

UTILIZING POPULATION-SPECIFIC EDUCATION TO IMPROVE THE
CONFIDENCE OF GERIATRIC TRAUMA CARE PROVIDERS

By

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Abstract

Geriatric patients make up a large percentage of emergent presentations to critical access hospitals. Persons over the age of 65 bring with them multiple co-morbidities, polypharmacy, and complications with care due to aging physiological processes. Health care professionals are faced with the challenge of considering these factors while performing emergent and lifesaving treatments. The purpose of this project was to provide population specific education to health care professionals to increase self-efficacy in providing trauma care to persons 65 years of age or older. A literature review was performed to determine which factors can have the most detrimental effects on geriatric patient mortality after a traumatic injury. Research of the literature was also used to generate an education program for providing trauma care specific for the geriatric population. The target audience for this program was health care professionals in a critical access hospital in Northwest Kansas. The audience evaluated perceptions of self-efficacy in providing evidence-based care to injured geriatric patients using pre- and post-presentation Likert scale surveys. Wilcoxon signed ranks test determined that a statistically significant improvement in self-efficacy was gained through the education program.

Keywords: education, geriatric, nursing, self-efficacy, trauma

TABLE OF CONTENTS

| | |
|----------------------------------------|----|
| Abstract..... | 1 |
| Statement of the Problem | 4 |
| Objective | 7 |
| Background and Significance | 7 |
| Definition of Variables | 9 |
| Theoretical Framework | 9 |
| Assumptions | 10 |
| Literature Review..... | 10 |
| Geriatric Triage | 11 |
| Education | 16 |
| Methods..... | 17 |
| Project Design | 17 |
| Project Sample | 17 |
| Selection Process | 19 |
| Data Collection Instrument and Methods | 19 |
| Human Subjects Protection | 20 |
| Data Analysis | 20 |
| Results..... | 20 |
| Demographics | 20 |

| | |
|-------------------------------------|----|
| | 3 |
| Self-Efficacy | 22 |
| Discussion..... | 24 |
| Limitations | 26 |
| Conclusions & Recommendations | 26 |
| References..... | 28 |
| Appendices..... | 34 |

Utilizing Population-Specific Education to Improve the Confidence of Geriatric Trauma Care Providers

The aging of one of the largest population groups into their sixth and seventh decades has dramatically expanded the geriatric population worldwide. In the United States alone, persons over the age of 65 account for 48 million or 15 percent of our total population in 2015 (U. S. Census Report, 2016). Many of these persons are remaining in their homes longer, while managing multiple chronic health conditions. These factors result in an increased risk for injury and the devastating life altering events that can accompany a serious health incident. To limit the long-term consequences with geriatric injuries, population specific management of traumatic injuries could potentially improve patient outcomes. Emergency care professionals in critical access hospitals set in motion the process of determining appropriate care for geriatric patients in their communities. Education initiatives specific to the needs of geriatric patients can impact the care being delivered and significantly improve their lives after injury (Olufajo, et al., 2016).

Statement of the Problem

Traumatic injuries rank among the top causes for hospitalization of the geriatric patient (Maxwell, 2014). “Geriatric trauma patients 65 years or older account for 10% of all trauma but 28% of all trauma deaths” (Wiles, Day, & Harris, 2016). Trauma is defined as a serious injury to the body caused by two main forces: blunt force or penetration trauma according to the National Institute of General Medical Studies (NIH, 2018). Blunt force trauma occurs when an object or force strikes the body, often causing concussions, deep cuts, or broken bones. Penetrating trauma results in injury when an object pierces the skin or body, usually creating an open wound. Falls account for up to 50 percent of injuries in the geriatric population, while motor vehicle accidents, pedestrian accidents, and burns make up an additional 30 percent of reported injuries (Bonne &

Schuerer, 2013). According to the Geriatric Practice Management Guideline of the Eastern Association for the Surgery of Trauma, persons over the age of 65 face an increased risk for adverse outcomes after injury (Calland, et al., 2012).

The care of the geriatric patient is complex as considerations must be made for multimorbidity, potential interactions or adverse effects from pharmaco-therapeutics, deconditioning and muscle weakness, fragility of tissue and bones, impaired wound healing, and changes in cognition (American College of Surgeons, 2010). These factors also contribute to the higher incidence of injury for this group. With the advances in chronic disease management, the geriatric population is enjoying a more active lifestyle, while polypharmacy and comorbid conditions exacerbate potential complications from injuries derived from these activities (Bradburn, et al., 2012; Gaebel & Keiser, 2017).

Geriatric patients have significant co-morbidities which contribute to post-trauma mortality (Bradburn, et al., 2012; Gaebel & Keiser, 2017). Geriatric persons are more likely to have multiple chronic conditions such as hypertension, diabetes, coronary artery disease, or congestive heart failure which may necessitate the use of beta blockers, calcium channel blockers, antihypertensives, anticoagulants, and diuretics. Aging alone can lead to heightened pain tolerance, frailty, increased risk for hypothermia due to decline in thermoregulation, and increased risk for developing shock as a result of limited physiologic reserve. (Bonne & Schuerer, 2013; Bradburn, et al., 2012; Hammer, et al., 2016; Min, et al., 2015; Washington State Department of Health, 2015). The use of traditional trauma protocols can be contraindicated considering the specific needs of the geriatric patient (Hammer, et al., 2016). Adjustments must be made to traditional trauma response actions to provide appropriate care for this complicated cohort of patients. The approach of care specific for the injured geriatric patient can promote

early detection of injury, decrease risks for complications, and expedite care to improve patient outcomes and decrease mortality (Bonne & Schuerer, 2013; Min, et al., 2015). In addition to providing age specific care, the methods used to triage the injured geriatric patient should be adjusted to more accurately determine the severity of injuries. Reduction of an individual facility's trauma activation thresholds for geriatric patients can improve mortality rates (Calland, et al., 2012; Min, et al., 2015; Wiles, Day, & Harris, 2016). Critical access facilities must also consider the level of injury which would necessitate a transfer to higher level of care. Even for the minimally injured geriatric patient, consideration for early transfer to a facility with geriatric trauma specialists can improve patient outcomes by up to 80% (Bradburn, et al., 2012; Goodmanson, et al., 2012; Zafar, et al., 2015).

Critical access and rural hospitals are often on the front lines of caring for the injured geriatric patient. Emergency department physicians, advanced practice providers, and nurses are often isolated from geriatric specialists and have identified a need for specific trauma education for geriatric patients (Cortez, 2018; Wolf & Delao, 2013). The inclusion of education regarding the needs of the geriatric population in new practices and protocols is essential for improved patient outcomes (Cortez, 2018; Zafar, et al., 2015). As critical access hospitals in northwest Kansas look to obtain and renew trauma designation certifications, the organizations aim to include geriatric education in their continuing education lineup. While the current Kansas Trauma Registry regulations do not specify continuing education topics, facilities strive to provide care relevant to the needs of individual healthcare providers and their communities (KDHE, 2018).

Objective

The purpose of this project was to provide an education program for health professionals at one critical access hospital in rural Kansas to increase their level of self-efficacy while providing emergent care to injured patients 65 years of age or older. According to Harmon (2019) a geriatric trauma education program will benefit the hospital and the community by allowing their providers the opportunity to learn about special considerations for geriatric trauma patients. “Several of our nurses also serve the community at EMTs, so this education will affect the care they provide in both roles” (Harmon, 2019).

Background and Significance

In the total geriatric population in the United States, 3 million are treated for falls annually with one out of every five falls causing serious injury such as a broken bone or head injury (CDC, 2017). From those falls, total medical costs were over \$50 billion in 2015 (CDC, 2017). The direct costs related to falls overburdens the already strained Medicare system. Indirect consequences such as loss of independence, loss of financial security, and diminished health or even death can be attributed to traumatic falls as well. It is estimated that 15% of geriatric fall patients with resultant traumatic injury will die from their injuries (Hashmi, et al., 2014). While the statistical data and cost significance listed is specific for falls which encompass up to 50% of geriatric injuries, the principles of age-related improvements to geriatric care can be equally applied to other mechanisms of injury such as motor vehicle collisions and farm accidents (Bonne & Scheuer, 2013; Bortz, 2015).

While considering the improvement of care and mortality, one must not deny the significance of overall reduction of health care costs and resource utilization. Appropriate triage of geriatric trauma patients can reduce length of stays and post-injury deficits (Min, et al., 2015;

Staudenmayer, et al., 2013). Early detection of co-morbidities can dramatically reduce the length of time to readmission and emergency room visits after initial trauma admissions (Ko, et al., 2015). These adjustments can dramatically reduce the amount of expenditures of monetary and other resources as well as decrease the financial burden of the patient (Maxwell, et al., 2016).

The geriatric population accounts for up to 50% of total population in the rural communities in northwest Kansas as shown in the KU Institute for Policy and Social Research (2016) Older Population Density Ratio in Kansas (Appendix A.). As this population continues to age the number of healthcare needs and risk for injury will continue to climb. Front-line health care providers, such as EMS, emergency room nurses and providers, are in the position to determine whether a patient qualifies as a trauma and the intense assessment and treatment that comes with it. With an understanding of the potential complications and needs of geriatric patients, healthcare professionals in critical access hospitals can provide population specific care and improve patient outcomes.

The target critical access hospital for this project was situated in a rural county in Kansas. The county health center (CHC) boasts a progressive vision and is dedicated to administering quality care to the community with the aid of current technological and medical advancements. The CHC employed 30 nurses and saw an average of 150 patients in their emergency department each month (Harmon, 2017). Approximately 40 percent of these patients are over the age of 65, which is consistent with the average population in rural counties in Kansas for the same age group. (Harmon, 2017; U. S. Census Report, 2016). Older adult injuries per month were reported to be sporadic in number and severity, with fewer than one or two a month (Harmon, 2019). The high-risk population and low volume of occurrences increased the need for specialized and regular education on geriatric trauma. The CHC holds a Level IV trauma designation which

stipulates that advanced trauma life support will be administered in remote areas where higher levels of care are not readily available and that the care provided can be enhanced by effective education and support of the providers delivering care (KDHE, 2018). This project served to provide geriatric injury and assessment education to the professional staff of CHC as stipulated by the collaboration affidavit (See Appendix B).

Definition of Variables

The main variable in this project was perceived self-efficacy of the health care provider regarding the delivery of geriatric trauma care. Theoretical knowledge was fostered through the delivery of facts in this education presentation. Practical or operational knowledge was demonstrated by the application of the education provided to geriatric injury case studies and survey responses.

Theoretical Framework

The theoretical basis for this project was easily outlined using the Adult Learning Theory. Knowles identifies five main assumptions of the adult learner which are equally applicable to health care professionals (Knowles, et al., 1984). Health care providers have a highly developed sense of self-concept and can direct their own learning utilizing past-learning experiences. Providers of emergent care are trained to be problem focused in their approach to clinical situations which parallels the necessity for improved practices. The individual provider's motivation to further his or her practice and clinical knowledge is driven by the desire to do no harm and to provide evidence-based care.

The Functional Context Learning Theory is another example of a learning theory which was applicable to this project as it suggests learners find relevance in new information being presented when it is pertinent to their own work (Sticht, 1988). Nursing education incorporates

theory, education, and most importantly clinical practice. Nursing care advances by studying the challenges in practice and remedying disparities with bedside improvements. Advanced practice nurses strive to improve nursing practice and health care delivery through marrying theoretical and clinical expertise (Gatti-Petito, et al., 2013).

The cognitive concept of self-efficacy is the belief in one's ability to influence events that effect one's life and control over the way these events are experienced as explained by psychologist Albert Bandura (Buchanan, 2019). According to Bandura, self-efficacy is influenced by four main principles: previous successes and failures; behaviors and consequences in similar situations; encouragement and discouragement from others; and enthusiasm or anxiety in a specific situation (Buchanan, 2019). By applying the foundation of Knowles' Adult Learning Theory and Bandura's self-efficacy principles, this project incorporated theoretical concepts into a geriatric trauma adult education program to improve the clinical confidence and perceived self-efficacy of emergency care providers.

Assumptions

For this project, it was the assumption that healthcare providers had somewhat sporadic or limited experience with injuries in patients over 65 years. It was also assumed that the providers would seek to incorporate population specific needs into the emergent care of the geriatric population.

Literature Review

The extensive review of literature provided evidence which supported the need for education regarding appropriate triage and management of geriatric trauma patients, specifically in rural areas where geriatric specialists are not available. The literature review also identified

co-morbidities and assessment data which would predispose a geriatric patient to negative outcomes which will be included in the educational presentation.

A literature search was performed using CINAHL, Cochrane Library, PubMed, ProQuest, UpToDate, and Web of Science to review studies which evaluated geriatric trauma protocols and mortality measures in addition to trauma education methods. The CDC, U. S. Census, and Kansas population databases were reviewed to garner statistical data. Key word searches include using *geriatric trauma*, *rural trauma*, *geriatric injury triage*, *critical access hospital*, *geriatric trauma education*, *geriatric injury*, and *rural healthcare needs*. Inclusion criteria encompassed studies performed in the last eight years with participants were over the age of 65 who had injuries resulting from trauma. The studies examined trauma protocols or initiatives which were implemented explicitly for the geriatric patient. Factors related to the geriatric patient which contributed to an increased risk for injury and negative outcomes as a result of treatment were investigated. Population specific educational needs and challenges for critical access or rural hospitals were reviewed. Methods of instruction for nursing staff responsible to respond to trauma alerts were considered. Studies were excluded if published more than eight years ago.

Geriatric Triage

The Institute of Medicine recommends trauma centers include specific geriatric protocols and assessments in response to the increase in rate of geriatric injury and rising mortality with those injured, including but not limited to geriatric specialists, comprehensive geriatric assessments, and geriatric trauma protocols (Maxwell, et al., 2016). Level III and Level IV trauma centers currently report only 30% of geriatric trauma patients receive a complete geriatric assessment, while only 17% employ or consult a geriatrician or someone specialized in geriatric

care (Maxwell, 2016). Staudenmayer, et al., (2013) found that the injured geriatric patient was under-triaged in the field at a rate of 32.8%. In larger Level I trauma centers, the experience in geriatric trauma and early consultation with a geriatrician decreased mortality and improved comprehensive multidisciplinary care (Cortez, 2018; Goodmanson, et al., 2012; Maxwell, et al., 2016; Olufajo, et al., 2016; Zafar, et al., 2015).

Another important factor identified was early, comprehensive triage prior to admission or transfer to a Level I or Level II trauma center. Through the review of primary research studies, the literature supported the effectiveness of geriatric protocols implemented in any facility which treats injured geriatric patients. Key components of early triage assessments which impacted mortality rates included age, co-morbidities, injury severity score, Glasgow coma score, hypotension, level of consciousness, base deficit, preinjury frailty, venous lactate levels (Bradburn, et al, 2012; Bonne & Schuerer, 2013; Bortz, 2015; Calland, et al., 2012; Hammer, et al., 2016; Hashmi, et al., 2014; Ichwan, et al., 2015; Joseph, et al., 2014; Joseph, et al., 2013; Maxwell, Dietrich, & Miller, 2018; Maxwell, et al., 2016; Min, et al., 2013; Salottlo, et al., 2013). Limitations identified were retrospective study design, small samples sizes, and potential selection biases (Bradburn, et al., 2012; Calland, et al., 2012; Hammer, et al., 2016; Hashmi, et al., 2014; Ichwan, et al., 2015; Joseph, et al., 2014; Joseph, et al., 2013; Maxwell, et al., 2016; Min, et al., 2013; Salottlo, et al., 2013).

The identification of co-morbidities and contributing factors is extremely critical in the early treatment of geriatric trauma. Hashmi, et al., (2014) found that injured patients over the age of 74 years doubled their risk of mortality after injury. Min, et al., (2013) revealed an increase in post-injury complications such as infection, pneumothorax, aspiration, pulmonary

embolism, and deep vein thrombosis with hypotension upon initial assessment and found that even mildly elevated injury severity scores increased mortality by 24%. These are merely examples of the multifactorial issues that can complicate the care and recovery of the injured older adult (See Table 1.). According to Maxwell, et al. (2016), there exists a need to perform “early, holistic assessment aimed at establishing goals of care based on individual needs and personal values” (p. 201.) Identification of co-morbidities and other contributing factors offers an opportunity to provide trauma care specific to the needs of geriatric patients. Consideration of those co-morbidities allows for timelier and more specific triage of geriatric trauma patients (Hashmi, et al., 2014; Ichwan, et al., 2015; Joseph, et al., 2013; Staudenmayer, et al., 2016; Wiles, Day, & Harris, 2016).

With the aging population, there are many avenues to decrease the rate of exposure to traumatic injuries. The extent of which is too large to consider and discuss within the guidelines of this project. However, Maxwell, et al. (2016) demonstrated that frailty and cognitive decline leads to increased mortality at six months and one year after a traumatic injury, while Bradburn, et al., (2012) and Hammer, et al. (2016) revealed that population specific trauma guidelines can reduce mortality rates. Maxwell, Dietrich, & Miller (2018) discusses the importance of utilizing frailty as an indicator of biological aging and the associated risks for injury rather than relying on chronological age alone. While there is some debate regarding the specific guidelines to implement for geriatric trauma policies or programs, consideration and adjustments for the geriatric patient to any standard trauma guideline will increase survival rates and enhance quality of life post-injury (Bradburn, et al., 2012; Cortez, 2018; Hammer, et al., 2016).

Table 1.

Physiological changes of aging and injury

| Body System | Aging Effect | Significance with injury |
|----------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Neurologic | Dementia or Previous stroke | Inaccurate assessment, masks decreasing level of consciousness |
| | Atrophy | Increases risk for bleeding and cell rupture |
| | Decreased pain sensation, neuropathy | Hides severity of injury or worsening condition |
| Cardiovascular | Hypertension | Alters the "normal" blood pressure reading, hides early signs of hypovolemia |
| | Heart failure | Complications with aggressive fluid resuscitation |
| | Use of beta blockers, calcium channel blockers, or ACE inhibitors | Delays vasoconstriction and masks early signs of blood loss |
| | Decreased great vessel elasticity | Increased risk for aortic rupture or dissection |
| | Decreased refractory response to hypovolemia | Lack of compensatory mechanisms with blood loss |
| | Use of anticoagulants | Increases risk for bleeding, delayed subdural hemorrhages |
| | Use of diuretics | Dehydration effects complicates hypovolemia |
| Pulmonary | Decreased functional capacity/elasticity | Less respiratory reserve, higher risk for hypoxia, higher risk for pneumo/hemothorax |
| | Reduced oxygenation/perfusion | Increased risk for lactic acidosis |

| Body System | Aging Effect | Significance with injury |
|-----------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------|
| | Smoking history, COPD, emphysema | Difficulty with oxygenation, increased risk for hypercapnia |
| GI / Hepatic | Cirrhosis | Increased risk for bleeding, decreased medication metabolism, increased risk for toxicity |
| | Decreased intestinal circulation | Increased risk of intestinal necrosis with hypotension |
| Genitourinary | Decreased renal circulation, friable tissue | Increased risk for fluid retention, ureter or urethral trauma, and hemorrhage |
| Musculoskeletal | Osteoporosis, degenerative disease of joints, arthritis | Increased fracture rate and severity (hip/pelvis with falls), functional decline post-injury |
| | Kyphosis | Increased risk of spinal cord injury and compression fractures |
| | Loss of cartilage, decreased joint elasticity | Increased incidence of pneumonia and joint injury |
| Integumentary | Decreased elastin and cell reproduction | Decreased thermoregulation capabilities, increased risk for subcutaneous hemorrhaging |
| Endocrine | Diabetes | Delayed healing, increased risk for infection |
| | Decreased response to catecholamines | Decreased response to stress, decreased compensation mechanisms, persistent hypotension |

Note: ACE = angiotensin converting enzyme, COPD = chronic obstructive pulmonary disease.

Adapted from Bonne & Schuerer, 2013; Bradburn, et al., 2012; Dalton, et al., 2015; Hammer, et al., 2016; Min, et al., 2015; & Washington State Department of Health, 2015.

Education

The application of research evidence into practice is facilitated by dissemination to direct patient care providers through educational endeavors. The effectiveness of education is in part due to the content of the material but is largely related to the receptiveness and motivation of the audience. Sticht stressed the importance using the foundation of current knowledge to process new information and skills in functional means such as application-based assessments to facilitate the learning process (Sticht, 1976). An education program which includes the interwoven concepts of knowledge with the application of those concepts into realistic clinically based scenarios would likely be more successful in increasing audience participation and patient outcomes.

Direct care providers in emergency rooms have the unique opportunity to vastly improve the quality of the initial care after a traumatic injury. “The elderly trauma patient presents a challenging clinical dilemma to any health care team,” (Resnik, 2011). Emergency care education which focuses on the specific needs of the geriatric trauma patient can foster provider confidence and improve patient outcomes following injury. Optimum results with patients can be achieved when cared for by nurses and health care providers who are educated in the specific needs of the geriatric population (Resnik, 2011).

Rural settings are challenged to find supplemental education programs which meet the needs of nurses and providers. Wolf noted three important barriers identified by nurses in the delivery of care in rural setting and critical access hospitals: 1) skill level and experience of providers and nurses, 2) lack of knowledge of specific clinical populations, and 3) limited resources for educational opportunities (2013). “The incorporation of geriatric education for trauma nurses must be considered as a first step in preparing nurses for the care of geriatric

trauma patients,” (Bortz, 2015, p. 305). Through this education program, it was proposed that health care providers in this rural community would feel aptly prepared to administer evidence-based care to geriatric trauma patients.

Methods

Project Design

An evidence-based education program was developed, and peer reviewed by an experienced trauma services provider. The program was disseminated in a manner to allow for continued educational use by the CHC at the request of the chief nursing officer. The education program was made available to the CHC as a PowerPoint voiceover presentation in addition to a pdf format for handout.

A pre- and post-test study design was used to evaluation self-efficacy data prior to and after the education program presentation. A Likert scale survey was developed to measure the change in the participants’ perceived self-efficacy regarding providing geriatric trauma care. Descriptive data was collected regarding demographics of the audience; including by not limited to provider role, years of experience, and level of education.

Project Sample

Permission was obtained from the chief nursing officer of the CHC to provide an education program on geriatric trauma. Program participants were derived from a convenience sample of emergency and nursing care providers which serve the community of the CHC. The audience included licensed practical nurses and registered nurses. Convenience sampling was ideal for this project as it allowed for voluntary and anonymous participation. The program was scheduled at a time to optimize participant numbers.

Selection Process

Both pre- and post-surveys were to be filled out completely. Participants were limited to licensed personnel. This target audience was selected due to an identified need for specialized geriatric trauma education (Cortez, 2018; Harmon, 2019; Wolf & Delao, 2013). All surveys were filled out in their entirety by licensed participants. Based on the inclusion criteria, no survey responses were excluded from the study.

Data Collection Instrument and Methods

A 12 item self-efficacy Likert scale survey was adapted from tested and validated tools from educational and health care research (See Appendix C). Items were drawn from the scale by Bonsaksen, et al., (2013) and edited to evaluate specific geriatric trauma self-efficacy principles by adding terms such as “geriatric trauma” to the questions. General self-efficacy questions were derived from the education-based survey from Gaumer Erickson & Noonan (2018). General self-efficacy survey questions were selected based on the applicability to this project, while the wording remained unchanged.

The Likert scale questions were chosen and developed to evaluate self-efficacy. Questions 1, 2, 3, 10, and 11 were specifically worded to evaluate geriatric trauma self-efficacy. The remaining questions were used to measure general self-efficacy beliefs about to education and clinical practice.

The identical pre- and post-surveys were distributed by paper handout prior to and after of the education program. No identifying information was obtained from the participants. Data was entered in REDCap manually based on paper survey responses. Quantitative data was collected to analyze significant differences of pre- and post-presentation self-efficacy

questionnaires completed by the program participants. In addition to self-efficacy scores, demographic information was collected for descriptive statistical analysis of the participant pool.

Human Subjects Protection

Based on the educational focus, proposed learning outcomes, and methods of data collection for the project, no human subjects' risks for harm were identified. This quality improvement project which was focused on provider education was submitted to the KUMC Human Subjects Committee and required no further review. No identifying information such as name, street address, or phone number was collected. Volunteer participants for the project were not required to identify themselves to the researcher and were able to conclude their participation in the project at any time without bias.

Data Analysis

Data from the surveys was entered and organized in REDCap, a secure server. Once entered in REDCap, the data was exported to SPSS for analysis. Twenty participants completed both surveys. Descriptive statistics were performed on the demographic categories of age, gender, profession, years in profession, and education. Non-parametric statistical analysis was performed to compare changes in mean scores of each self-efficacy survey question using Wilcoxon signed rank test.

Results

Demographics

There were 20 education program participants, consisting of 19 females (95 %) and one male (5 %). There were two participants less than 25 years of age (10 %), ten 25 to 39 years of age (50 %), four 40 to 54 years of age (20 %), and four 55 to 70 years of age (20 %). The majority of the participants or 19 (95 %) reported being registered nurses, with one LPN (5 %) in

attendance as well. Participants reported five (25 %) had been in their profession less than 5 years, three (15 %) had 5 to 9 years of experience, six (30 %) had 10 to 19 years of experience, and six (30 %) had 20 to 30 years of experience. Twelve (60 %) of the licensed professionals have an associate's degree and 8 (40 %) have a bachelor's degree. See Table 2 for summarized data.

Table 2.

| <i>Demographic Frequency and Percentages</i> | | |
|----------------------------------------------|-----------|------------|
| Variable | Frequency | Percentage |
| Age* | | |
| < 25 years | 2 | 10.0 |
| 25-39 years | 10 | 50.0 |
| 40-54 years | 4 | 20.0 |
| 55-70 years | 4 | 20.0 |
| Gender* | | |
| Male | 1 | 5.0 |
| Female | 19 | 95.0 |
| Profession* | | |
| LPN | 1 | 5.0 |
| RN | 19 | 95.0 |
| Years in Profession* | | |
| <5 years | 5 | 25.0 |
| 5-9 years | 3 | 15.0 |
| 10-19 years | 6 | 30.0 |
| 20-30 years | 6 | 30.0 |
| Education* | | |
| Associate | 12 | 60.0 |
| Bachelor | 8 | 40.0 |

* n=20

Self-Efficacy

The reliability and validity of the original education self-efficacy survey had been established (Gaumer Erickson & Noonan, 2018), however revisions were made to meet the needs of this study. Additional reliability and validity testing were not conducted after revisions were made.

Descriptive statistics for each question can be reviewed on Table 3.

Table 3.

Question Descriptive Statistics

| Questions | Minimum | Maximum | M | SD | |
|-----------|---------|---------|---|------|---------|
| One | Pre | 3 | 5 | 3.7 | 0.65695 |
| | Post | 3 | 5 | 4.2 | 0.52315 |
| Two | Pre | 2 | 4 | 3.5 | 0.60698 |
| | Post | 3 | 5 | 4.35 | 0.58714 |
| Three | Pre | 2 | 5 | 3.95 | 0.82558 |
| | Post | 4 | 5 | 4.4 | 0.50262 |
| Four | Pre | 3 | 5 | 3.9 | 0.71818 |
| | Post | 3 | 5 | 4.2 | 0.52315 |
| Five | Pre | 3 | 5 | 3.8 | 0.69585 |
| | Post | 3 | 5 | 4.3 | 0.65695 |
| Six | Pre | 3 | 5 | 3.9 | 0.71818 |
| | Post | 3 | 5 | 4.35 | 0.58714 |
| Seven | Pre | 3 | 5 | 4.05 | 0.75915 |
| | Post | 3 | 5 | 4.35 | 0.58714 |
| Eight | Pre | 3 | 5 | 3.75 | 0.63867 |
| | Post | 3 | 5 | 4.35 | 0.67082 |
| Nine | Pre | 3 | 5 | 4.1 | 0.71818 |
| | Post | 4 | 5 | 4.45 | 0.51042 |

| Questions | | Minimum | Maximum | M | SD |
|-----------|------|---------|---------|------|---------|
| Ten | Pre | 2 | 5 | 3.8 | 0.83351 |
| | Post | 3 | 5 | 4.4 | 0.59824 |
| Eleven | Pre | 2 | 5 | 3.8 | 0.76777 |
| | Post | 3 | 5 | 4.35 | 0.58714 |
| Twelve | Pre | 2 | 5 | 4.15 | 0.81273 |
| | Post | 4 | 5 | 4.55 | 0.51042 |

Note. Pre- and post-survey question descriptive statistics.

The standard deviation for each pre- and post-survey question is less than 1.0 which demonstrates an acceptable level of variation in the data.

Analysis of pre- and post-survey results can be reviewed in Table 4 which contains two-tailed Wilcoxon signed rank statistical data. All questions demonstrated a significant increase in scores after the education program.

Table 4.

| <i>Wilcoxon Signed Ranks Test</i> | | |
|-----------------------------------|----------------|----------------|
| Variable | Z ^a | p [*] |
| Question 1 | -3.162 | 0.002 |
| Question 2 | -3.690 | <0.001 |
| Question 3 | -2.714 | 0.007 |
| Question 4 | -2.449 | 0.014 |
| Question 5 | -3.162 | 0.002 |
| Question 6 | -3.000 | 0.003 |
| Question 7 | -2.449 | 0.014 |

| Variable | Z ^a | p* |
|-------------|----------------|-------|
| Question 8 | -3.464 | 0.001 |
| Question 9 | -2.333 | 0.020 |
| Question 10 | -3.000 | 0.003 |
| Question 11 | -3.051 | 0.002 |
| Question 12 | -2.530 | 0.011 |

Note. Z scores calculated from post- to pre-survey scores.

a. Based on negative ranks.

* $p < 0.05$

Question 2 asked the participant if he or she had sufficient knowledge to care for geriatric trauma patients and had the largest increase in self-efficacy score from pre- to post-survey (Z score -3.690). Applying a more conservative significance level ($p < 0.01$), questions 4, 7, 9 and 12 would not have demonstrated statistically significant improvements in self-efficacy. This may represent unreliability with these general self-efficacy questions or indicate lack of participant's overall confidence and learning capability.

Discussion

The distribution of the demographic data was significantly uneven in the gender and profession categories. This pattern was considered given the location of nursing education programs, the facility's staffing practices, and the expectations of scholarly activities attendance. Upon review of similar facilities demographics, one may find that the distribution could likely represent a normal pattern for critical access facilities in rural Kansas communities.

Other demographic measures such as age, years in profession, and education have varying distribution patterns. Half of the program participants were between the ages of 25 and

39 years. This statistic was unexpected considering the population statistics for rural Kansas communities (KU Institute for Policy and Social Research, 2016). The years in profession and age distribution for nursing professionals at the CHC represented a valuable combination of experience and expected future years of service. While most of nursing professionals held an associate's degree, the CHC provided a tuition reimbursement program to help more nurses continue their education to obtain a bachelor's degree (Harmon, 2017). Increasing the educational preparedness among their nursing professionals will facilitate the aspiration to engage in quality learning opportunities. The additional educational concepts of nursing research and leadership that are included in baccalaureate curriculums will promote evidence-based approaches to clinical improvements in bedside practices for the CHC.

The average difference in mean (Z score) from post- to pre-survey questions specific for geriatric trauma was -3.189. This Z score demonstrated a larger increase in self-efficacy in geriatric trauma after the program than general self-efficacy (-2.770). This finding suggests that the geriatric trauma education program increased the participants' confidence in delivering geriatric trauma care. By providing specific trauma education for geriatric patients which incorporates the specific needs of this population, health care providers will have the confidence and ability to improve patient care outcomes (Cortez, 2018; Wolf & Delao, 2013; & Zafar, et al., 2015).

Albert Bandura held that positive self-imagery, mastery experiences, social modeling, and social persuasion are the corner stones of self-efficacy (Buchanan, 2019). The changes in scores of the general self-efficacy questions increased more than expected in this study. While it predicted that the general self-efficacy scores may improve slightly, the degree to which the questions changed was surprising. These findings could indicate that the education program

improved the participants' beliefs in their overall clinical practice and competence. As mentioned earlier, specific questions regarding the participants' beliefs in their learning ability and coping could be viewed as lacking statistically significant improvements. This is a potential area of exploration where further general self-efficacy questions may identify additional training needs.

Demographic data was analyzed for correlations in mean self-efficacy scores. No significant trends were observed; however, nurses over 39 years of age, over 19 years in their profession, and baccalaureate prepared had higher initial self-efficacy scores. This trend likely indicates the improvement of self-efficacy which comes from clinical experience and emotional intelligence with years of clinical practice.

Limitations

We acknowledge that the sample size (n=20) was small but data was carefully analyzed and interpreted. A limitation for this project existed due to utilizing unidimensional case studies. If the technology were available, assessment of self-efficacy and skill development could have been enhanced by using virtual or hands-on simulation experiences. The majority, or 95.0 percent, of participants were registered nurses and female. A participant group with a wider distribution of profession and gender could have added to the complexity of the analysis of the study results, however this could be corrected on future studies.

Conclusions and Recommendations

The introduction of a geriatric trauma education program improved the self-efficacy scores of study participants. Increased self-efficacy of health care professionals can translate into excellent bedside care and significantly improved patient outcomes. The health care providers at the CHC in rural Kansas are on the front lines of providing trauma care to geriatric

members in their community. This project served to increase the self-efficacy of the health care professionals so that they may provide excellent, evidence-based care specific to the needs of the geriatric patient.

Recommendations for further investigation and research would be to perform longitudinal assessments of self-efficacy after live trauma events at the CHC. The use of supplementary instruments that assess other variables that may influence quality of geriatric trauma care may be added in future studies as well. The adaption of self-efficacy questionnaires to evaluate other areas of clinical nursing practice may be useful to identify opportunities for additional continuing education projects for the professional at the CHC.

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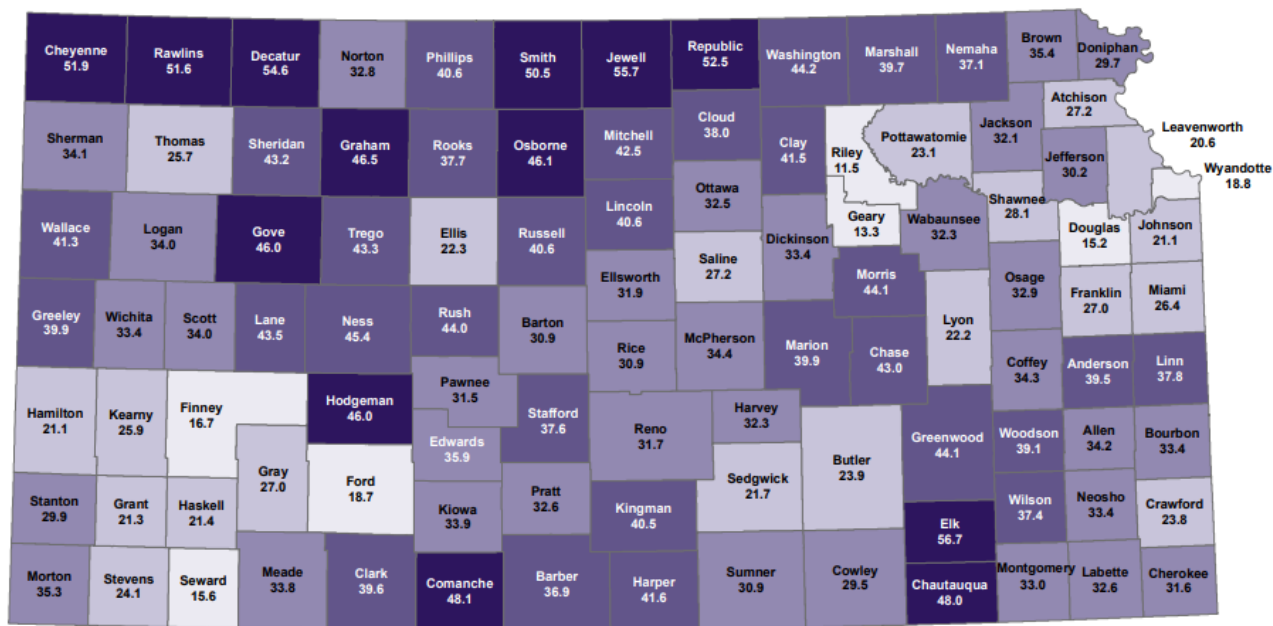
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Appendices

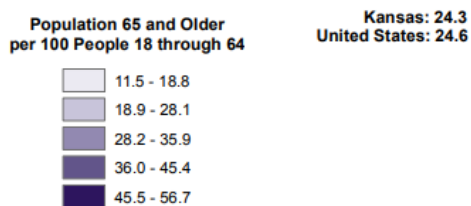
Appendix A

Older Population Dependency Ratio in Kansas

Older Population Dependency Ratio in Kansas, by County, 2016



Source: Institute for Policy & Social Research, The University of Kansas; data from U.S. Census Bureau.



University of Kansas Institute for Policy & Social Research, 2016.

Appendix B

Doctoral Nursing Project
Collaborative Affidavit

1. Purpose of the Agreement

Tina Tinkel, BSN, RN and Rooks County Health Center have agreed to work together to develop an education program related to trauma care of the geriatric patient. This agreement describes their understandings and commitments to this collaborative effort.

2. Scope and Duration:

Parties will work together for the period beginning in December 2017 through December 2019. The scope and duration of the collaboration may be amended and/or extended through the joint agreement of both parties.

3. Decision-making structure & authority:

All significant decisions regarding the collaboration will be made with agreement between both parties. Significant decisions would include eligible attendees, goals and educational needs of the audience, and scheduling of the education program.

Rooks County Health Center has identified Pam Harmon, RN, CNO within their organization to serve as the principle coordinator for the collaboration.

4. Resource Commitment to the Collaboration

No monetary resources are necessitated nor sought in this collaboration.

7. Accountability process and problem solving:

The education program will be coordinated to identify and share the essential principles of evidence-based care for the injured geriatric patient. The program will be adopted to meet the needs and goals of the both parties and the intended audience.

The signatures below represent the commitment to the collaboration and implement this agreement.

| | |
|------------------------------------------------|---------------|
| <u>Pam Harmon, RN, CNP</u> | <u>2/7/19</u> |
| Pam Harmon, RN, CNO Rooks County Health Center | Date |
| | |
| <u>Tina Tinkel, BSN, RN</u> | <u>2/7/19</u> |
| Tina Tinkel, BSN, RN | Date |

Appendix C



Geriatric Trauma Education Pre-Program Survey

Tina Tinkel, BSN, RN
Adult Gerontology DNP Project

| Demographics | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|-------------|-------------|----------------|
| Please circle the most appropriate response: | | | | | |
| Age | <25 years | 25-39 years | 40-54 years | 55-70 years | > 70 years |
| Gender | Male | | Female | | Gender Neutral |
| Profession | LPN | EMT/Paramedic | RN | APRN/PA | MD/DO |
| Years in profession | < 5 years | 5-9 years | 10-19 years | 20-30 years | > 30 years |
| Level of Education | Diploma | Associate | Bachelor | Master | Doctorate |
| Questionnaire | | | | | |
| Please rate how you feel regarding the following statements: | Disagree | Somewhat Disagree | Neutral | Agree | Strongly Agree |
| 1. The geriatric trauma care I provide is based on current evidence in research. | 1 | 2 | 3 | 4 | 5 |
| 2. I have sufficient knowledge to care for geriatric trauma patients. | 1 | 2 | 3 | 4 | 5 |
| 3. I can learn geriatric trauma principles being taught in this class. | 1 | 2 | 3 | 4 | 5 |
| 4. I can remain calm when facing difficult clinical situations due to my coping abilities. | 1 | 2 | 3 | 4 | 5 |
| 5. I am confident that I can deal efficiently with unexpected events. | 1 | 2 | 3 | 4 | 5 |
| 6. When struggling to accomplish something difficult, I focus on my knowledge instead of feeling discouraged. | 1 | 2 | 3 | 4 | 5 |
| 7. I believe no matter who you are, you can significantly change your level of competence. | 1 | 2 | 3 | 4 | 5 |
| 8. When confronted with a problem, I can rely on my experience to find a solution. | 1 | 2 | 3 | 4 | 5 |
| 9. I can overcome most challenges if I invest the necessary effort. | 1 | 2 | 3 | 4 | 5 |
| 10. I believe in my ability to care for a geriatric trauma patient. | 1 | 2 | 3 | 4 | 5 |
| 11. I feel confident in using my knowledge in geriatric trauma to provide quality patient care. | 1 | 2 | 3 | 4 | 5 |
| 12. If I take advantage of educational opportunities, I can develop my clinical skills. | 1 | 2 | 3 | 4 | 5 |
| <small>Survey adapted from: Bonsaksen, T., Kottorp, A., Gay, C.L., Fagermoen, M.S., & Ierdal, A. (2013). Rasch analysis of the general self-efficacy scale in a sample of persons with morbid obesity. <i>Health and quality of life outcomes</i>, 11 (202). Gaumer Erickson, A. S. & Noonan, P. M. (018). Self-efficacy questionnaire. In <i>The skills that matter: Teaching interpersonal and intrapersonal competencies in any classroom</i> (pp. 175-176). Thousand Oaks, CA: Corwin.</small> | | | | | |