discussions upon admission to the ICU and decrease the amount of time it takes for palliative care to be consulted. Prior to the intervention, there were 19 separate palliative care orders for consultation and the range of timing for these orders were 0 to 102 days after admission to the ICU with an average of 12.8 days. In the post-intervention period, there were a total of 13 medical orders for palliative

care. These consultations were requested between day 0 and day 10 of ICU hospitalization with a median of 6 days and mean length of 5.5 days. Figure 1 is a box plot of these findings.

**Figure 1:** *Box Plot of Timing of Medical Orders for Palliative Care Consultation (n=19 in pre and n=13 in post intervention)*



There is a large difference in the means of the pre and post intervention periods; however due to a small sample size, using a 2-sample Wilcoxon test had a  $p$  value of 0.95 failing to show statistical difference. Because one medical order during the pre-intervention period was a notable outlier with timing of 102 days, a sensitivity analysis considered omitting this medical order for palliative care consultation. The timing for the remaining  $n=18$  pre intervention medical orders ranged from 0 to 22, with an average of 7.9 days, still higher than the post-intervention mean.

### **Nursing Education Module**

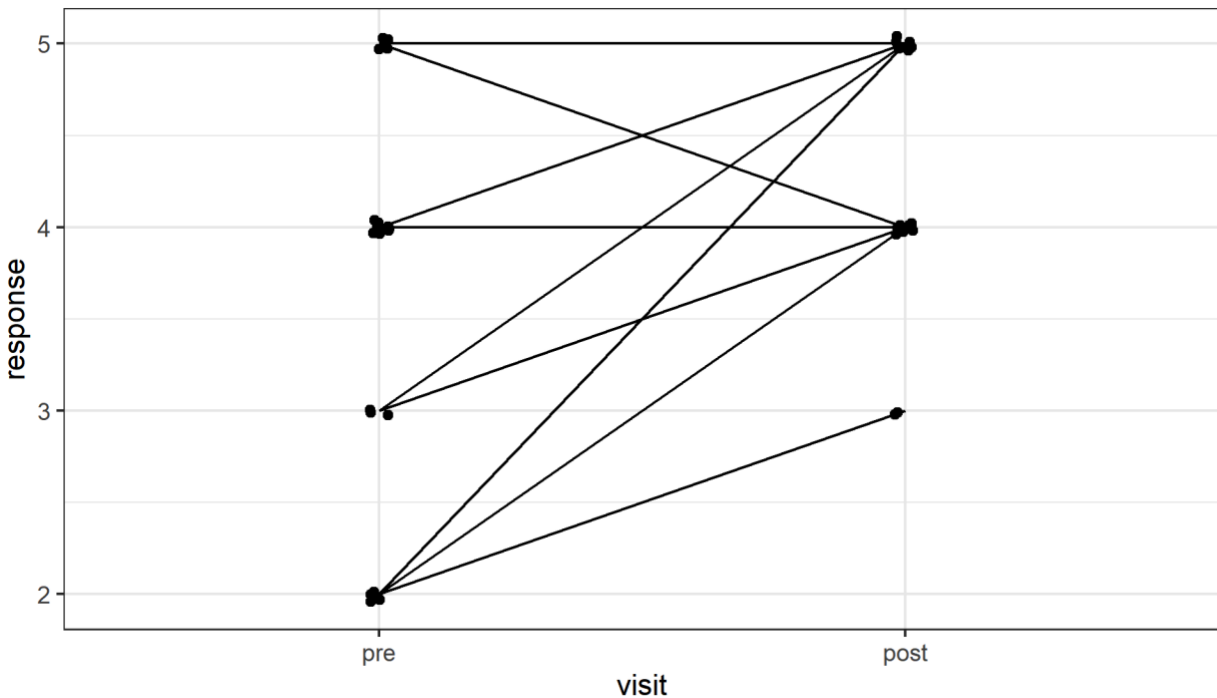
Demographic information was obtained on the nurses who completed the online educational module. Of the nurses who completed the educational module, 5 had less than 2 years of nursing experience, 12 had 3-5 years of nursing experience, 1 had 6-10 years of experience and 3 had greater than 10 years. In terms of educational background, 3 nurses had an



Associate's Degree in Nursing, 2 had a Master's degree and majority had a Bachelor's Degree. Nine nurses were under the age of 30, 5 were in their 30's, 2 were in their 40's and 5 were above the age of 50.

In the knowledge and attitudes survey, only question 5 resulted in statistically significant change after the educational module. The question was: "Most ICU patients experience needs that can be addressed by palliative care." There was increased agreement with this statement using a 2-sample Wilcoxon analysis with a  $p$  value of 0.015. A permutation test was also conducted, which also showed statistical significance with a  $p$  value of 0.015. This information is depicted in Figure 2.

**Figure 2:** Arrow Plot of Statement "Most ICU patients experience needs that can be addressed by palliative care"(n=21)



Key: Response 2 Disagree, 3 neutral, 4 agree, 5 strongly agree

The first question on the self-efficacy of SOFA scoring (Appendix E) was related to identification of mortality risk based on nursing experience. No change was expected for this question after taking the course as nursing experience was unchanged, and no statistical significance was observed. Question 2 was regarding nurses’ ability to determine “patient’s mortality based on SOFA score”, there was also no statistical significance observed. For questions 3-5, there were significant changes in nurses becoming more confident using the SOFA tool, interpreting the results and utilizing the information in ICU rounds. The 2-sample Wilcoxon test and the Permutation test were utilized for statistical analysis and for question 3 which asked regarding the completion of the SOFA score using an online calculator or paper version, the p-value was 0.005 on Wilcoxon and 0.003 on the Permutation test. For question 4, which asked about the ability to interpret the SOFA score, the p-value was 0.007 and for question 5, comfort level with leading discussion of mortality risk in ICU rounds, the value was 0.05 for the Wilcoxon test and 0.03 on the permutation test.

**Table 1:** *Statistical Analysis for Pre and Post Test Questions*

Question	Mean pre	Mean post	Mean change (95% CI)	Wilcoxon test p-value	Permutation test p-value
Knowledge and Attitudes Question 5	3.67	4.24	0.57 (0.19, 1.0)	0.015	0.015
Self-Efficacy Question 3	4.05	5.38	1.33 (0.62, 2.14)	0.005	0.003
Self-Efficacy Question 4	4.10	5.29	1.19 (0.51, 1.95)	0.007	0.002
Self-Efficacy Question 5	3.62	4.33	0.71 (0.14, 1.38)	0.05	0.03

The table above shows the 95% confidence interval which was calculated nonparametrically, by bootstrapping. Both Wilcoxon and the permutation test are nonparametric tests with the null hypothesis of no change between pre and post education.

## CHAPTER SIX: DISCUSSION

This pilot project found that there was a reduction in the mean timing from ICU admission to medical order for palliative care consultation when mortality screening was performed by ICU nurses upon patient admission to the unit and subsequent discussion of results in ICU rounding. The timing did not reach statistical significance due to a small sample size, but there was a notable difference when comparing the mean between the two groups. Multiple studies have been conducted on the benefits of early introduction of palliative care in the critically ill patient population. Research demonstrates that the timeliness of palliative care consultation impacts the level of benefit patients can gain from this service (Barkley, et al., 2019; Ma, et al., 2019). According to Barkley, et al. (2019), benefits of palliative care include a reduction in inpatient mortality and decreased 30-day readmission rate, which are aligned with the goals of this institution. However, these benefits are only observed if the palliative care consultation was placed prior to day 6 of hospitalization, therefore, decreasing this timeline is of great importance (Barkley, et al., 2019). In the current DNP project during the post-intervention period, the timing of palliative care consultations decreased to a mean of 5.5 days, which according to Barkely et al (2019) can maximize the observed benefits of palliative care. Ma, et al. (2019) also found that the earlier the palliative care team is involved in patient care, the greater the impact of outcomes. If palliative care is consulted within the first 2 days of

admission, there are significant reduction in the number of total mechanical ventilation days, reduced rate of tracheostomies, reduced total ICU and pharmacy related costs while increasing hospice utilization (Ma, et al., 2019).

On average approximately 10% of patients who are at high risk of death receive a palliative care consultation and when a consultation is requested, it occurs on the 9<sup>th</sup> day of an ICU hospitalization (Ma, et al., 2019). In this DNP project, 9.6% of the pre-intervention population admitted to the ICU, received a medical order for palliative care consultation with an average of 12.8 days into the hospitalization. During the post-intervention period, overall, fewer patients received a palliative care consultation which could in part be due to patients in the post-intervention period having lower SOFA scores, thus less severity of illness. However, when orders for palliative care consultation were placed, it occurred on average 5.5 days into the hospitalization which is a difference of 7.3 days. This finding remains important even though it did not show statistical significance within this pilot project. Reduction in the time of palliative care involvement in the ICU is linked to services resulting in greater impact both to patients and families as well as cost reduction (Ma, et al., 2019). Seaman et al. (2017) found that 21.9% of palliative care consultations orders occur on the day of death or discharge when likely the palliative care team can have little or no impact on outcomes. This pilot project supports the need for larger studies in the future to help determine if introduction of mortality screening tool upon ICU admission can help providers to involve palliative care services earlier in the course of an ICU hospitalization. When palliative care consultation occurs earlier in the course of hospitalization, it allows for palliative care teams to have greater impact. This is a significant finding and worth further investigation with a larger population of ICU patients.

Palliative care benefits patients, families, healthcare providers, and the economics of healthcare (Barkley, et al., 2019; Ma, et al., 2019; Mercadante, et al., 2018; Seaman et al., 2017). Wolf, et al. (2019) suggest that increased involvement of palliative care can also benefit healthcare providers as patients receive less medically aggressive and futile care, which can ease symptoms of moral distress and burnout. The goal of this project was to demonstrate an increase in the utilization of palliative care services and to decrease the timeframe of medical orders for palliative care. The implementation of a mortality screening tool in the ICU upon patient admission has the potential to impact quality of life in patients with elevated risk of death with earlier involvement of palliative care services.

Nurses in the ICU often care for dying patients. Limited data exists on nurses' knowledge and attitudes regarding palliative care. Pre and post-education surveys on nurses pre and post educational module attempted to garner further information on knowledge that currently exists and to identify how an educational module on palliative care can impact such knowledge (Price, et al., 2017). One of the statements that the 21 nurses who completed the educational module had to score their agreement regarding palliative care attitudes was "Most ICU patients experience needs that can be addressed by palliative care." Pre-intervention, the respondents had varying degrees of agreement with this statement; however, after completion of the educational module, there was a statistically significant increase in the level of agreement among nurse respondents.

The ICU nurse educator asked the DNP student to help edit a portion of the nursing orientation educational module's that is provided to all new nurses upon hire to the institution. Editing was requested for the section related to advanced care planning, Physician Orders for Life Sustaining Treatments, symptom management and palliative care for hospitalized patients. During this activity, the DNP project investigator found that all nurses during onboarding were

taught that palliative care is for actively dying patients only. It is important for all nurses, especially ICU nurses to understand the benefits of early initiation of palliative care services. Therefore, it was important that palliative care module as part of this project helped change how palliative care had been taught and practiced at this community hospital. This finding is consistent with the literature which indicates a lack of formal palliative care education for nurses and practices vary between facilities (Kim, et al., 2020; Subih, et al., 2022). The hospital administration will continue to encourage nurses to take the learning module that was developed for this project.

The educational module provided to the nurses did show improved self-efficacy in performing SOFA screening, and nurses felt confident that they would be able to discuss mortality risk in ICU rounds. The 3 items of self-efficacy that showed statistically significant change included: a) calculating a SOFA scoring using the paper version or online calculator, b) determining the associated mortality risk and, c) discussing the findings in multidisciplinary rounds. Nurses' confidence in these three skills can strengthen their voice when participating in interdisciplinary discussions about providing quality patient care. The education was intended to further the understanding of palliative care and also empower nurses to advocate for patients in need of palliative care services. Gantz, et al. (2020), related the Self-Efficacy Theory to educating nurses on palliative care and found that empowering nurses' knowledge and understanding allowed for positive attitudes related to practice change.

### **Limitations**

This was a single institution pilot project and was carried out in 1 ICU setting with relatively small sample size of nurses and providers. Data were collected only for 7 weeks prior to the intervention and 7 weeks post intervention, which is a short timeframe for data collection.

There are also no recent, reliable instruments to measure ICU nurses' attitudes and knowledge regarding palliative care.

The online educational module that was created for this project and made available for nurses to complete, was only completed by approximately 30% of the staff nurses. No personally identifiable information was gathered on the nurses who completed the module; therefore, it was not possible to determine if nurses who took the module were more likely to initiate discussion about palliative care during interdisciplinary rounds. Although unit director, educator and hospital administration were supportive of the program, nursing compliance with viewing the educational module was low. Also, the hospital uses a significant number of traveler nurses who were not offered the education, leaving many nurses who were not aware of the practice change on the unit. A decision was made to provide unit-based in-services prior to project implementation and a separate in-service during charge nurse meeting to help improve compliance. During the 9 in-services, approximately 10-15 nurses attended per session receiving the information and all 6 charge nurses attended the in-person charge nurse meeting. However, these nurses did not receive the full education as the 51-minute video addressed goals and benefits of palliative care unrelated to the mortality screening tool. The nurses who did not take the module only received the mortality screening portion of the education and this likely influenced their ability to advocate on behalf of their patients as their understanding of the benefits of palliative care was limited. This could have had an impact on the results that were seen during this pilot phase.

The literature has identified some barriers that contribute to the underutilization of palliative care services including unfamiliarity with individual providers and lack of clear understanding of services offered by palliative care (McDarby & Carpenter, 2019). Attempts

were made to tackle these particular issues by provision of palliative care education for medical staff, but it is unclear if the intensivists attended this training.

The SOFA scoring system has traditionally been used to determine mortality risk. The site of the project is interested in identifying patients who are at the highest risk for inpatient mortality, therefore the use of this instrument is appropriate for this setting. However, results may not translate to general usage at other facilities as institutional goals may vary. For those institutions with a well-established palliative care program, providers will likely have more experience with palliative care services and may not need assistance in identifying patients who could potentially benefit.

### **Lessons Learned**

This project was undertaken at a community hospital that the project investigator was not associated with. Project implementation as a student has many challenges even with supportive leadership team. The Chief Executive Officer (CEO) served as a mentor for the DNP student, however not having an organizational affiliation, it was challenging to work with the nursing and medical staff, especially during the Covid-19 pandemic. The ICU was dealing with staff shortages and burnout, so it was a difficult time for the addition of a nurse-led intervention. Identification of more stakeholders early in the project planning phase may have helped to assist with various resources that were needed during the project. Project investigator did not have access to the online learning module that was used to upload the nursing education module. Various staff members were identified to assist with this task; however, they had not previously used the system, there was turn over within the department, delaying the originally intended timeline for project implementation. For further investigation at this site, an appointed project



investigator who is employed by the institution and has familiarity with the ICU team would be beneficial and likely result in greater involvement of the ICU nurses.

### **Recommendations for Future Research**

A statistician consulted on this project and recommends a matched pair study in the future where patients with same severity of illness are paired to increase the power of the analysis. After performing a simulation, depending on the desired power, matched pairs of 24-92 patients will be required to reach statistical significance.

The palliative care group that has been consulting on these patients is also interested in evaluating outcomes between the pre and post intervention groups and has requested data from the hospital to look into any differences in the length of ICU stay and total hospitalization, total days of mechanical ventilation, hospice utilization and pharmacy related expenses in the 2 groups.

### **Implications for Practice**

Palliative care availability is increasing in acute care hospitals with 75% of hospitals that have 50-beds or more currently offering the service (Barkley, et al., 2019). Often when hospitals start a program, the goal is to identify patients at the highest risk for mortality and provide targeted interventions. Mortality screening tools upon admission can help identify the patients with the highest needs in a timely manner to ensure maximal benefit from palliative care resources. Prior studies have found a benefit in using the SOFA score to help guide time-sensitive end-of-life conversations (Bier, et al., 2020; Orr, 2019; Tan et al., 2018). This DNP project failed to show any increase in the number of medical orders requesting palliative care consultations, but did appear to improve the timeliness of the orders.

There were possible reasons that the medical orders for palliative care did not increase. The project investigator noted that some physicians started having increased goals of care conversations after determining that a patient had a high risk of mortality. There was a slight increase in the number of hospice discharges that occurred during the post-intervention period. The hospital was not able to provide data on the number of Do Not Resuscitate orders which could also indicate the number of conversations that occur between patients/families and providers. There was also a decrease in the average SOFA score for the post-intervention population, possibly signifying lower mortality risk patients in the post-intervention period. Low number of nurses completed the educational module designed for this project which likely impacted knowledge, attitudes and self-efficacy of palliative care understanding and the application of mortality screening and subsequent discussion, which could have impacted the number of palliative care consultations. Further educational on topics of palliative care can help improve nurses' attitude regarding the discipline and based on a positive change in self-efficacy scores, nurses were both capable of performing mortality screening, interpreting the results and presenting the information to colleagues during rounding. The most important finding of this study were increased timeliness of medical orders for palliative care and improved self-efficacy related to mortality screening and interpretation of results among nurses, which warrants further studies.

## CONCLUSION

Palliative care is a relatively new specialty that has experienced tremendous growth over the past two decades (Grant, et al., 2021). The availability of services and their utilization varies greatly between facilities (Jones & Bernstein, 2017). Multiple studies have demonstrated the benefits of palliative care can include improved pain and symptom management, alignment of

goals of care to the treatment plan, improved communication and understanding of the clinical condition, improved satisfaction with care, and death occurring at a preferred location.

(Mercadante, et al., 2018; Seaman et al., 2017). Despite these documented benefits, palliative care remains underutilized or requested late in the trajectory of illness. The site of this DNP project has had similar experiences after initiating a palliative care program in the fall of 2019.

The lack of a process to identify potential palliative care patients was the subject of this DNP project. The use of mortality screening tools has been determined to be valid predictors of mortality risk, with the SOFA score being an acceptable and feasible instrument (Bier, et al., 2020; Orr, 2019; Tan et al., 2018). This DNP project found some benefits to the use of a mortality screening tool, mainly decreasing the time frame from ICU admission to medical order for palliative care consultation. Due to a small sample size, the change was not found to reach statistical significance, however was strong enough to warrant further investigation. This study also helped determine that providing ICU nurses with palliative care education helps improve attitudes related to palliative care and also provides sufficient knowledge to perform a mortality screening. This knowledge, in turn, can empower nurses to be able to discuss their findings with ICU providers thus allowing nurses to advocate for their patients' unmet palliative care needs.

## APPENDICES

## Appendix A

### Sequential Organ Failure Assessment Score: Hospital Form

Variable	SOFA Score Components					Total
	0	1	2	3	4	
<b>Respiratory</b> - PaO <sub>2</sub> /FiO <sub>2</sub> , mm Hg	> 400	≤ 400	≤ 300	≤ 200	< 100	
<b>Coagulation</b> - Platelets x 10 <sup>3</sup> /μL	> 150	≤ 150	≤ 100	≤ 50	≤ 20	
<b>Liver</b> – Bilirubin (mg/dl)	< 1.2	1.2 – 1.9	2.0 – 5.9	6.0 – 11.9	>12.0	
<b>Cardiovascular</b> – Hypotension	None	MAP < 70 mmHg	Dop ≤ 5 or Dob (any dose)	Dop > 5; Epi ≤ 0.1 or Norepi ≤ 0.1	Dop > 15; Epi > 0.1 or Norepi > 0.1	
<b>CNS</b> – GCS scale score	15	13 – 14	10 – 12	6 – 9	< 6	
<b>Renal</b> – Creatinine (mg/dl) or urine output (ml/dl)	< 1.2	1.2 – 1.9	2.0 – 3.4	3.4 – 4.9 or < 500 ml	> 5.0 or < 200 ml	
Dop=Dopamine, Epi=Epinephrine, Norepi=Norepinephrine					<b>SOFA Score:</b>	

Score 4-5 → 20.2% mortality

Score 6-7 → 21.5% mortality

Score 8-9 → 33.3 % mortality

Score: 10-11 → 50% mortality

Score 12 or higher → 95.2% mortality

Results of SOFA Score Discussed in Rounds

## Appendix B

Mortality Risk Associate with Sequential Organ Failure Assessment Score

<b>SOFA Score</b>	<b>Mortality if Initial Score</b>	<b>Mortality if Highest Score</b>
<b>0-1</b>	<b>0</b>	<b>0</b>
<b>2-3</b>	<b>6.4%</b>	<b>1.5%</b>
<b>4-5</b>	<b>20.2%</b>	<b>6.7%</b>
<b>6-7</b>	<b>21.5%</b>	<b>18.2%</b>
<b>8-9</b>	<b>33.3%</b>	<b>26.3%</b>
<b>10-11</b>	<b>50%</b>	<b>45.8%</b>
<b>12-14</b>	<b>95.2%</b>	<b>80%</b>
<b>&gt;14</b>	<b>95.2%</b>	<b>89.7%</b>

## Appendix C

### Sequential Organ Failure Assessment Scores for Random Sample of Patients

#### PRE-INTERVENTION PERIOD RANDOM SAMPLE SOFA SCORES

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
	0	5	10	9	13	2	3
	6	1	12	1	12	18	4
	10	4	7	10	4	5	11
	5	0	10	4	3	7	2
	0	1	2	10	1	8	
	3	0	8	0	6		
		12		8	3		
					8		
<b>ESTIMATED AVERAGE SOFA SCORE</b>	4	3	8	6	6	8	5
<b>ASSOCIATED MORTALITY RATE</b>	20.2%	6.4%	33.3%	21.5%	21.5%	33.3%	20.2%

**TOTAL ADMISSIONS TO THE ICU: 199 PATIENTS    RANDOM NUMBER OF PATIENTS WHO RECEIVED A SOFA SCORE: 43**

#### POST-INTERVENTION PERIOD RANDOM SAMPLE SOFA SCORES

	6	4	8	8	4	6	0
	7	2	4	2	2	4	0
	0	0	7	0	1	7	2
	3	10	10	2	0	3	4
	0	2	12	1	5	5	0
	5	4		4	4	1	4
	7	12		0	1	7	0
<b>ESTIMATED AVERAGE SOFA SCORE</b>	5	6	8	2	2	5	2
<b>ASSOCIATED MORTALITY RATE</b>	20.2%	21.5%	33.3%	6.4%	6.4%	20.2%	6.4%

**TOTAL ADMISSIONS TO THE ICU: 224 PATIENTS    RANDOM NUMBER OF PATIENTS WHO RECEIVED A SOFA SCORE: 54**

## Appendix D

### Knowledge and Attitudes Nursing Assessment

Please read each statement carefully and place an X in the column that describes your best level of agreement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
1. Palliative care plays an important role in the ICU.						
2. Palliative care is only appropriate in situations where there is evidence of patient deterioration or impending death.						
3. The philosophy of palliative care is compatible with that of aggressive treatment.						
4. The attending physician is the only one who can make decisions on which patients would benefit from palliative care.						
5. Most ICU patients experience needs that can be addressed by palliative care.						
6. The goals of palliative care are synonymous with the goals of terminal care.						

Questions 2 and 3: From Palliative care quiz for nursing

Questions 6: The Palliative Care Knowledge Questionnaire

Questions 1, 4, 5: Were developed for this DNP project to measure nursing attitudes



## Appendix E

### Self Efficacy on Mortality Screening Assessment

Please read each statement carefully and place an X in the column that describes your best level of agreement	I have little confidence 1	2	3	4	5	6	7	8	I am very confident 9
1. Identify patient's risk of mortality upon admission based on my ICU nursing experience.									
2. Identify patient's mortality risk using the SOFA scoring tool.									
3. Use an online calculator or paper version to calculate a SOFA score.									
4. Interpret the results of the SOFA scoring tool.									
5. Present the SOFA scoring results and mortality risk in ICU rounds.									

TABLE OF EVIDENCE

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMITATION OF FINDINGS
<p>Barkley, J.E., McCall, A., Maslow, A.L., Skudlarska, B.A. &amp; Chen, X. (2019). Timing of palliative care consultation and the impact on thirty-day readmissions and inpatient mortality. <i>Journal of Palliative Medicine</i>, 22(4), 393-399.  <a href="https://doi.org/10.1089/jpm.2018.0399">https://doi.org/10.1089/jpm.2018.0399</a></p>	<p>Evaluate the impact of the timing of palliative care consultation (PCC) on the 30-day readmission and inpatient mortality rate</p>	<p><u>Sample:</u> n=43,463 patients with length of stay (LOS) &lt; 30 days who did not receive a palliative care consultation and n=6,043 patients who received a palliative care consultation</p> <p><u>Setting:</u> Patients admitted to an 8-hospital not-for-profit healthcare system in North Carolina</p>	<p><u>Methods and Design:</u> A retrospective observational study utilizing healthcare system data on timing of PCC and determining 30-day rehospitalization and hospital mortality data. All patients selected had a LOS&lt;30 days and admitted for primary diagnoses of infection, circulatory, neoplasm, respiratory, digestive system or overdose related condition with Charleston Comorbidity Score of &lt;3. Treatment group was divided into 3 subgroups: PCC 0-2 days, 3-6 days or 7-30 days.</p> <p>Patient who met all conditions above and did not have a PCC.</p> <p>Interventions and Measures: Primary outcomes measured were 30-day unplanned rehospitalization and risk adjusted mortality data. The</p>	<p>Late PCC group had a higher likelihood of LOS&gt;15 days or greater.</p> <p>30-day readmission for early PCC group (0-2 day PCC) was 15.6% lower compared with the usual group and 21.2% lower in the PCC day 3-6</p> <p>Inpatient mortality was 26.3% lower for the early PCC group and 25.9% lower for PCC placed hospital day 3-6</p> <p>For PCC placed day 7 or later,</p>	<p>This was a large study focused on benefits of PCC based on timing of the consult.</p> <p>Limitation: single not-for-profit hospital system in North Carolina which can potentially limit the applicability of the findings</p> <p>Given the large sample size, this study does show significant benefit for early PCC vs waiting to see how patient progresses in the course of the hospitalization prior to placing PCC</p>

			observed that was included were actual readmissions and deaths and the expected values were calculated by CareScience risk adjusted mortality.	inpatient mortality increased by 12%, but there was a benefit to the readmission rate by 16.3%	
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CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMITATIONS OF FINDINGS
<p>Bier-Laning, C.M., Hotaling, J., Canar, W.J. &amp; Ansari, A.A. (2020). Survival, outcomes, and use of acuity scoring systems following tracheotomy in veteran patients. <i>American Journal of Hospice &amp; Palliative Medicine</i>. 37(11). 890-896.  <a href="https://doi.org/10.1177/1049909120914518">https://doi.org/10.1177/1049909120914518</a></p>	<p>To determine if established prognosis tools used for critically ill patients can accurately predict survival in patients undergoing tracheostomy</p>	<p><u>Sample:</u> 138 patients who underwent tracheotomy</p> <p><u>Setting:</u> A single Veteran Affairs hospital in the Midwest</p>	<p><u>Methods/Design:</u> This was a post hoc analysis of patients in the prior 6 years who were admitted for medical, non-traumatic reasons to the hospital had received a tracheotomy in the hospital. Using data from EMR, LODS and SOFA scores were calculated using data from 24 hours (or earlier if not available) and patient death data was obtained for the 6 months following the procedure</p> <p>No comparison group</p> <p><u>Interventions and Measures:</u> LODS and SOFA scores were calculated for each patient using the most recent laboratory data available within the 24 hours of tracheotomy procedure. These numbers were compared against actual mortality rates to determine the</p>	<p>The average LODS score was 4.9 and average SOFA score 5.8, higher scores. Both LODS and SOFA scores had a statistically significant association between inpatients deaths with <math>t=-2.59(92)</math> for LODS and <math>t=-2.69(92)</math> for SOFA with <math>P</math> of 0.011 and <math>P</math> of 0.008 respectively.</p> <p>Both scoring systems also were predictive of 90-day mortality, however only LODS was associated</p>	<p>Many patients in the ICU are on the ventilator and discussions occur regarding need for tracheotomy, it is important to have prognostic information available.</p> <p>Limitation for the study is that majority of patients were male.</p> <p>Given the strong correlation of mortality risk tools to observed mortality, researchers suggest use of these tools in palliative care for purposes of prognostication</p>

			accuracy of the mortality scoring tools	with 180-day mortality.  At 90-days, the statistical significance was $t=-2.67(92)$ with $P=0.009$ for LODS and $t=-2.20(92)$ with a $P$ value of 0.031.	
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Notes: EMR=Electronic Medical Records; LODS=Logistic Organ Dysfunction Score; SOFA=Sequential Organ Failure Assessment

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMITATION OF FINDINGS
<p>Chang, C.H., Chen, S.W., Fan, P.C., Lee, C.C., Yang, H.Y., Chang, S.W., Pan, H.C., Tsai, F.C., Yang, C.W. &amp; Chen, Y.C. (2017). Sequential organ failure assessment score predicts mortality after coronary artery bypass grafting. <i>BMC Surgery</i>. 17(22).  <a href="https://doi.org/10.1186/s12893-017-0219-9">https://doi.org/10.1186/s12893-017-0219-9</a></p>	<p>To determine the validity of APACHE II and SOFA scoring as a predictor of mortality for CABG patients</p>	<p><u>Sample:</u> 483 patients, over the age of 20, who underwent CABG  <u>Setting:</u> a single tertiary care hospital in Taiwan</p>	<p><u>Methods/Design:</u> Post hoc analysis of patients who underwent CABG during study period. Multiple scoring systems were obtained including Society of Thoracic Surgeons (STS) mortality risk, European System for Cardiac Operative Risk Evaluation (EuroSCORE) II, SOFA, and APACHE II</p> <p>No comparison group</p> <p><u>Interventions/Measures:</u> Extraction of pertinent data to perform scoring system using initial post CABG laboratory findings with the primary outcome measurement of in-hospital mortality. Student <i>t</i> test was used to compare means and normal distribution of data. Chi-square test was used when evaluating observed and predicted deaths</p>	<p>Overall, in-hospital mortality was 9.9%. Both SOFA and STS mortality risk were significantly superior to EuroSCORE II. SOFA discriminatory ability (0.912±0.019, <i>P</i>&lt;0.001) and APACHE II (0.866±0.027) with <i>P</i>&lt;0.001 exhibiting a close agreement between observed and predicted mortality</p>	<p>There are varying degree of complications and mortality reported for post cardiac surgery patients, SOFA and APACHE II scoring systems were successfully applied to this population in a tertiary care hospital in Taiwan and both scoring systems were predictive of in hospital mortality. SOFA and APACHE II scores were calculated by using laboratory values in the immediate post-operative period. It is difficult to ascertain if pre-operative scoring would also be predictive of inpatient mortality, further studies would be needed in the preoperative period</p>

Notes: APACHE II=Acute Physiology and Chronic Health Evaluation II; CABG=Coronary Artery Bypass Grafting; SOFA= Sequential Organ Failure Assessment

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMITATION OF FINDINGS
<p>Kim, S., Lee, K. &amp; Kim, S. (2020). Knowledge, attitude, confidence, and educational needs of palliative care in nurses caring for non-cancer patients: a cross-sectional, descriptive study. <i>BMC Palliative Care</i>, 19(1), 105-119. <a href="https://doi.org/10.1186/s12904-020-00581-6">https://doi.org/10.1186/s12904-020-00581-6</a></p>	<p>To assess knowledge and understanding of nurses who care for patients with palliative care needs with varied medical conditions besides cancer.</p>	<p>Sample: 102 nurses in various departments who do not provide cancer care. 55 of the nurses were ICU nurses</p> <p>Setting: tertiary care hospital in Seoul, Korea</p>	<p>Methods/Design: A cross-sectional, descriptive correlational design</p> <p>Comparison Group: None</p> <p>Interventions/Measurement: Demographic information was self-reported by nurses that included sex, age, marital status, educational background, religious affiliation, work area, position, and specific education received on topics of palliative care, hospice or end of life care and they were administered Palliative Care Quiz for Nursing</p>	<p>Nurses had low levels of palliative care knowledge (9.73±2.10) on a scale of 0-20 with moderate attitude towards palliative care. Knowledge was significantly correlated with attitude. Prior education of palliative care, hospice or end of life care improved confidence in caring for patients</p>	<p>Knowledge in palliative care is limited in nurses across work settings and was the only modifiable factor found to affect nurses' confidence</p> <p>Limitation: This was a single center study in an academic medical center, with over 2500 nurses and only a sample size of 102 nurses. Also, done in Korea which may not translate to the US</p> <p>Finding: This study is significant to show that there is no standardized training for nurses in area of palliative and end of life care and nurses with prior education had increased confidence in caring for this population</p>

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMITATION OF FINDINGS
<p>Ma, J., Chi, S., Buettner, B., Pollard, K., Muir, M., Kolekar, C., Al-Hammadi, N., Chen, L., Kollef, M., Dans, M. (2019). Early palliative care consultation in the medical ICU: A cluster randomized crossover trial. <i>Critical Care Medicine</i>, 47(12), 1707-1715.  <a href="https://doi.org/10.1097/CCM.0000000000004016">https://doi.org/10.1097/CCM.0000000000004016</a></p>	<p>To assess the impact of early triggered palliative care consultations for ICU patients</p>	<p><u>Sample:</u> n=199 patients, with 97 in the intervention group and 102 care as usual</p> <p><u>Setting:</u> Two medical ICUs in Barnes Jewish Hospital</p>	<p><u>Methods/Design:</u> This was a cluster randomized crossover trial. Based on presence of severe or chronic organ dysfunction, patient were screened for eligibility.</p> <p><u>Comparison Group:</u> Treatment as usual group</p> <p><u>Interventions/Measurements:</u> In the intervention arm, patients received PC consult within first 48 hours of ICU admission. APACHE II was used to estimate disease severity. Clinical data was measured which included code status, duration and use of mechanical ventilation, ICU and hospital LOS, vasopressor use, in-hospital and 30-day mortality</p>	<p>Intervention group had significantly higher code status change to DNR/DNI, 50.5% compared with 23.4% Transfer to hospice care was 18.6% vs 4.9% in control group Mechanical ventilation was 2 days shorter and tracheostomy rate was 7.8% in care as usual group vs 1% in intervention group</p>	<p>In all measured variables, early palliative care consultation vs consultation as usual resulted in improved outcomes for patient</p> <p><u>Limitation:</u> This was a single center study in an academic medical center, results may not be generalizable</p> <p><u>Finding:</u> This study is significant to show benefits with early palliative care involvement, necessitating larger scale studies to validate outcome</p>

Notes: APACHE II= Acute Physiology and Chronic Health Evaluation II; DNR/DNI=Do Not Resuscitate/Do Not Intubate; ICU=Intensive Care Unit; LOS=Length of Stay; PC=Palliative Care



CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMITATION OF FINDINGS
<p>McCarroll, C. (2018). Increasing access to palliative care services in the Intensive Care Unit. <i>Dimensions of Critical Care Nursing</i>, 5(6), 180-192.  <a href="http://doi.10.1097/DCC.0000000000000299">http://doi.10.1097/DCC.0000000000000299</a></p>	<p>To determine if the use of a palliative care screening tool using evidence-based triggers would help increase the proportion of palliative care consults</p>	<p><u>Sample:</u> ICU admissions over the course of 3 months prior to intervention and 3 months post intervention. Only 10 patients admitted prior to intervention and 10 patients post intervention, sample size only 20 patients  <u>Setting:</u> A 14-bed ICU in the Midwest</p>	<p><u>Methods/Design:</u> A 8-point site specific screening tool was developed, was completed on admission and daily thereafter. If the patient scored positive on the screening tool, the nurse was expected to discuss the palliative care needs during daily multidisciplinary round that included the attending physician  <u>Comparison Group:</u> the number of palliative care consults in the 3 months prior to intervention  <u>Interventions/Measures:</u> After the QI project was implemented, the monthly number of palliative care consults for the 3 months post intervention was compared to the 3 months prior to the intervention</p>	<p>Prior to the intervention, only 10% of ICU admitted patients had palliative care consultation and post intervention, the rate was 30%. Data was determined to be statistically significant.</p>	<p>Although the study size was very small, this project did demonstrate that with the use of an evidenced based screening tool, patients are being identified for unmet palliative services as well as clinicians are being educated on aspects of palliative care.</p>

Notes: QI=Quality Improvement

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Designs, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMINATION OF FINDINGS
<p>Seaman, J.B., Barnato, A.E., Sereika, S.M., Happ, M.B. &amp; Erlen, J.A. (2017). Patterns of palliative care service consultation in a sample of critically ill ICU patients at high risk of dying. <i>Heart &amp; Lung</i>, 46(1). 18-23. <a href="https://doi.org/10.1016/j.hrtlng.2016.08.008">https://doi.org/10.1016/j.hrtlng.2016.08.008</a></p>	<p>To describe the patterns of palliative care consultation among ICU patients who are at high risk of death during the hospitalization.</p>	<p><u>Sample:</u> 775 patient who were admitted to the ICU during the study period who either died during the hospitalization or had an APACHE III score with a predicted mortality of 24.7%. <u>Setting:</u> Two tertiary care hospitals in the Mid-Atlantic</p>	<p><u>Methods/Design:</u> A retrospective analysis of patients admitted to the ICU in 2 tertiary care hospitals using APACHE III scoring system as well as all patients who expired during hospitalization in ICU and did not have an initial high mortality score. <u>Comparison Group:</u> None <u>Interventions/Measures:</u> EMR data was used to determine patterns of palliative care consultation. Of the study group, EMR data helped determine how many individuals received a palliative care consult and of those who did, at what point during the hospitalization and proximity to death/discharge, the consult was obtained.</p>	<p>A total of 73 patients received a palliative care consultation during the hospitalization, 13% of the consults that were placed received the consult a day prior to discharge, 21.9% on the day of death or discharge/transfer and the remainder received a consultation on average of 4 days prior to death/discharge.</p> <p>Average consultation request was 8.89-days <math>\pm</math> 6.02 (0-26) post hospitalization with average duration of consultation 4.64 <math>\pm</math> 4.11 (1-20).</p>	<p>This study solidifies that high risk patients (those at high risk of hospital mortality) have unmet palliative care needs and when services are available, palliative care consult is requested late in the course of hospitalization and majority of patients get palliative services on average 4.64 days, but almost 30% of patients, palliative care is requested on the day of death/discharge thus patients are dying without palliation of symptoms, suggesting earlier involvement of palliative services in the course of hospitalization.</p>

Notes: APACHE III= Acute Physiology and Chronic Health Evaluation III; EMR=Electronic Medical Records; ICU=Intensive Care Unit

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPERTATION, LIMITATION OF FINDINGS
<p>Tan, A.C., Jacques, S.K., Oatley, M., &amp; Guminiski, A.D. (2018). Characteristics and outcomes of oncology unit patients requiring admission to an Australian intensive care unit. <i>Internal Medicine Journal</i>. 49(6). <a href="https://doi.org/10.1111/imj.14160">https://doi.org/10.1111/imj.14160</a></p>	<p>To identify potential predictive factors associated with prognosis of patients admitted to ICU with advanced malignancies</p>	<p><u>Sample:</u> 96 patients with average age of 61 years old, 58% male, admitted to ICU with underlying metastatic disease</p> <p><u>Setting:</u> Single tertiary care hospital ICU in Australia.</p>	<p><u>Method/Design:</u> All medical oncology patients admitted to ICU between study period of June 2014 to June 2016. Factors such purpose of ICU admission, as well as completion of APACHE II and SOFA score completed. This was a retrospective study.</p> <p>No comparison group</p> <p><u>Measures/Instruments used:</u> After SOFA and APACHE II scores were obtained, patients were followed with clinical outcomes of hospital and ICU mortality as well as total length of stay were measured. Continuous variables were expressed as mean and SD and discrete variables as percentages. Multivariate and univariate logistic regression were used to</p>	<p>For inpatient mortality, APACHE II score (odds ratio of 1.11 with 95% confidence interval, 1.01-1.22, <math>P=0.03</math>) and SOFA score of (odds ratio of 1.29, 95% confidence interval 1.07-1.22, <math>P=0.03</math>) were predictive of hospital mortality. 30-day non-hospital mortality was associated with SOFA score with a <math>P=0.01</math> but not APACHE II scoring</p>	<p>SOFA and APACHE II scoring system have been used for prediction of ICU mortality with various patient populations. All patients with metastatic cancer would qualify for palliative care services and this study aims to differential patient who would benefit from ICU stay vs those who have a high risk of mortality and would benefit from palliative care services, concurrently with ICU stay or as a way of preventing admission to ICU. Further studies are needed to determine optimal time of use of these tools as well as incorporation of palliative care services and benefits that are observed with the use of these tools and patient outcomes</p>

			identify factors associated with 30-day and 6-month mortality, <i>P</i> -value of less than 0.05 was considered statistically significant		
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Notes: APACHE III= Acute Physiology and Chronic Health Evaluation; ICU=Intensive Care Unit; SOFA=Sequential Organ Failure Assessment

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