Improving Emergency Department Triage with Accurate Emergency Severity Index

Allocation

Quality Improvement Project

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Abstract

Introduction: Unlike any other aspects of the American Health System, the Emergency Department (ED) receives an average of 145.6 million visits per year (CDC, 2019). The high number of visits with the limited resources presents a growing challenge to the healthcare professionals who are constantly evaluating new ways to provide safe and timely intervention to wide range of patients' chief complaints in the ED. Unlike other parts of the healthcare system, the ED continues to screen and treat all Americans regardless of their ability to pay or other social-political determinant of health. ED visits across the country does not require appointments or time of visits. Overcrowding in the emergency department (ED) has become a worldwide public health problem over the last decade (DiSomma et al., 2015). As a result of upsurge and the problem of over crowdedness, the five-level Emergency Severity Index (**ESI**) triage was developed to help prioritize incoming patients and to identify those who cannot wait to be seen.

Purpose: The purpose of this project was to improve current ED triage knowledge and confidence level through education and training to provide a safer practice and improve health outcomes for all ED visits. The authors of the ESI triage algorithm recommended that the rate of ED mistriage should be kept less than 10% (Gilboy, Tanabe, Travers, & Rosenau, 2015).

Method: The quality improvement project utilized a pretest and a post-test method to evaluate if ESI education increased nurses triage knowledge and confidence level. The setting was an urban institute of higher learning in Northern New Jersey. The participants were graduate nursing students working as registered nurses in the ED. A standardized case base scenario was provided to each participant in pre and post education phases.

Implications: The quality improvement project increased ESI knowledge, which will improve current ED triage practice. Improvements in ED triage practice was evident by improved accuracy of ESI triage level assignation and confidence in triaging.

*Keywords***:** ED, ESI, Mistriage, under triage, Over-triage, Five-level triage algorithm, NASC-CDM.

ED: Emergency department

Triage: A rapid assessment of illness, presenting symptoms, history and physical with limited physiological data.

Mistriage: This is when patient severity of illness is either underestimated or over estimated

Under triage: This is when a patient illness severity is underestimated resulting to less prioritization of care.

Over-triage: This occur when the urgency of care is overestimated, resulting in over-prioritization of care

NASC-CDM: Nursing Anxiety and Self-Confidence with Clinical Decision Making scale. The tool helps in measuring clinical decision and confidence level.

Five-level triage algorithm: The level developed by AHRQ 1999 help in sorting patient into categories base on the severity of the illnesses and the number of resources needed to care for the patient.

Introduction

For the past two decades, the demand for Emergency Department (ED) services in the United States has been growing to the extent that EDs across the country are experiencing an increase in wait times and an increase in the numbers of patients who leave without being seen. (Hayden, Burlingame, Thompson, & Sabol, 2014). These upsurges create an imbalance between the capacity of the ED and the demand for patient triage, diagnostic images, laboratory tests, and specialty consultations that affect the flow of patients in the ED (Yarmohammadian, Rezaei, Haghshenas, &Tavakoli, 2017). Many hospitals are looking for new ways to help resolve the problem of overcrowding, decrease the number of patients leaving before being seen by the provider, reduce the door to treatment time for patients, and improve patients' overall safety and satisfaction. The delay in treatment is correlated with high mortality rates, prolonged length of stay in the hospital, worsening of medical conditions, and increased frequency of infections, increased readmission rates, anxiety, and an unhealthy work environment (Grossman, et al., 2014). The delay also places a heavy burden on healthcare professionals, especially ED nurses who may need to work extended hours to provide quality care.

Hospitals' operational staff is declining because of the rise of health issues plaguing its employees, partially due to an overwhelming influx of patients. The stressful nature of working in the ED contributed to chronic fatigue, exhaustion, tiredness, anger, irritability, frequent headaches, gastrointestinal disturbances, abnormal weight gain or loss, depression, insomnia, and breathing difficulties experienced by many nurses working in the ED (Sarafis et al., 2016). Even with the recent medical technologies and advancement in medicine, the number of patients visiting the ED has not declined. Since 1995, ED visits have increased nationally by 20% with a simultaneous decrease in ED operational staff by 9%; that is 31.4% decrease in operational staff

per year (Hayden et al., 2014). In addition to the increase in the number of ED visits, the enactment of the Emergency Medical Treatment and Labor Act of 1985 further compounded the problem by mandating medical screening examinations to all patients who present to the ED.

EDs throughout the nation have adopted several ways to address the problem of overcrowding in the ED. Some EDs have adopted the "Throughput method" that places a nurse practitioner or physician assistant in the triage area to identify the eligible patient at triage based on complaints, comorbidities and illness acuity (Gardner, Friedman, Carlson, Bradham, & Barrett, 2018). Additional measures adopted in several EDs include the use of an Admission Predictor Tool to quickly screen and process the patient for admission before the completion of ED treatment or screening. This process failed in many organizations because of the difficulty in identifying the level of care before diagnostic test results (Linthicum, 2018).

In the pediatric emergency department, the Kiosk-Model Bilingual Self-Triage System (KMBSTS) was implemented in many EDs. The KMBSTS was used to evaluate if parents of pediatric patients using a touch screen panel could accurately enter their child's medical history data at a higher speed than the routine nurse-initiated triage (Sinha, Khor, Amresh, Drachman, & Frechette, 2014). The KMBSTS used the touch screen function to identify children at risk of decompensation based on the chief complaints by parents. When parents enter the chief complaints and describe the symptoms accurately, a score will generate which will trigger the nurse or the physician's responses.

Assessing the quality of triage decisions is an ongoing concern in EDs around the nation. Most of the EDs in the United States have adopted the Emergency Severity Index (ESI) triage system. In the United States, 94% of the EDs use the ESI triage system. In the majority of those

EDs, triage accuracy was inconsistent with the recommendations outlined in the ESI guidelines (Worth, 2017).

When patients are assigned an ESI category based on the severity of their illnesses, level of care that will maximize resource utilization and the door to treatment time for the patients are generated (Gilboy, Tanabe, Travers, & Rosenau, 2012). In the place of the usual practice of seeing patients by the time of arrival, the ESI enables nurses, doctors, nurse practitioners, and physician assistants to assess and treat patients based on the severity of the illness. The purpose of this quality improvement project is to evaluate if ESI education will increase nurses' confidence, knowledge in ESI assignment, and decrease the door to treatment time or intervention time for patients.

Background and Significance

The EDs play a growing role in the U.S. health care system, with advanced capability to manage a wide range of diseases and time-sensitive medical conditions (Morganti, et al., 2013). The use of the ED is growing faster than the use of any other parts of the American healthcare system. According to the Center for Diseases Control and Prevention (2017), 136.9 million patients visited the ED in 2016 which is 42% of the US population. About 12.3 million of the visits resulted in hospital admissions and 1.5 million of those visits were transferred to a critical care unit (CDC, 2017). The high volume of patients has created a crisis of overcrowding in many EDs. Overcrowding results from the increased demand for health services and the lack of alternatives to ED visits for many patients, especially those with low income and with no health insurance coverage. Unlike other medical systems that cap the number of patients seen per day, the EDs have no restriction or limit to how many patients visit the ED. On any given day, the ED workload can shift from a low volume of patients to a high volume of patients within a short

period. Because of these challenges and the limited resources available, 94% of EDs depend on accurate ESI triage system to provide stratification of patients into five groups from the least to the most urgent based on acuity. This stratification allows those patients with an urgent medical need to be seen first regardless of the time of arrival of other patients. The ESI stratification helps to improve the quality, safety, efficiency, and effectiveness of health care for many Americans (Gilboy, et al., 2012).

The Agency for Healthcare Research and Quality (AHRQ) has adopted the ESI level five ESI triage system as a reliable triage tool because of its excellent inter-rater reliability and the rapid, stratification that the ESI algorithm provides by categorizing ED patients by both acuity and resource needs. The validity of the tool has been evaluated by examination of outcomes by several thousand patients. The various studies found the ESI tool to be consistent and have a strong correlation with hospital length of stay and mortality (AHRQ, 2014). The various studies have suggested the need for ESI training and education. In addition to the AHRQ, the Emergency Nurses Association (ENA, 2019), has adopted a position statement on triage that states, it is a "critical assessment process performed by a registered nurse or nurse practitioner with a minimum of one year of emergency nursing experience, as well as appropriate additional credentials and education." The statement reinforces the need for experience and education of the ESI triage system. ENA maintained that triage nurses must engage in a validation process that includes observation and chart review, with remediation and further education as appropriate (ENA, 2016).

EDs face an even more profound crisis when patients are left waiting longer in the waiting room or when the sickest patients are not appropriately sorted out (Gilboy, et al., 2012).

Inaccurate triage as either under-triage or over-triage leaves patients at risk of deterioration or increased use of scarce resources. Many EDs function with limited resources, limited beds, personnel, anddiagnostic tools. The prioritization and efficient use of these resources are important to provide quality care to patients who may require immediate or life-saving measure. Failure to conserve the resources or overutilization of these resources due to inaccurate ESI algorithm will place other patients' lives at risk. Accurate triage acuity that uses a reliable and valid ESI tool is needed for quality patient stratifications in the ED (Gilboy, et al., 2012).

The ESI as a five-level triage algorithm provides clinically relevant stratification of patients into groups from group-1 (most urgent) to group-5 (least urgent) on the basis of acuity and resource needs. The algorithm is based on how long a patient can safely wait before being seen by the provider (Gilboy, et al., 2012). The nurse conducts a focused assessment when the patient arrives in the ED. Based on the assessment, the triage nurse will assign an ESI number to the patients after a triage decision is made based on the patient's objective and subjective data. The number determines the treatment priority of the patients based on the presenting symptoms. For example, ESI level 1 includes patients with respiratory arrest, cardiopulmonary arrest, and significant head trauma with hypoventilation, active seizures, shock, and sepsis with signs of hypo-perfusion and unresponsiveness. About 1-3% of all ED patients fall under this category of level 1. These patients are seen immediately by providers and nurses. The treatment team is required to be at the bedside with immediate life-saving measures as any delay could affect morbidity and mortality. Patients are assigned ESI level 2 if the nurse determines such patient to be at high risk of decompensation or death if not seen within 15 minutes. Example of such patients is those presenting with an acute coronary syndrome, immunocompromised patients with fever, abnormal vital signs, reactive airway diseases such as asthma and altered mental

status (AHRQ, 2016). The nurse and physician must see the patient within 15 minutes. ESI 3, 4, and 5 are determined based on how many resources the patient will need before deposition can be made.

The flow of patients in the ED depends on the accuracy of these numbers; not only does it trigger nurses and providers responses, but it also helps in allocating the resources properly. Assigning ESI 2 to a patient with ESI 4 is considered over-triage, and it will lead to over-utilization of scarce resources and resuscitation bed and staff for a non-urgent situation. The problem is worse when ESI 2 patients are assigned ESI 3; it is under-triage and places the patients at risk of deterioration, decompensation, morbidity, and mortality. The estimation of the wait time or acuity is made after the nurse determined that the patients do not meet ESI-1 or ESI-2 criteria and it depends on the resources the patient will need to reach a deposition. The resources include the number of tests (ECG, x-ray, CT-MRI,), interventions (IV fluid, IM/nebulized medications, a simple procedure like laceration repair, sedation), and consultations the patient will require during the ED stay. Consideration for resources is made when ESI 1-2 are ruled out, and it is used for a non-urgent patient's condition (AHRQ, 2016).

A functioning ED depends on the ability of skillful and experienced ED nurses to carry out an accurate triage rating that provide patients with quality treatments. However, to achieve this, patients arriving in the ED must be sorted correctly. In addition, the consistency and accuracy of triage tools including the policy and procedures are vital to the survival of the ED patients (Bullard et al., 2017). When policies, procedures, and training are in place, it is easier for nurses to make accurate triage decisions. The safety, the survival of patients, and the successful operations of the ED depend upon correct triage decisions.

Needs Assessment

Globally, many EDs are experiencing longer than normal wait times. Many experts and healthcare policy makers in many countries have introduced some form of national waiting time guarantees (Viberg, Forsberg,Borowitz, & Molin,2013). International comparison of waiting times and delays in treatment in EDs are critical for countries to improve policy and for patients to be able to make informed choices. Many countries in Europe have fallen below the international average waiting time of 30 minutes while other countries still have a longer waiting time in the ED. Among the developed world, Canada has the highest proportion of patients waiting for longer than an hour, with an average waiting time of 29% (Ubelacker, 2017). In May 2014, the Centers for Disease Control and Prevention reported average emergency department wait times in the United States (about 30 minutes) and treatment times (about 90 minutes), which add up to roughly two hours in the ER (Esposito, 2015). In 2013, a new interactive application called "ER Wait Watchers" gathered national data on ED wait time. The app used data from the Centers for Medicare and Medicaid Services (CMS) to measure timely and effective care (CMS, 2013). In New Jersey, patients spend an average of 30 minutes waiting, an additional 148 minutes in the ED; a duration that is more than 40 other states and 15 minutes longer than the national average (Groeger, 2013).

To resolve the problem of longer than normal wait time, attempts have been made globally, nationally, and locally. One way of resolving the problem was to identify the factors that are causing the longer wait times (Brown, 2016). Among the factors listed by Brown (2016), were frustrating ED triage system, diagnostic delay, limited resources such as numbers of bed available, inadequate disaster preparedness, closure of many EDs, and visiting the ED during the busiest hours. Triage has been cited in the literature as one of the causes of prolonged wait

times in the ED which have reduced quality of care and increased adverse health effects in the

EDs (Horwitz, Green, & Bradley, 2010). As a result of the failure of the ED reduce delay and

overcrowdedness, many countries have adopted different triage systems to address the delay in

care, improve access to care and improve overall patients' outcome. Regardless of the traige

system adopted, all triage processes are designed to assess the severity of the health condition of

the patient, and assign a treatment scale based on priorities. The Australian Triage Scale (ATS),

the Canadian Triage Acuity System (CTAS), the Manchester Triage System (MTS) and the ESI

where all designed to function in that process. Compared to the ATS, CTAS, and the MTS, the

ESI has been found to be superior in validity and reliability with a *P* value <0.01 (Christ,

Grossmann, Winter,Bingisser, & Platz, 2010).

Many nurses including literature have expressed concerns that the assigned triage level

can change based on the nurses' previous experiences, with several nurses noting that junior

nurses tend to over-triage (Mistry, et al., 2016). To ensure proper triage and accuracy in the

triage system, emergency nurses have expressed concerns for standardization of training

programs and education that will reduce the rate of over-triage by junior nurses and under-triage

by older nurses. Accurate triage will ensure effective resource distribution and patient safety in

the face of overcrowded EDs. Policy makers have called for emergency nursing input as an

essential component to understanding a triage tools' strengths and weakness (Mistry, et al.,

2016). Many EDs have tried to solve these problems by creating an alternative option like the

fast track section to meet medical needs of patients with less urgent health concerns for minor

illnesses and injuries like laceration repair, patients with normal vital signs, and patients who

require little to no resources. The fast track alternatives allow patient with low ESI algorithm

(ESI 4-5) to been seen quickly, treated in the fast track and discharged home within a reasonable

time. A review of the record from some hospitals indicates 35% of the patients in the ED were seen in the fast track area. Though, the initiation of care in fast tracks has helped to reduce wait time in many EDs. Treating high risk patients in the fast track area due to inaccurate triage has been linked to poor health outcomes (Gilboy, 2014). The ENA has maintained apposition statement that all nurses working in the ED must be engage in ESI validation process that includes observation and chart review, with remediation and routine education. ESI is no longer a tool of choice for the ED nurses rather a validated tool that is adopted in the United States and other developed countries to sort patients in the ED based on the severity of their illness and the resources available. Recognizing high risk patients and accurate anticipation of resources are important in improving patient outcome and delivery of timely care. As complex as the five-level ESI triage system can be, one of the responsibilities of ED nurse is the ability to prioritize patients' care using nursing assessment skill and accurate ESI algorithm. In addition, The American College of Emergency Physicians together with ENA supports the use of the ESI triage algorithm as a valid and reliable tool (ENA, 2016). In today's healthcare, the ESI triage system is no longer an optional tool for ED nurses but part of the overall six aims identified by the Institute of Medicine (IOM, 2001). To improve the overall quality of healthcare the ESI triage process through training and education must function to decrease the risk of negative outcomes due to mistriage, particularly while patients are waiting. The education allows everyone to be able to speak, understand, and interpret the same triage language. As a reference to IOM requirement, the language must be understood and interpreted universally by all nurses involved in patient care (AHRQ, 2014). ESI triage training is no longer for triage nurses only but for all ED providers and ED nurses. The IOM identified that accurate ESI triage will lead to reducing waits and sometimes harmful delays for those who receive care (AHRQ, 2014).

Other patients with more urgent health needs are assigned ESI levels of a less urgent health need. Mistriage, or failure to identify and differentiate patients with severe illness (e.g., myocardial ischemia, sepsis) from those with less urgent needs (e.g. constipation, headache for 2 months, minor infections) contributes to delays in time-sensitive interventions and a potentially avoidable clinical deterioration, morbidity, and mortality (Hindson, et al., 2018).

A recent scenario in a North East Jersey ED was the case of a 57 years old woman who presented with epigastric pain 7/10, and extreme fatigue. The history reveals the patient is a smoker with elevated cholesterol level and CABG in 2016.The triage nurse assigned non-urgent ESI five to the patient. The triage nurse identified the patient as a "frequent flyer" and therefore based the judgment on the patient's frequent visits to the hospital rather than the presenting complaint. The triage nurse assigned ESI -5 to the patient; and consequently, the patient was left in the waiting area for two hours before being seen by a provider. At the time the patient was seen and sent for CT scan, the patient had decompensated with ECG reading of inferior wall myocardial infarction. The triage nurse failed to consider the possibility of cardiac pathology in epigastric pain given the history of elevated cholesterol and smoking. If the triage nurse had assigned a higher triage level-2 considering a pain of 7/10 in the thoracic region, the provider would have seen the patient within 15 minutes, order ECG, and other diagnostic tests. Evaluation of abdominal pain, epigastric pain, and chest pain require a thorough and time-sensitive approach that employs the knowledge, skills, and training of a triage nurse. The delay exacerbates patients' condition, increases ED crowdedness, increases patients' wait time, decreases satisfaction, increases resource utilization, and reduces overall patients' outcomes.

In another institution in South East Jersey during a travel assignment, an interview with some of the nurses regarding the inaccurate ESI triage revealed that some of the nurses have not

had any training or education for many years, and they are not confident with the ESI algorithm.

A nurse stated, "Assigning a lower ESI of 2 will generate vital signs reminder and ongoing

assessment every hour from the electronic health record". The nurse added, "the lower the ESI

level you assigned, the less work or documentation a nurse will need to enter into the EHR''.

Though assigning an arbitrary ESI number to a patient is convenient for some nurses, it delays

the time it takes the provider to see the patients and increase patients' length of stay. The need to

educate the nurses on accurate ESI acuity is more urgent as delay will continue to have adverse

effects on patients' health outcomes.

Many hospitals across the state do not have written policies regarding staff education and

training regarding ESI. ESI is not included as part of annual competency training in the ED

despite it validity and reliability in improving overall patient outcomes and saving hospital

money through efficient utilization of limited resources.

Problem / Purpose Statement

ED overcrowding, now commonly experienced across the globe, stretches finite resources and

leads to delays in treatment and increased mortality. An effective and reliable systems for ED

triage are critical to ensuring appropriate resource allocation, patient prioritization, and

expedition of care for critically ill patients (Mistry, et al., 2018). In addition, there is also a

problem of revenue loss for the hospital due to increasing numbers of patients leaving before

being seen by a provider. In 2012, the Center for Medicare & Medicaid Services called attention

to improve ED wait times for patients by issuing hospital reimbursement incentive payments of

more than 964 million dollars to hospital for patient care and patient experience during any visit

to the hospital (Hwang, Lipman, & Kane, 2015).

The purpose of this quality improvement (QI) project is to improve nurses and doctors' response to patients in the emergency department by accurately assigning the ESI algorithm to all patients in the ED through education and training of ED nurses. The knowledge from the training will help nurses decrease emergency department crowdedness, decrease the time it takes for ED providers to assess and treat patients which may result in less crowded EDs, increase the efficacy of treatment, increase patients' satisfaction and overall patient outcomes. Improvement in nurse's confidence through ESI training may lead to an increase in knowledge and provide nurses with the tool to help sort patients for treatment based on the five-levels of ESI acuity.

Clinical Question

(P) Among ED nurses, (I) how does Emergency Severity Index education (ESI), (C) compared to no ESI education, (O) affect nurse's confidence, and knowledge in triage using the ESI five level system

Aims and Objectives

This project aims to increase nurse's confidence and knowledge through ESI education. Enhanced confidence and knowledge of the ESI will help reduce the subjectivity and variability inherent in the ESI that can lead to a functional lack of triage and a burden of undifferentiated ESI level patients that could affect overall patient outcomes, satisfaction, and revenue loss due to improper resource allocation or utilization. The objectives are to:

1. Develop education and training classes for nurses regarding accurate triage of patients using the ESI five level algorithms.

2. Evaluate nurses' confidence as measured by the self-assessment tool in using the ESI five level triage system.

3. Assess nurses' knowledge of the ESI five level system and the application into patient's scenario.

4. Implement a plan that will sustain the training/retraining of nurses due to the new evidence.

Review of Literature

The search includes Cumulative Index of Nursing and Allied Health Literature (CINAHL), MEDLINE, Cochrane Library, and ProQuest databases. The search criteria required that publications were written in English and published in peer-reviewed journals. Restriction on the publication date and geographic subset, sex, and special interest were limited to articles published after December, 2011. The key words for the search were *emergency triage*, *ESI education*, *accuracy of ED triage nurse*, and *ESI and patient's treatment time*. Additional key words included in the search were *triage nurse knowledge*, *nurse confidence in triage*, *ED workflow*, *and delay in triage, mistriage*, and *under-triage*. A total number of 16,800 records were initially identified through the database base search. Additional website search engine like Google and Yahoo was conducted using key words "ESI in emergency department", resulted in 74,300 topics, most of which were unrelated to the items of the project.

Most of the records obtained were also duplicated from the online library and the additional source used. The duplicated records were screened from the online library data, reducing the number from 42,000 to 21,000records. It was difficult to screen for duplicate copies from other sources like Google; therefore, the screening was done by considering sites with credibility (domain, authors, sources, writing style, site design) and the date of the publication. An additional screening measures focusing on the items in the topic reduced the record to twenty-four articles and journals of which eighteen of the twenty-four were duplicates

from the online library. The records were further narrowed by the year of publication from 2011

to 2014. An overwhelming number of articles were removed by narrowing the publication year

to 2014, bringing the total articles for review to 1,350. The 1,350 articles, and the peer reviewed

journals were screened by their title only, and it was narrowed down to 48 articles. Some of the

48 full text articles were not relevant to the topic or the PICOT question of the project. The

records were narrowed down to sixteen articles relevant to the project and EBP practices. Nine

research studies were selected for final review and the reference list of each publication was also

reviewed for additional information that maybe relevant to the topic. Most of the topic from the

references list were not relevant to the EBP and were eliminated.

Most of the selected literature supported the EBP that ESI education improves nurses'

confidence and enhance triage acuity and accuracy. The literature further suggests that accurate

ESI will lead to a better patient outcome and decrease overcrowdedness in the ED. The literature

suggests that lack of ESI education will lead to inaccurate ESI assignation and poor patient

outcomes (Jordi, et al., 2015). The literature did not address if ESI education will decrease the

patients' door to treatment time but added that increase education of the ESI will improve the

confidence of triage nurses. However, some publications supported that ongoing triage

education lead to better patient flow in the ED (Jordi, et al., 2015). Although, multiple studies

support the need for ESI education, there were few studies that suggested no evidence of ESI

training or education on the triage acuity and patient outcome.

ESI Education in Relation to Nurses Knowledge and Confidence

Jordi, et al. (2015) reported an improvement in nurses' confidence level after ESI

education. According to the author, ESI acuity rating went from a confidence level of 46% to

78% on the Krippendorff's alpha tool after ESI testing and ESI education was offered. In

addition to increasing nurse's confidence levels, ESI education was linked to accurate triage

process, supportive decision making, faster triage processes, and improvement in inter-rater

agreement relating to the accuracy (Malyon, Williams, & Ware, 2014; Wolf, Delao, Perhats,

Moon, &Zavotsky, 2018).

In a different study, Martin, et.al (2014) conducted a descriptive exploratory study to

explore the differences in nurses' attitudes and the difference in nurses' experience in assigning

ESI algorithm. The study included 64 nurses and 1,644 patients who entered the ED via the

triage area and were subsequently triaged using the five level ESI algorithm. Clinical expert

raters who measured nurses' experiences, attitudes, and interventions toward patients in triage

validated the accuracy of the ESI triage. The study revealed that there was no statistically

significant evidence that attitudes and experience influenced ESI level assigned to patients. The

study suggested that attitudes and experience alone do not improve triage accuracy and that

additional interventions to improve accurate triage assignation are needed. The study negated

the current practice of one-year experience for ED nurses before being assigned to the triage

area. Finally, the study showed that the ESI tool is reliable only if used accurately by the nurse.

To support the work, Jordi and Martin, Farzad, (2018), in a descriptive cross-sectional

study of 750 patients in the ED at Sina Teaching Hospital, carried out a study aimed to evaluate

the accuracy of emergency nurses in correct triage using the ESI triage system. The study

participants were selected using the convenience sampling method and the patients' triage level

was determined by nurses and physicians separately. Among the 750 patients, 577 (76.9%) were

classified in correct triage groups, 90 (12%) were in the under-triage groups and 83 (11.1%) in

the over-triage groups. The data was analyzed using SPSS Kappa agreement coefficient. The

$p<0.001$ indicated the difference between the triage level of the physician and that of the nurse.

The study concluded that improving nurses' skills and knowledge might increase the accuracy of

ED nurses in triaging patients. The study suggested that education and training on ESI

areimportant in improving triage accuracy and nurses' confidence.

Additional literature explored whether there was a direct correlation between nurses'

education of ESI triage and the patients' length of stay in the ED. In a study conducted by

Khatiban et al. (2014) the education of the nurses on ESI was found to have a positive influence

on ESI triage assignation and a nurse's performance. The ESI-triage education via problem

based learning strategy significantly lead to the decrease in the triage duration ($P<0.001$) and the

nurses' performance improvement ($P<0.001$). The author decided to compare the data of 72

participants who did not receive ESI education but were experienced ED nurses and 72 nurses

who received two weeks of education and training on ESI triage system. The data was analyzed

using the Mann-Whitney and Anova with 95% confidence. The data resulted in the duration ($p<$

0.001) indicating a significant difference in reduction of time from the door to first provider

evaluation. In the study, providing education to ED nurses on ESI decreased patients' length of

stay in the ED. The study implied that providers saw patients earlier than the usual time and

moved patients to disposition sooner than the usual time before the education was offered.

Kalantarimeibidi, Yadollahi, and Esfandiari (2014) conducted a cross sectional study to

evaluate the knowledge of fifty nurses before and after nine hours of an educational workshop

regarding patient triage based on ESI. The nurses selected for the study had at least six months

experience in the ED and had not participated in any triage educational workshop. Data were

collected using structured questionnaire and analyzed using SPSS. The test resulted in a $p<0.05$

indicating a statistically significant relationship between characteristic of nurses and the

knowledge scores in six weeks after education and no significant relationship was seen between

academic degree, marital status and gender of participants in ESI triage. The study concluded

that this education has a positive effect on increasing the knowledge and practices of ED nurses

regarding the triage of patients using the ESI. In addition, the study recommended the expansion

of practical and theoretical courses of the ESI.

Similarly, Brosinski, Riddell and Valdez (2017) conducted a process improvement

project to decrease the percentages of under-triage patients to less than 10%, using the ESI tool.

The author indicated that under-triage of patients lead to poor patients' outcome in the ED due to

longer periods of stay in the ED waiting room. To achieve a reduction in the number of under-

triage patients in the ED, the author included a three month chart review of pre and post ED

training. The chart review revealed that 102 of the 388 patients triaged were under-triaged. The

project was divided into three phases, with each phase lasting three months. The review entailed

evaluating and classifying patients based on the ESI categorization to determine the

appropriateness of the assigned triage category. The second phase consisted of a presentation of

the ESI refresher training course for all ED nurses. Phase III consisted of conducting a second

retrospective chart review mimicking the steps performed during phase one. The result of the

study showed that refresher training courses increased triage skills, and adequately support

knowledge retention, thus improving quality of the triage process. The study recommended

quarterly ESI training to help mitigate the problem of ESI under-triage.

Nurses Knowledge and Confidence Unrelated to ESI Education

Some studies reported that additional education or training does not affect improvement in nurse's performance and confidence; therefore, did not increase the accuracy of the triage algorithm. Grossman, et al. (2014) conducted a similar study to investigate the effects of a teaching intervention to reduce under-triage among ED patients. The author used a pre-posttest quasi experimental design to collect data one year after the teaching intervention was carried out. The study population of nurses and patients included N= 519 patients; 511 were aged +65 years. There were 16 nurses included in the pre-test and 17 nurses included in the post-test respectively. All of the nurses were trained according to the recommendations of the ESI implementation handbook, which is a four-hour training program. Participants took a test before and immediately after the training and another test one year later. The tests were evaluated using the Paired Wilcoxon Signed Rank test. The findings indicated that the rate of under-triage was stable over-time and the teaching intervention did not lead to a decrease in the rate of under-triage, suggesting that knowledge alone is not the reason for under-triage and that other independent factors could be contributing to under-triage of patients in the ED. The study was done in a single center and the education was provided for four hours only. The short duration of the training could be another factor why changes were not effective.

Similarly, Mistry, et al. (2016), conducted a study to assess triage accuracy, variability, and self-perception among trained nurses performing ESI triage in Dhabi in United Arab Emirates. The study recruited 35 ED nurses and utilized twenty-five standardized triage cases in the ESI hand-book to evaluate accuracy of the ESI among the trained and experience nurses in the ED. The author used the Krippendorff's alpha to assess for accuracy and inter-reliability of the ESI. The results showed accuracy of the ESI triage as 58.7% with 28.8 % of the cases under-

triage and 12.3% over-triaged. The study showed that although the nurses had a high perception

of performance, the practice environment rather than education might affect ESI assignment.

The study suggested the need for a more reliable ED triage tool, as the ESI reference standard is

universally poor with high variability. This study was conducted in a single environment with

possible barriers to using ESI in real time.

Findings and Link between Current Literature and Project Idea

The literature reviewed provided some evidence that ESI training and education improves

triage accuracy. The ESI has been widely accepted in many hospitals and has become the

standard triage scale in many countries. The reliability and the validity of the five level ESI

triage scale were tested by experts and adopted as the standard of emergency triage by experts

who compared it with other tools (Martin et al. 2014). With the limitation of the setting, time,

and population of study, many studies linked accurate ESI triage to education and training.

Some studies concluded that increase knowledge and skills of ESI triage depend on the

expansion of practical and theoretical courses of the ESI. The studies further supported yearly

annual review course or refresher courses with additional training programs like didactic

presentations, group discussions, and scenario-based triage case studies, posters, pocket cards,

and reinforcement tools for all ED nurses. Some literature showed that knowledge alone is

insufficient to improve ESI skills because no differences in ESI accuracy after participants were

exposed to training course. It was suggested that nurses' confidence level is an important

element that need to be evaluated. The review of literature provided example of increase in

confidence level after participants were exposed to education session, therefore supported the

project idea that increase in knowledge will lead to increase. In the literature, many factors were

found to affect ED triage in addition to knowledge. Factors like nurse's attitude, work place

environment, personality style, fear, and years of experience were listed as other probable factors affecting triage accuracy.

In conclusion, the idea of this project was born on current delay of care and assignation of wrong ESI score to patient in a level two urban hospital in North East New Jersey. Nurses working in the location claimed they have not received any formal training of how to correctly triage patients. The institution also assigned experienced nurses to the triage session with the assumption that years of experience increases triage accuracy. A summary of the literature, the evidence type, sample, size, setting, findings of the study and limitation are presented in the evidence table Appendix A.

Theoretical Framework

When designing a learning theory, it is important to understand how adults learn differently. For knowledge to be meaningful, it must move from reflective observation to concrete experience (Kolb, 1984). The project is conceptualized on the theory of experiential learning proposed by David Kolb. The theory states that "learning is the process whereby knowledge is created through the transformation of experience, and that effective learning is seen when a person progresses through the four stages and able to execute all stages of the model" (Kolb, 1984, p.38). The theory believes that knowledge involves experience, perception, cognition, and change in behavior. The experiential learning theory is a four-stage learning cycle that facilitates the application of newly acquired knowledge in relevant settings. The theory is relevant to this study because it provides a framework for the education of nurses regarding ESI education in the ED. Kolb (1984) emphasizes that knowledge must begin with concrete experience, or a new experience of a situation, or a re-interpretation of existing experience. In this stage, the nurses have some experiential knowledge of triage, as well as a basic

understanding of the ESI tool. The education will assess that which is known about ESI.

Majority of all the ED nurses have participated in the triage; thereby, providing the nurses the

opportunity to review, reflect, and relearn information they may already have known. The basis

of the new knowledge begins with reviewing the information which is known before creating a

new knowledge. The second stage of Kolb's cycle is reflective observation. In this phase, the

adult learner reflects and reviews on the experience. By reviewing and/or reflecting, the learner

tries to determine if any inconsistencies between the experience and understanding exist (Kolb,

1984). The ED nurses in this stage will reflect on the new learning with an attempt to understand

why the old practices became inaccurate. Reflective observation will give rise to the formation

of a new idea or a modification of an abstract concept. Finding why errors occur or why many

patients are either over-triage or under-triage, will help the learner understand the new concept

and application of the new idea. Understanding of the new concept will lead to active

experimentation in the Kolb's cycle. In this last phase, the learner applies the new knowledge

into practice (kolb, 1984).

Summarized Application of the Theory to Project Intervention

Stage 1: Concrete Experience - (a new experience or situation is encountered, or a

reinterpretation of existing experience). Participants reflect in previous experience or an

overview of a new experience in ESI triage. Participants who have experience in ESI triage will

reflect on the concrete experience and those without experience with the ESI system will be

provided with overview of the scenario. Pre-test will be administered in this stage.

Stage 2: Reflective Observation of the New Experience of particular importance is any

inconsistencies between experience and understanding. The participants will reflect on the

pretest score and their confidence level. Reflection on the pretest score allows the participant to

draw comparison between the past concrete experience and the new experience. This stage will

propel participants into the learning stage

Stage 3: Abstract Conceptualization is a reflection on a new idea, or a modification of an

existing abstract concept the person has learned from their experience. In stage 3, the participant

either learns via in person class lecture or uses the online module via YouTube and Facebook

discussion. A post-test will be administered to monitor participants' progress

Stage 4: Active Experimentation is when the learner applies their idea(s) to the world around

them to see what happens. A post-posttest is administered in this phase and participants are

provided with opportunity to review, and discuss experience gained using the created Facebook

page. All participants will be encouraged to share learning experience via Facebook or emails

and to apply and reproduce the new experience at their various place of employment.
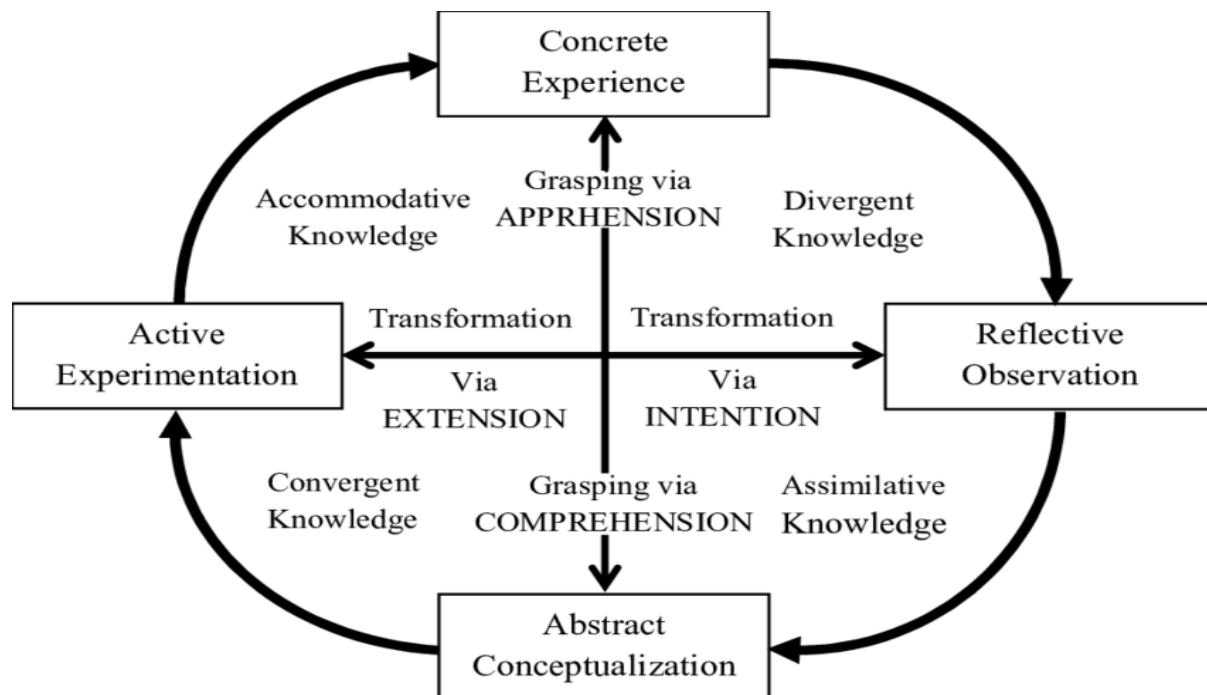
Adapted from www.research gate.net

Methodology

The proposed quality improvement project will use a pre and post-test survey to evaluate if ESI education leads to an increase in nurses' knowledge and confidence. Nurse's confidence level will be measured using a standardized Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) tool that includes 20-cases in both pre and post-test phases. The tool will be administered twice (pre and post-test) to evaluate ESI confidence before the education intervention and ESI confidence after the intervention. As a quality improvement project, the aim is to assess nurses' knowledge and confidence using a developed online education lecture by provided by Agency for Healthcare Research and Quality (AHRQ) for ESI training.

To measure knowledge increase after providing ESI education, the investigator will use a pre-test and a post-test developed by the AHRQ to evaluate if ESI education leads to increase in ESI knowledge among participants. The test will consist of a 20-case based scenario and it will be administered before the education (pre-test phase) and two weeks after the education session (post-test phase). The AHRQ cases will evaluate the impact of the intervention (education) on the target outcome (increase in knowledge and confidence). The design was selected because it allows one to see the effect of the intervention and minimizes the threats to internal and external validity due to the exposure of the participants to the same test. The method selected allows the evaluation to occur in an environment not tightly controlled, where reactions to pre and post test questions are more likely to be genuine, compared to other study methodology. The pre and post-tests were designed by the AHRQ as a useful evaluation tool because it reflects the most

recent evidence-based literature of improving triage accuracy by education. Triage education according to Farzad, et al. (2018) improves the knowledge and skills of triage nurses.

Setting

The project will take place in a large urban institution of higher learning in northern New Jersey. The institution is one of the largest academic centers in the State of New Jersey. The setting offers post graduate programs to all qualified students regardless of sex, race, and ethnicity, economic, social and cultural background. The major program offered are nursing courses for the Doctor of Nursing Practice degree. The setting only admits students who have completed a four-year program and have earned a bachelor degree in nursing or other related areas.

Study Population

The participants in this project are ED nursing students who are pursuing an advanced degree in Family Nurse Practitioner in Emergency Care (FNP-EC). The FNP-EC students will be from different cultures, background, and ethnicities that are either currently working in the ED or plan to work in the ED. All participants that will be selected are ED nurses who are enrolled in the post graduate degree program and pursuing a specialty in emergency care. The population includes male and female nurses from the ages of 20 years to 65 years. The enrollment status is either full time students or part-time students and it includes students who change track to FNP-ER or have submitted a request for a change of track to FNP-ER to the faculty. Prior experience in the ED is not a requirement. The population may also include those performing the duty of ED manager, supervisor, or assistant nurse manager in the ED, if such a person is enrolled as a student in the postgraduate degree program and pursuing FNP-ER. The

population size will be made of 30-40 ED nursing students that are in the graduate program and

work in the ED or planning to work in the ED.

Participants with experience in the ED, but presently pursuing another degree type at the

postgraduate level will be excluded. Ages below 20 and greater than 65 years will also be

excluded. The project will use a Raosoft Power Analysis (2004) for the sample size calculator,

using 5% margin of error, 95% confidence level, with a response distribution of 50%, the

minimum recommended sample size will be 37. Based on the inclusion criteria and the number

of students in the ED track, the expected sample size will be 40 participants.

Subject Recruitment

All subjects for the project will be de-identified. Subjects are recruited by emails

initiated by the Principal Investigator (PI) of the project. Participation in the project was

voluntary, and participant's information or identity were not required. The recruitment period

started in August through September 2019. Interested participants responded via email.

Potential participants were informed that participation was voluntary and that participants

reserved the right to withdraw from participation at any point in time. Participants were also

informed that the decision to participate or not to participate would not affect their grades or their

performances in the class. See copy of the recruitment material in Appendix B**.**

Consent Procedure

The consent to take part in a QI project study will be electronic and returned before the

project pre-test. Participants were informed of the privacy and confidentiality of the information

collected. Participating individuals were informed of the right to withdraw their participation at

any times, if the individual chooses not to continue with the project. See Appendix B for consent

procedure and form.

Risks/Harms

There were minimal or no risks involved in taking part in the project. All participants'
information were de-identified. Participation was voluntary and all participants were informed
of the pre and post-test processes. Participants were made aware that the test scores does not
count towards their grade thus decreasing anxiety and perceived risk of a low grade associated
with test taking. The incidence of these risks was rare and less than 1%. In addition, there was
minimal discomfort that involves participants' time in learning the module and taking part in the
study. Some questions asked by participants may bring back sad feelings. If any participants
experience any form of emotional reaction to the case scenario that leads to unwanted feelings,
the PI will arrange a meeting with such individual and if necessary, the participant was provided
with information on how to get further help or assistance in the institution. Possible effects in
the case study may also affect the participants' practice either positively or negatively.

Subject Costs and Compensation

There were no cost in participating in the project. Subjects will not receive monetary
compensation for their participation in the project. No other form of compensation in
participating in the study.

Study Interventions

The intervention followed the theoretical framework of the project after obtaining the
IRB approval from Rutgers University and having the participants signed consent form. The
theory of experiential learning proposed by Kolb (1984) states that learning is the process where
knowledge is created through the transformation of experience. The theory argues that effective
learning occurs when a person progresses from concrete or new experience to reflective

observation, and finally to formation of a new idea or a modification of an already existing concept which leads to the application of the knowledge to practice (Kolb, 1984).

In phase one, a new experience or situation is encountered, or a reinterpretation of an existing experience. Participants will review the project and decide if they wish to proceed with the ESI scoring education, sign and return the consent. At the completion of phase one, the intervention will proceed to phase two of the Kolb cycle which is a reflective observation of the new experience or interpretation of the existing experience. In this phase, a pre-test will be provided to all the participants to test existing knowledge of the ESI triage system. The NASC-CDM self-confidence questionnaire will also be administered to test existing confidence level. Abstract conceptualization (phase three) proceeds after the completion of phase two as participants reflect on their performance in phase two and indicate a need for modification of existing experience or acquisition of new knowledge. In this phase, the investigator will educate the participants via 52: 25 minutes YouTube video developed by AHRQ and an online PowerPoint presentation. See Appendix E for the link to the YouTube video. The participants will have four weeks to complete the session and review the power point. After the completion of the education session, in four weeks the intervention will progress to phase four of the Kolb's circle- Active Experimentation. The last phase of active experimentation is expected to last for two weeks. In the final phase, the participants will complete the post-test and the self-confidence questionnaire.

Outcome Measures

The outcomes variables of the project are knowledge and self-confidence. In post education intervention, an increase in knowledge and an increase in nurse confidence level of ESI is expected. To measure if the intervention affects the outcomes, the project will use the pre-test and the post-test 20-casescenario (see Appendix F and Appendix G) of ESI triage

developed by ESI experts of AHRQ research team. The case scenario will measure participant's

knowledge of the ESI before the education session (pre-test), and after the education session

(post-test). The tool will measure if education about ESI scoring leads to an increase in ESI

knowledge. In addition, the participants' confidence level will be tested with the NASC-CDM

questionnaire. To ensure internal and external validity, the pre and post-test instruments will be

the same. Each participant will have 20-cases of ESI quiz and a 20 NASC-CDM questionnaire

that are the same in the pre and post phase. The test time will be 40 minutes for the pre and post-

test ESI quiz. See Appendix F and Appendix G for the pre, post-test, and Appendix H for the

NASC-CDM questionnaire. The 20-case based scenarios had been validated by expert raters for

inter-rater reliability. The investigator will measure the participants' level of confidence using

the NASC-CDM questionnaire rated on a scale of 1-5 (Appendix H). The questionnaire will be

administered twice, before education and at the completion of the education series. Both

questionnaires will be compared to measure if education about ESI contributed to an increase in

the participants' level of confidence in triaging patients.

The dependent variables that will be measured are confidence level (using NASC-CDM)

and knowledge of ESI scoring (using the result of the pre-test and post-test score). The result

will be calculated by dividing the total numbers of correct questions by each nurse by the total

number of questions (20). The independent variable will be time, measured in pre and post-test.

Reliability and validity: The pre-test and the post-test tools have been determined to be

reliable by AHRQ experts (AHRQ, 2014). The scenarios have met inter-rater reliability and

were developed by an expert panel that included researchers, physicians, and nurses who have

previously established content validity of the case scenarios. The selected questions cover a

broad area of the ESI triage system; it covers common chief complaints in all populations relating to ESI triage.

The reliability of the NASC-CDM was verified using the internal consistency reliability Cronbach's Alpha Reliability Analysis (CARA), a tool that measure the internal consistency and how closely related a set of items are to a group (UCLA, n.d). CARA found NASC-CDM to be reliable due to the homogenous nature of the instrument. The NASC-CDM tool has been used in several studies and pilot studies. Validity of the NASC-CDM has been evaluated by comparing the inter-item total correlation and a widespread review of the literature and evaluation by a panel of experts (DeVellis, 2003; Waltz et al., 2005). The panel's findings included inter-item correlation between .30 and .70, which were considered reasonable to experts (Waltz, et al 2005).

Project Timeline

The project starts from February 2019 with proposal writing, and it is expected to end in December 2019. The project timeline includes all the activities of the project; proposal development, IRB submission, recruitment, data analysis, evaluation, final writing, and presentation and dissemination of the final project. See Appendix I for the timeline chat.

Resources Needed

The PI will absorb project costs, which will include the publication of laminated ESI. See appendix J for the breakdown of costs.

Evaluation Plan

The investigator evaluated the dependent variables (knowledge and confidence) measured using the pre-test, and post-test and the independent variable (ESI education) measured in time. The test measured knowledge of the ESI before education and at the completion of the online lecture. The AHRQ 20 cases quiz was verified by expert raters for inter-rater reliability. The questions covered the common chief complaints in all populations related to the five-triage levels. The NASC-CDM tool was administered at the beginning and at the end of the online lecture to evaluate the participant's confidence level. The process was administered by the CO-PI, and the variables was compared to see if ESI education leads to increase in ESI knowledge and increase in participants' confidence level in ESI triage. The test showed that online lecture increased the accuracy of assigning ESI algorithm through improvement in a post-test grade compared to the pre-test score. An additional goal of the project is to promote quality, safe and timely emergency care through accurate ESI triage. The reason for the selection of the evaluation method is due to time sensitivity because it shows either an increase or a decrease in ESI knowledge and confidence. The method allows the CO-PI to measure if the dependent variables expressed in percentage (total number correct divided by total number of questions multiply by 100) and the independent variables represented by changes in score over-time. A decrease in the numbers of the under-triage, mistriage, and over-triage questions show a positive response that ESI education increase knowledge and accuracy of ED triage. Contrarily, an increase in under triage, mistriage, and over-triage questions show a negative correlation that ESI education has no effect on the nurse's knowledge of the ESI. The selected method of evaluation is also cost effective and easy to administer.

Data Maintenance and Security

To ensure the safety of participants' information, all participants will be de-identified.

Demographic information will be given a number not associated with personal identity and

participants will be asked to write such number on the test score for ease of computation and

analysis. Private information or data will not be requested or discussed. The measurement tools

will be anonymous and will not reveal the identity of the participants. Keeping the tools

anonymous will protect participants' privacy and keep their personal information free from being

used for identity theft. All data will be de-identified from the beginning of the project to the

completion of the project including the closure of the IRB and final writing of manuscript. All

data will be destroyed in accordance with Rutgers University guidelines upon completion of the

project. Hard copies of the consents and aggregate data will be housed in Dr. Kamienski office

at SB 1130 Rutgers University School of Nursing 65 Bergen Street Newark, New Jersey

Data Analysis

Multiple imputation methods were applied to analyze variables after all variables were

coded and checked for data normality of distribution. A paired sample t-test using SPSS to

analyze the frequencies, mean, and standard deviation was used. With the paired t-test, the

observation of one variable was paired with the observation of another variable. Wilcoxon

Signed-Rank test (WSR) was used to measure the statistical significance between the pre and the

posttest scores. The result of the WSR test showed there was a statistical significant difference

between the pre and the post-test using a significance level of 0.05. The p-value

resulted **0.00200000**, ($p(x \leq Z) = 0.00100000$). The value meant that the chance of type1 error

(rejecting a correct H_0) is small with a value of 0.002000 (0.20%). Therefore, the researcher

concluded that providing ESI education increases the ESI knowledge and accuracy.

 An overall significant difference in the percentage from the pre-test to the post-test with a $p< 0$

was expected. The *Mean* was calculated to show if the average number of percentage incorrect

decreases over-time. The estimated marginal mean was represented with a profile plot.

Profile plots

Continuous Field Information Pretest scores

N = 11
Min = 25
Max = 75
Mean = 55.5
Std. Dev. = 18.23
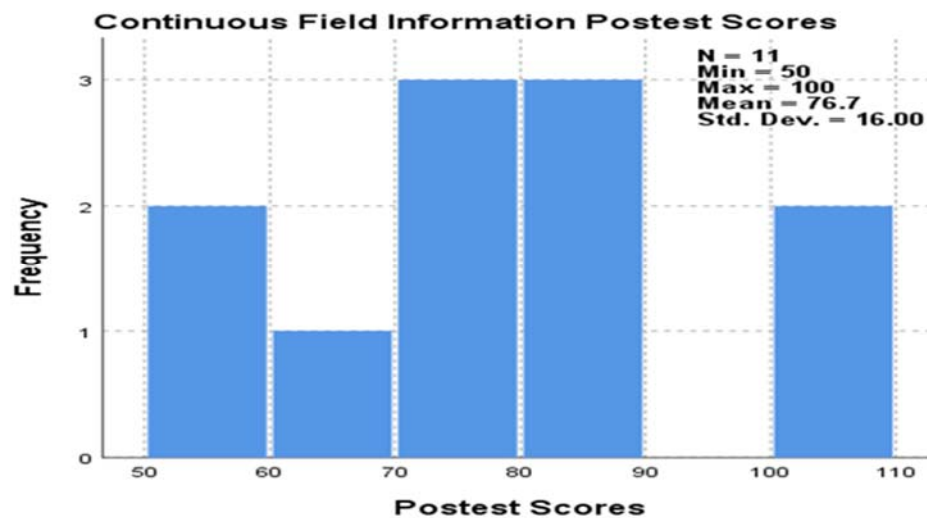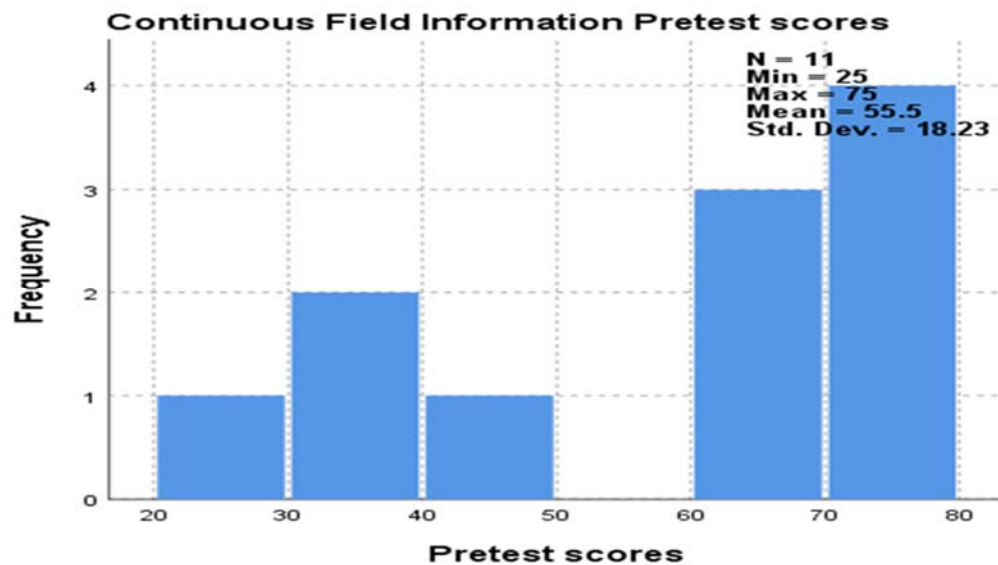
To evaluate the NASC-CDM scores, the survey data were corrected coded as ordinal variable and the pre and post-test data were compared using WSR. The result of the analysis showed the *p*-value is .77948. Using the significance level of *p* < 0.05, the result of the confidence level failed to show statistical significance. The higher p- *value* allowed the investigator to reject the alternative and accept the null that providing ESI education did not affect the nurse's confidence level.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest scores	4.85	20	1.387	.310
	Postest score	5.00	20	.324	.073

Test Statistics[a]

	Postest score - Pretest scores
Z	-.300[b]
Asymp. Sig. (2-tailed)	.764

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

The value of *z* is-0.284. The *p*-value is .764, not significant at ***p* .05**.

Test Statistics[a]

	Postest score - Pretest scores
Z	-.300[b]
Asymp. Sig. (2-tailed)	.764

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Ranks

		N	Mean Rank	Sum of Ranks
Postest score - Pretest scores	Negative Ranks	9[a]	7.83	70.50
	Positive Ranks	8[b]	10.31	82.50
	Ties	3[c]		
	Total	20		

a. Postest score < Pretest scores

b. Postest score > Pretest scores

c. Postest score = Pretest scores

Test Statistics[a]

	Postest Scores - Pretest scores
Z	-2.758[b]
Asymp. Sig. (2-tailed)	.006

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Clustered Bar Mean of pretest, Mean of posttest by participants...
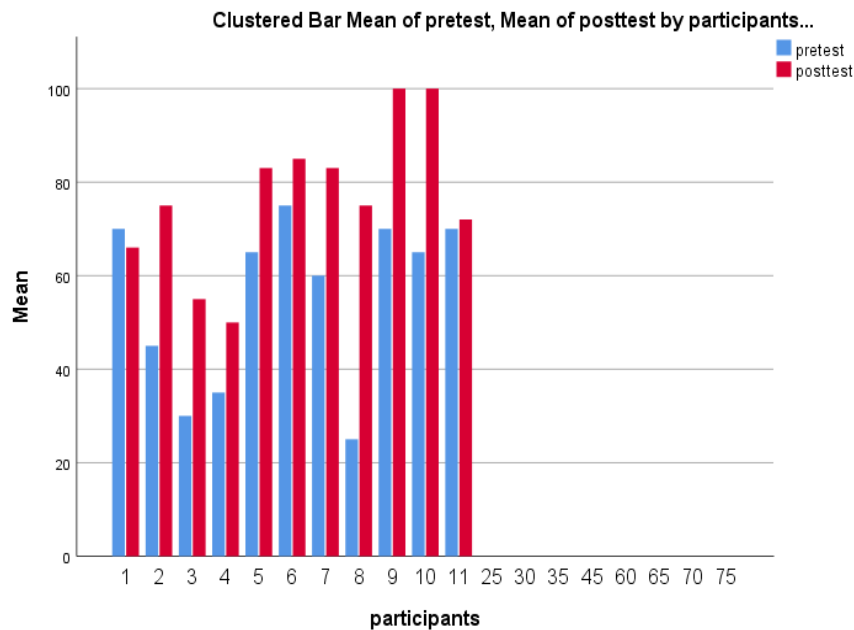
Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pretest scores	11	55.45	18.228	25	75
Postest Scores	11	76.73	16.001	50	100

Demographics: A total of 12 DNP students in the ED track participated in the pre-test survey, but only 11 participants completed the survey and the quizzes. There were no missing responses from the 11 surveys and quizzes in the pre and posttest phases. The investigator was not able to compare individual scores due to the anonymity of the test result, rather, a general comparison of

the class scores were evaluated. All the 11 participants were between the ages 22-65 years and

were all registered nurses with active RN license. All the participants work in the ED

representing 100% of the sample population. About 16.67% of the participants have 1-3 years of

experience working in the ED, 58.33% have between 3-7 years of experience and 25% reported

having over 7 years of experience as ED nurse. Finally, all the participants have had experience

with ESI triage.

Table 1

Summary of Demographics

	n	percent
Years of Experience		
0 – 21 years	0	0
22 – 65 years	12	100
Career		
Non-RN	0	0
RN	12	100
Registered nurse in the ED	12	100
Years of Experience		
0 -3 years	2	16.67
4- 7 years	7	58.33
7 + years	3	25
Enrolled in DNP program	12	100
Experience with ESI	12	100

Findings

The result of the analysis showed an increase in scores in the post-test scores and a decrease in the numbers of mistriage, under-triage and over-triage questions when compared with the pre-test. The result of the WSR test showed a statistically significance difference in percentages of correct answers from the pre-test to the post-test. The overall increase in score and decrease in numbers of mistriage and under-triage questions after the training allowed the researcher to conclude that ESI education will improve nurse's knowledge in ESI triage. The findings were supported by Farzard et.al. (2018) that education and training on ESI is important in improving nurses' knowledge and triage accuracy. The study supports planning a program based on ESI education.

The researcher did not find any difference in the confidence level before and after education class. The participant's confidence in ESI triage remained unchanged. Over 90% somewhat agreed that they have the highest degree of confidence without anxiety in using the ESI triage. Most participants in the pre training session reported no confidence in the ESI triage. The percentages of participants who selected that they were somewhat confidence with ESI five level triage were higher in the post-test phase compare to the pretest phase. Although the percentage of somewhat confidence was higher in the posttest than pretest, the overall score in the confidence scale did not changed in both test. Using a sample paired T-test to compare the pre-test and post-test score, the result failed to show any significance increase in confidence level after online education. The higher p-value was .77948, allowed the researcher to reject the alternative and accepted the null hypothesis that ESI education does not increase the nurse's confidence level. The study did not support initial study done by Jordi et.al, (2015) that providing additional education will increase nurses' confidence in using ESI triage. Mistry, et al.

(2016) concluded that providing education alone will not increase nurses' confidence in triage, and argued that self-perception of nurses on ESI triage could influence confidence level.

Discussion and Conclusion

The purpose of the quality improvement project was to evaluate if providing ESI education will increase ESI knowledge and increase nurses' confidence in using ESI algorithm in triage. The ultimate aim was to increase ESI accuracy which will decrease the rate of over-triage, mistriage and under-triage to increase patients' safety and improve quality of care. The project recruited 11 DNP students with either a full time or a part-time employment as ED nurse. Each participant completed a 20-case base standardized ESI questions two weeks before the online education course. The same questions were provided two weeks after the online course. In addition to the test quiz, each phase also contained a 20-standardized NASC-CDM questionnaire. The ESI standardized questions covered all categories in the ESI 5 level common chief complaints. At the completion of the post-test quiz and survey, a non-parametric test was run to determine if the observations obtained between the pre-test and the post-test variable were systematically different from one another.

Limitations

The study had several limitations. First, the online tool used in recording data was anonymous; therefore, the researcher was unable to compare each participant's pre-test and post-test scores. The web-based software and the anonymity of the participants did not allow the researcher to view if participants actually completed the education training. Second, the external threat to validity were the inability to track participant's progress and determine if the same participants completed both phases of the test and survey. The pre-test recorded 23 participants and only 11

participants completely answered all questions. The post-test survey recorded 13 participants and only 11completely answered all questions. The researcher is unable to determine if the participants who provided incomplete answer in pre-test phase also participated in the post-test quiz and survey.

Third, the small sample size of 11 participants makes it difficult for generalization for the entire population. Finally, the time between the pre-test, education and post-test may have effects on the internal validity of the pre and post test scores.

Recommendation

The researcher has several recommendations for future research to address the limitation of the study. The researcher recommends that future research should consider using large random sample size to increase the external validity. Future research should also consider controlling the amount of time between the pre-test, education and post-test. Future research should consider a non-anonymous study to be able to determine if all participants participate 100% in the education session before taking the post-test score. Future research should look into how to increase nurses' confidence in triage. The result of the project suggests additional training tool to increase nurse's confidence in triage is necessary.

Sustainability and Translation

Published outcome of the study will be presented to some EDs in Northern New Jersey after the presentation of the project. The outcome will support evidence by AHRQ that providing routine training class to ED nurses will improve ESI accuracy and decrease the rate of mistriage, under-triage and over-triage. The researcher is working with managers of selected EDs to begin a

routine ESI training class for ED nurses and new hires. A simplified ESI chart will be provided

to triage nurses at every class lecture.

Dissemination

The findings of this project will be submitted to professional journals such as American Journals

of Emergency Medicine, New Jersey Emergency Nurse Association. The study will be

published in articles. The researcher will engage in ESI training and continuing ESI education

class to improve ESI knowledge that will lead to a safer practice. The researcher will advocate

through hospital management to provide ESI training and knowledge testing to all old and new

hire nurses working in the ED. The outcome of the project is an additional proof to hospital

management that ESI knowledge decreases errors, provides safety and saves cost by proper

resource utilization.

Professional Reporting

The findings of the studies will be submitted to the Editor-in-Chief, Journal of Emergency

Nursing. The abstract of the studies will be submitted to the ENA New Jersey State Council for

publication.

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Appendix A

Evidence Table

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Study findings that help answer the EBP Question	Limitation	Evidence Level & Quality
1	Jordi, et al., (2015)	Cross-sectional study	ED nurses are from four hospitals in a German speaking part of Switzerland. 69 of the nurses are from the ages of 25-60 years, with 1-27 years of nursing experience. The test was conducted in a single room. The nurses were tested simultaneously in this room.	Despite previous exposure of nurses to the ESI tool, ESI competency testing had a different acuity rating. 78% of the nurses felt confident after taking the competency testing. Using the Likert scale the confidence level of the nurses was 78%. The study supports the EBP question that providing additional education will increase nurses' confidence in using ESI triage.	Nurses were made aware of the study's purpose. The simultaneous testing of the nurses in the single room could haveaneffect on the confidence level. There is a possibility of selection bias due to the number of eligible nurses who did not participate in the study.	Level III. Good quality
2	Martin, et.al., (2014)	A descriptive exploratory study	Sample included 64 ED nurses and 1,644 triage events at 3 emergency departments. The data collected included demographic data, attitude (Caring Nurse Patient Interaction, CNPI-23)	The study found that there was no statistically significant evidence that showed that attitude and experience influenced the ESI levels assigned to patients. The study suggested that attitudes and experience alone do not improve triage	The study focused on nurses' attitudes and experience and did not explore other factors that could affect triage accuracy. The study did not provide additional education to	Level V Good quality

			survey. The data were collected through the eight hours shifts retrospectively charts. Descriptive statistics were used to describe the nurse and Pearson's correlation was used to examine the relationship between experience and attitude.	accuracy and that additional interventions to improve accurate triage assignation are needed.	nurses. The participant may not be truthful or behave naturally when they know that they are being observed. The possibility of researcher's bias is high with the study design.	
3	Farzad, et al., (2018)	Descriptive cross-sectional study	The sample included 750 patients who were referred to the ED at ████ ██████ The study took place from July-August 2015. Participants were selected using the convenience sampling method.	The post analysis of the data using SPSS Kappa agreement coefficient is $p<0.001$. It indicated a statistical significance difference between the triage level of the physician and the nurse. The study concluded that improving nurses' skills and knowledge might increase the accuracy of ED nurses in triaging patients. The study supports the EBP question that education and training on ESI is important in improving nurses knowledge and triage accuracy. The study supports	The subjects may not behave naturally knowing they are being observed. The study cannot be generalized, due to the single settings.	Level V. Good quality

				planning a program based on ESI education.		
4	Khatiban et al., (2014)	Observational study	The study was done at ███████ ████████ The sample included 12 triage nurses, 75% men and 25% female. All nurses have a bachelor's degree. There was total of 144 triaged patients in two years period. The study adopted a problem-based learning to determine the effect of education on ESI	The study used active educational strategy to compare the triage time by the nurse using pre and post education questionnaire. The data was analyzed by t-test, Mann-Whitney and ANOVA with 95% confidence level using the SPSS-20. The result was an improvement in the nurse's performance after education and the decrease in patient's door to doctor duration. The study supported the EBP that ESI education will lead to patient's door to treatment time	The sample size of 12 triage nurses is too small to infer generalization. The education method of problem-based learning may be difference from the traditional teaching method	Level IV Good quality
5	Kalantarim eibidi, Yadollahi, &Esfandiar i (2014)	Cross sectional study design	This was a workshop educational class comprised of 50 nurses with 9 hours of ESI education training. Questionnaire were used to evaluate the knowledge and practice of the nurses.	The average scores of participants increased from 31.8±9.9 to 69.7±8.1 (p= 0.001, r=0.87). There was no significant relationship between characteristics of nurses and their knowledge scores in six weeks after education (p>0.05). While it was seen	The timing of the educational class was too short. The study design cannot be used to analyze behavior over time. Small population size may make it difficult for generalization.	Level IV. Good quality

				between the work history of nursing (p=0.038), working in emergency department (p=0.001), as well as type of employment (p=0.019). The study supports the EBP because it shows a strong correlation between education and ESI triage accuracy. The study recommends expanding the theoretical and practical courses of education is essential to improve the knowledge and quality of service presentation.		
6	Wolf, L., Delao, A., Perhats, C., Moon, M., &Zavotsky, K. (2018).	Exploratory qualitative study	Members of ▇▇▇▇ were selected for the study. A total of 26 nurses older than 18 years of age working in the US emergency department who attended the ENA conferences in Orlando Florida. All nurses selected were	The lack of education and experience was among the barrier listed that resulted in inaccurate triage process. The study suggests that nurses need to have at least one year of experience in the ED before assigning the duty of a triage nurse. The study supports the importance of regular training and competency assessment to facilitate the triage	The sample of the study was a small self-selected group at the nursing conference. The distant between the focus group interview was also limited to about 1 year. The nurses were small fraction from various states, therefore findings may not be generalizable	Level VI Good quality

			full time ED nurses.	and support effective decision making.		
7	Martinez, et.al., (2017)	Descriptive cross-sectional study	A study of the Hospital Emergency Services (HES) in ▓▓▓ ▓▓ n Catalonia. The study included 67 ED nurses working in the districts. The population consist of 85.2 % women, with a mean year of experience in nursing of 14.2 and 9.0 with HES. The independent variables were constructed with the use of questionnaires through January to October	In the study, the competency score on the COMVa questionnaires were higher in nurses with training than those with many years of experiences without training. Comparative analysis of the participating hospitals there were no differences between the nurse experience, experience in HES and age however the result obtained confirm that the professional competence in triage/RAC is related to the professional training, both in triage and in critical patient. The study supports the need for yearly education training and competencies for triage nurses.	Small sample size makes findings difficult to generalize. The triage tool employed in measuring competencies is not exclusive to nursing care in HES.	Level IV Good quality
8	Brosinski, Riddell, & Valdez (2017)	A descriptive cross-sectional study	A chart review of 388 patients triaged using the ESI algorithms for a 7-months period with a pre and post ESI Training in an urban hospital.	The result of the study shows that refresher There was a statistically significant difference of p <0.001 when tested with 1-sided t test at 95% confidence	Participant's behavior may be difference when they know they are being tested. Possibility of selection bias	Level IV Good quality

				which supports that training course prevent skill delays, and adequately support knowledge retention, thus improving quality control of the triage process. The study recommended quarterly ESI training to help mitigate the problem of ESI undertriage.	in the chart reviewed.	
9	Grossman, et al., (2014)	A quasi experimental pre-post-test.	A sample of 519 patients older than 64 years in the ED of an urban tertiary and primary care center with a 1-hour lecture mandatory for all ED nurses	The findings indicated that the rate of undertriage was stable over-time and the teaching intervention did not lead to a decrease in the rate of undertriage. The finding suggested that knowledge alone is not the reason for undertriage and that other independent factors could be contributing to undertriage of patients in the ED	The duration of the lecture for 1-hour was too short for ESI training. There is the possibility of selection bias because no triage level was selected in a group of patients. The list of potential risk factor for the triage maybe incomplete.	Level III Good quality
10	Mistry, et al., (2016)	Cross sectional observational study	The study included 35 nurses at ███████ ██████ UAE. The study was done in medical trauma and pediatric ED and the sample	The finds that that nurses have five or more years of experiences who were regularly trained in scored higher than nurses who received the educational training. The study finds a higher	The training, attitudes, and perception of nurses where there study was done may be different from that of the United States. The sample size also makes	Level IV Good quality

			included 35 ED nurses	variability in ESI algorithm. The study suggests that a practice environment rather than education only may affects ESI assignation. The study did not support the EBP that providing education will increase nurses confidence and patients door to treatment time. It argued that self-perception of nurses of ESI triage were higher in the pre-educational period.	it difficult for generalization. The possibility of selection biases is also higher with this type of study	
11	AHRQ, 2014	A non-research study	The Agency for Healthcare Research and Quality's (AHRQ)produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable, and to work within the U.S. Department of Health and Human Services and with other partners to make sure that the evidence is understood and used. AHRQ	The AHRQ supports ongoing education for ESI quality and found a strong consistent correlation with the use of ESI to patient length of stay and support mandatory education for all nurses using the ESI triaged algorithm	No evaluation of strength included in the study	Level IV Excellent quality

			priorities are described.			
12	ENA, (2016)	Anon-research study	Emergency Nurses Association on triage qualification and competency.	ENA maintained the position nurses must receive adequate education and demonstrate knowledge application to successfully function in the role of triage nurse. ENA supports ongoing triage education course and a clinical orientation to enhance triage skills and knowledge.	No evaluation of strength and weakness included in the study	Level IV Excellent quality

Appendix B

RUTGERS
School of Nursing

CONSENT TO TAKE PART IN A PROJECT STUDY

TITLE OF STUDY: *Improving Emergency Department Triage*
Principal Investigator: Saturday M. Ugbo, RN, DNP student.

STUDY SUMMARY: This consent form is part of an informed consent process for a project study and it will provide information that will help you decide whether you want to take part in this study. It is your choice to take part or not. The purpose of the project is to: evaluate if Emergency Severity Index (ESI) Education will improve Emergency Department (ED) nurses confidence and knowledge of the ESI triage system. If you take part in the project, you will be asked to take part in the lecture which will be conducted in class and or online with a structured PowerPoint slides, audio lecture podcast and a hand-out. You will also be ask to participate in a pretest and a posttest to evaluate the outcome of the education. Your time in

the study will take about 20 minutes for the pretest exam, one hour for each session of the lecture online educaton. Additional 40 minutes for the posttest and the questionnaire. The lecture period will last for two months and you can decide how much time you spend studying the material. Possible harms or burdens of taking part in the study may be the possibility that a third party may have access to your email address, your name and phone, and that the project will require some of your valuable time. The possible benefits of taking part may be the education will lead to an increased knowledge and confidence of the ESI triage system. An alternative to taking part in the project study is a self-pay interactive web-based training course.

The information in this consent form will provide more details about the project study and what will be asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part, you should feel free to ask them and should expect to be given answers you completely understand. After all of your questions have been answered and you wish to take part in the research study, you will be asked to sign this consent form. You are not giving up any of your legal rights by agreeing to take part in this project or by signing this consent form.

Who is conducting this research study?
Mr. Saturday Ugbo is the Co-Principal Investigator and Project Manager of this project. A Principal Investigator has the overall responsibility for the conduct of the project.
Mr. Saturday Ugbo may be reached at ██████████ or mail any correspondence to ██████████
██████████████████ . Direct all email to ██████████████

The Principal investigator will be asked to sign this informed consent. You will be given a copy of the signed consent form to keep.

Why is this study being done?
The reason this study is being done is to provide knowledge and confidence to nurses who work in the emergency department so that they can quickly and easily sort patients out for treatment when they arrive in the ED. The study is done to see if providing education will have any effect on the knowledge of the nurses and increases their confidence level. When nurses sort patients out correctly, it will decrease the amount of time patients spend waiting in the ED, improve patients' health outcome and help save the ED money by adequate resource utilization.

Who may take part in this study and who may not?
To take part in this study, you must be: 1: Age 21 -65 years 2: A registered nurse 3: currently employed in the ED 4: Enrolled in the RN to BSN Family Nurse Practitioner in Emergency Care program. These four components are the inclusion criteria and failure to meet all of the four component will exclude you from the project study.
Why have I been asked to take part in this study?
You have been asked to take part in this study because you are an ED nurse, aged between 21-65 years and currently pursuing an advanced degree in Emergency Care.
How long will the study take and how many subjects will take part?
The study will recruit about 40 students to participate in the study. The study will require 20 minutes of pretest, one hour lecture period or completing a web-based online module and 30

minutes of posttest and evaluation questionnaire. The study duration will last from September to December of 2019.

What will I be asked to do if I take part in this study?

If you agree to take part in this project, you will be asked to sign and return this consent form, take a pretest to evaluate your knowledge of the ESI before ESI education, complete a questionnaire about your confidence level, take part of the online learning module by reading the PowerPoint slides and watching the You-Tube video . You will also be asked to complete the posttest, complete the self-confidence questionnaire and complete the evaluation questionnaire. You will have a total of two months to complete the educational portion of the study.

What are the risks and/or discomforts I might experience if I take part in this study?

There are minimal risk involved in taking part in this project, your email address or phone number may get into third party or identity theft, although the incidence of these risks are rare less than 1% as additional steps are in place to store your email on an encrypted computer to completely shred the information once the project is completed by December 2019. In addition, there may be minimal discomfort that involve your time in learning the module and taking part in the study. Some questions asked by others or by you may bring back sad feeling or make you unhappy. Examples in the case study may also affect the way you practice either positively or negatively.

Are there any benefits to me if I choose to take part in this study?

The benefits of taking part in this study is to increase your knowledge base of the ESI triage. The project will also increase your confidence in using the ESI tool through the education provided. This benefit will be replicated in your place of work as it may increase triage accuracy, reduces the percentage of under triage and over triage and may lead to improved health outcomes for your patients. However, it is possible that you may not receive any direct benefit from taking part in this study.

What are my alternatives if I do not want to take part in this study?

Taking part in this project is voluntarily. However, you can still receive ESI education either through the self-pay interactive web based training course or through your institution if such institution provides ESI training course.

How will I know if new information is learned that may affect whether I am willing to stay in the study?

During the course of the study, you will be updated about any new information that may affect whether you are willing to continue taking part in the study. If new information is learned that may affect you after the study or your follow-up is completed, you will be contacted.

Will I receive the results of the Project?

There will not be any individual results reported of the study. Aggregate result will be available upon request.

Will there be any cost to me to take part in this study?

You will not incur any cost in taking part in the study. The PI will be responsible for 100% of the cost of the study.

Will I be paid to take part in this study?

You will not be paid to take part in the study.

Who might benefit financially from this project?
There are no immediate financial benefits to anyone in taking part of the project.
The project is improve the quality of ED triage system through provision of ESI education.

How will information about me be kept private or confidential?
All efforts will be made to keep your personal information in your research record confidential, but total confidentiality cannot be guaranteed. Youremail address will be kept in an encryptdcomputer .

What will happen to my information or biospecimens collected for this research after the study is over?
- The information collected about you for this project will not be used by or distributed to investigators for other project or research. The information will be shredded by the end of the project. No biospecimens will be collected in this study.

What will happen if I do not wish to take part in the study or if I later decide not to stay in the study?
It is your choice whether to take part in the research. You may choose to take part, not to take part or you may change your mind and withdraw from the study at any time.

If you do not want to enter the study or decide to stop taking part, your relationship with the study staff will not change, and you may do so without penalty and without loss of benefits to which you are otherwise entitled.

You may also withdraw your consent for the use of data already collected about you.

Who can I call if I have questions?
If you have questions about taking part in this study or if you feel you may have suffered a project related injury, you can call the study investigator Mr. Saturday Ugbo, DNP student at Rutgers School of Nursing, 65 Bergen Street, Newark NJ 07107

If you have questions about your rights as a research subject, you can call the IRB Director at: Newark Health Science 973 972 3608 or the Rutgers Human Subjects Protection Program at (973) 972-1149.

Who may use, share or receive my information?
The research team may use or share your information collected or created for this study with the following people and institutions:
- Rutgers University investigators involved in the study;
- University Hospital or Robert Wood University Hospital personnel to communicate information necessary for health care operations;
- The Rutgers University Institutional Review Board and Compliance Boards
- The Office for Human Research Protections in the U.S. Dept. of Health and Human Services

Those persons or organizations that receive your information may not be required by Federal privacy laws to protect it and may share your information with others without your permission, if permitted by the laws governing them.

Will I be able to review my project record while the research is ongoing?

No. We are not able to share information in the research records with you until the study is over. To ask for this information, please contact the Principal Investigator, the person in charge of this project study.

Do I have to give my permission?
No. You do not have to permit use of your information. But, if you do not give permission, you cannot take part in this study.

If I say yes now, can I change my mind and take away my permission later?
Yes. You may change your mind and not allow the continued use of your information (and to stop taking part in the study) at any time. If you take away permission, your information will no longer be used or shared in the study, but we will not be able to take back information that has already been used or shared with others.

How long will my permission last? Your permission will last through the duration of the project till completion. However, you can withdraw your participation at any time

Appendix C

AGREEMENT TO PARTICIPATE

1. Subject consent:

I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study.

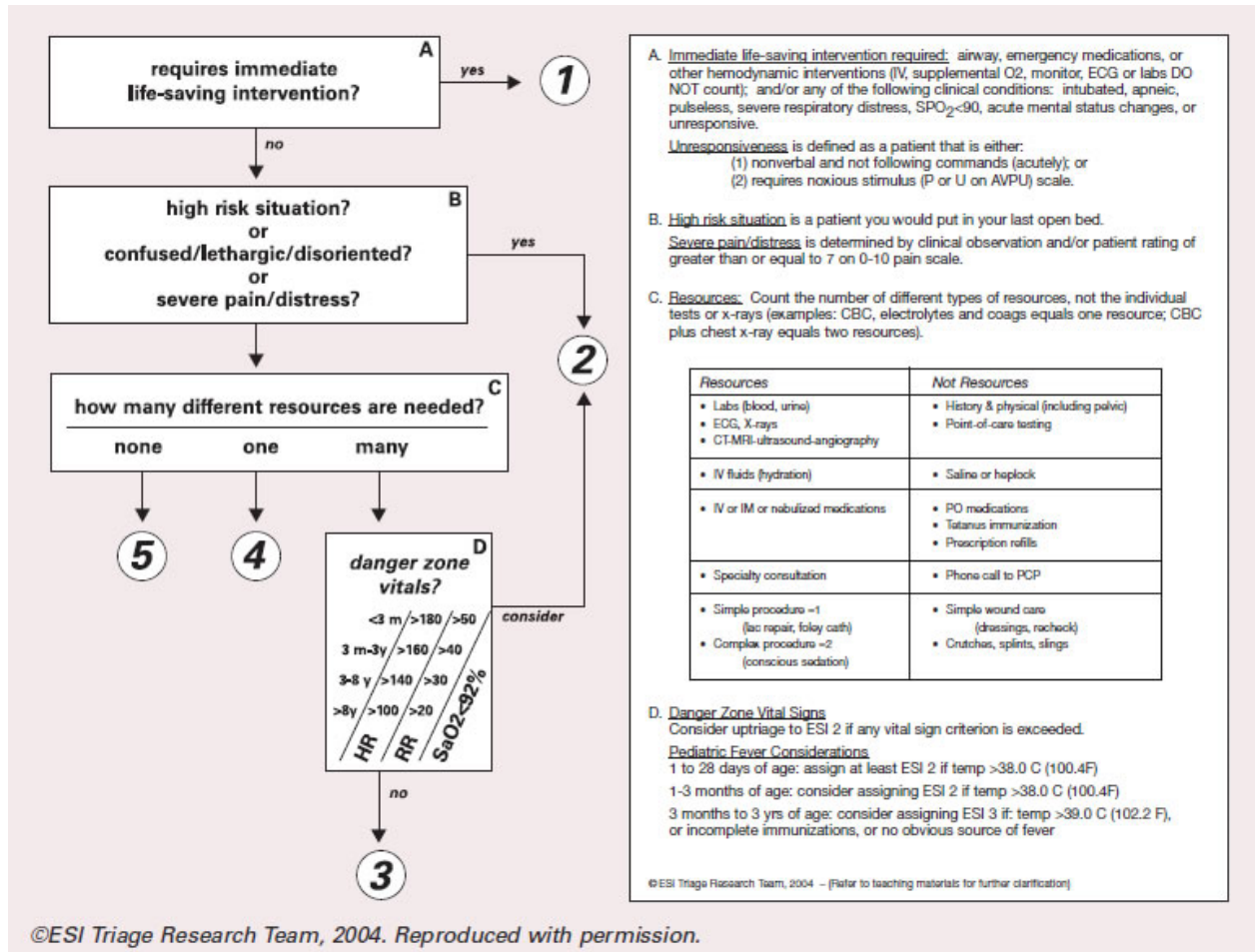Subject Name:_____

_____

Subject Signature:_____ Date:_____

_____

2. Signature of Investigator/Individual Obtaining Consent:

To the best of my ability, I have explained and discussed all the important details about the study including all of the information contained in this consent form.

Appendix D

ESI Resource Card

requires immediate life-saving intervention? — A — yes → ①

no ↓

high risk situation? or confused/lethargic/disoriented? or severe pain/distress? — B — yes → ②

↓

how many different resources are needed? — C

none | one | many

↓ ⑤   ↓ ④   ↓

danger zone vitals? — D
<3 m / >180 / >50
3 m-3y / >160 / >40
3-8 y / >140 / >30
>8y / >100 / >20
HR / RR / SaO2 <92%

consider → ②

no ↓

③

A. Immediate life-saving intervention required: airway, emergency medications, or other hemodynamic interventions (IV, supplemental O2, monitor, ECG or labs DO NOT count); and/or any of the following clinical conditions: intubated, apneic, pulseless, severe respiratory distress, SPO2<90, acute mental status changes, or unresponsive.
Unresponsiveness is defined as a patient that is either:
(1) nonverbal and not following commands (acutely); or
(2) requires noxious stimulus (P or U on AVPU) scale.

B. High risk situation is a patient you would put in your last open bed.
Severe pain/distress is determined by clinical observation and/or patient rating of greater than or equal to 7 on 0-10 pain scale.

C. Resources: Count the number of different types of resources, not the individual tests or x-rays (examples: CBC, electrolytes and coags equals one resource; CBC plus chest x-ray equals two resources).

Resources	Not Resources
• Labs (blood, urine) • ECG, X-rays • CT-MRI-ultrasound-angiography	• History & physical (including pelvic) • Point-of-care testing
• IV fluids (hydration)	• Saline or heplock
• IV or IM or nebulized medications	• PO medications • Tetanus immunization • Prescription refills
• Specialty consultation	• Phone call to PCP

• Simple procedure =1
  (lac repair, foley cath)
• Complex procedure =2
  (conscious sedation)
	• Simple wound care
	  (dressings, recheck)
	• Crutches, splints, slings

D. Danger Zone Vital Signs
Consider uptriage to ESI 2 if any vital sign criterion is exceeded.
Pediatric Fever Considerations
1 to 28 days of age: assign at least ESI 2 if temp >38.0 C (100.4F)
1-3 months of age: consider assigning ESI 2 if temp >38.0 C (100.4F)
3 months to 3 yrs of age: consider assigning ESI 3 if: temp >39.0 C (102.2 F), or incomplete immunizations, or no obvious source of fever

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Appendix E

ESI Online Learning Video

ESI Emergency Severity Index https://www.youtube.com/watch?v=A7gxXX3tMRU&t=320s

Appendix F

ESI Pretest, Posttest, Post Posttest

		Vital Signs:
1.	A 23 year old female present to triage complaining of generalized abdominal cramping with moderate vaginal bleeding, one pad every four hours since she woke up this am. She is 6 weeks pregnant. She denies any localized pain or other complaints. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	**Vital Signs:** Temperature 98.6 Heart rate 86 Respiratory rate 16 Blood pressure 120/80
2.	"I have been sick for 4 days with the GI bug that is going around. Today, I am really dizzy." Reports multiple episodes of vomiting and diarrhea for 4 days, denies fever or chills, lips are dry and cracked and his skin is cool and moist. This 29-year-old male is healthy, takes no medications and has no allergies. **Select the correct ESI acuity level below:** **a) ESI level 1** b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	**Vital Signs:** Temperature 37.3 C (99.2 F) Heart rate 132 Respiratory rate 24 Blood pressure 78/palpable
3.	A 45 year old male is brought to triage by the police. He was found in the park and appears intoxicated. There is a small laceration to his forehead; he cannot remember how he got this, but denies trauma. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	**Vital Signs:** GCS is 14 Temperature 98.2 Heart rate 96 Respiratory rate 18 Blood pressure 150/90

4.	"I can't seem to get the bleeding stopped and I have been pinching my nose for the past hour" reports a 63 year old patient on warfarin (Coumadin) for atrial fibrillation. "About an hour ago it just started Pouring blood. I can feel it running down the back of my throat and I think I am going to vomit." The patient's skin is cool and diaphoretic.
	Select the correct ESI acuity level below:
	   a) ESI level 1
	   b) ESI level 2
	   c) ESI level 3
	   d) ESI level 4
	   e) ESI level 5
		Vital Signs: Within normal limits

5.	EMS brings in an elderly patient from the nursing home. They were called to the scene for a "possible stroke." The patient is unresponsive with an obvious facial droop. She has a long medical history and no other information was sent with the patient from the nursing home.
	Select the correct ESI acuity level below:
	   a) ESI level 1
	   b) ESI level 2
	   c) ESI level 3
	   d) ESI level 4
	   e) ESI level 5
		Vital Signs: Heart rate is 96 Respiratory rate 10 Oxygen saturation is 89%

6.	A 39 year old obese male presents to triage with a chief complaint of chest heaviness, "like someone is sitting on his chest" but denies chest pain. His wife made him come. Associated symptoms include mild nausea, shortness of breath. Symptoms woke him from sleep and the skin is warm and moist.
	Select the correct ESI acuity level below:
	   a) ESI level 1
	   b) ESI level 2
	   c) ESI level 3
	   d) ESI level 4
	   e) ESI level 5
		Vital Signs: Temperature 98.4 Heart rate 30 Respiratory rate 16 Blood pressure 75/50

7.	"Mom thinks I broke my finger. I was playing baseball and caught a fly ball without a mitt." A healthy 11 year old male points to his right 3rd finger with a deformity. His mother tells you that he takes no medications and has no allergies. **Select the correct ESI acuity level below:** a) ESI level 1	**Vital Signs:** Temperature 36.9 C (98.4F) Heart rate 82 Respiratory rate 18

	b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	Blood pressure 102/78

8.	"My heart is pounding in my chest" reports a 26 year old female With a history of supraventricular tachycardia. Note Vital Signs at triage. "I feel like I am going to pass out" she tells you.
	Select the correct ESI acuity level below:
	    a) ESI level 1
	    b) ESI level 2
	    c) ESI level 3
	    d) ESI level 4
	    e) ESI level 5
		Vital Signs:
		Heart rate 188
		Blood pressure 70/palpable

9.	A 59 year old female presents to triage complaining of nausea and epigastric distress. She feels like this is a GI problem. She denies SOB but complains of "feeling so tired".
	Select the correct ESI acuity level below:
	    a) ESI level 1
	    b) ESI level 2
	    c) ESI level 3
	    d) ESI level 4
	    e) ESI level 5
		Vital Signs:
		PMH: high cholesterol, DM
		Temperature 97.8
		Heart rate 84
		Respiratory rate 18
		Blood pressure 150/90

10.	A 55 year old female presents to triage with a sudden onset of acute loss of vision in left eye. She has normal visual acuity in her right eye. She denies any medical history or medication use.
	Select the correct ESI acuity level below:
	    a) ESI level 1
	    b) ESI level 2
	    c) ESI level 3
	    d) ESI level 4
	    e) ESI level 5
		Vital Signs:
		Temperature 37C (98.6 F)
		Heart rate 88
		Respiratory rate 18
		Blood pressure 140/85

11.	The police arrive in the triage area with a disheveled young man in handcuffs who is talking rapidly to himself. The police report that they were called to his home because he was standing on the front lawn naked screaming obscenities to the neighbors and threatening to kill them all.
	Select the correct ESI acuity level below:
	    a) ESI level 1
	    b) ESI level 2
	    c) ESI level 3
		Vital Signs:
		Within normal limits

	d) ESI level 4 e) ESI level 5	
12.	. A 19 year old requests to see a doctor for treatment of an in grown toenail. The nail area is red, tender and draining pus. He denies any medical problems, is on no medications and has no allergies. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	**Vital Signs:** Temperature 37 C (98.6 F) Heart rate 82 Respiratory rate 16 Blood pressure 118/72
13.	EMS arrives with a 76 year old female who tripped over her dog and injured her right hip. On exam her right leg is shortened, externally rotated with good circulation, motor and sensation. The patient rates her pain as 5 on a scale from 0 to 10. She denies any complaints prior to tripping over her dog. She has a history of hypertension and medications include a diuretic. She has no allergies. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	**Vital Signs:** Temperature 35.7 C (96.2 F) Heart rate 78 Respiratory rate 18 Blood pressure 148/90
14.	A 40 year old female presents to triage complaining of a sudden onset of a severe frontal headache after moving her bowels. States the headache is associated with nausea. She denies other symptoms. Holding her head, appears very uncomfortable. Denies medical history. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	**Vital Signs:** Temperature 98.6 Heart rate 110 Respiratory rate 24 Blood pressure 140/95
15.	A 70 year old male presents to triage with difficulty emptying his bladder, voiding in very small amounts. He states he is "dribbling". Complains of 4/10 pain. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2	**Vital Signs**: Temperature 97.7 Heart rate 72 Respiratory rate 20

c) ESI level 3 d) ESI level 4 e) ESI level 5	Blood pressure 110/80

16. A 17 year old male walks into triage stating: My boss won't let me come back to work until I get a note from a doctor. I work in a grocery store stocking shelves. Yesterday I was moving stock and several boxes fell and hit my foot. I'm fine, it doesn't hurt but my boss made me come. There are no obvious signs of trauma to the foot. Vital signs are within normal limits.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
	Vital Signs: Within normal limits

17. "I shouldn't have eaten those fried clams" the patient tells you as you begin her triage assessment. Her chief complaint is abdominal pain that started two hours ago, which she rates as 6 on a scale of 0 to 10. She has vomited once and continues to be nauseous. She is 48 years old with no past medical history, takes no medications and has no known allergies.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
	Vital Signs: Blood pressure 142/84 Heart rate 98 Respiratory rate 20 Temperature 37.2 C. (99 F)

18. Med flight arrives with a 32-year-old female who was the restrained driver in a high-speed motor vehicle crash. The patient is 7 months pregnant and complaining of pain in her right lower leg and abrasions on her face from the airbag. She appears in no acute distress. Her skin is warm and dry. She asks you if her baby is going to be ok.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
	Vital Signs: Heart rate 100 Respiratory rate 26 Blood pressure 140/82

	Vital Signs:
19. A62 year old male is brought in by his daughter with a complaint of generalized weakness. The patient was due for dialysis today, but missed the appointment because he feels weak. Denies other problems. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	Temperature 99.0 Heart rate 92 Respiratory rate 22 Blood pressure 100/68
20 "My daughter forgot to pack her inhaler", states the mom of a 13 years old girl. PMH of asthma. The daughter denies any shortness of breath or wheezing. They are on vacation and the mom just wants to be prepared. **Select the correct ESI acuity level below**: a) ESI level 1 b) ESI level 2 c) ESI level 3 d) ESI level 4 e) ESI level 5	Temperature 98.6 Heart rate 74 Respiratory rate 16 SPO2 100% on RA.

Appendix G
Pretest, Posttest, Post Answers with Rationale

	Vital Signs:
1.A 23-year-old female present to triage complaining of generalized abdominal cramping with moderate vaginal bleeding, one pad every four hours since she woke up this am. She is 6 weeks pregnant. She denies any localized pain or other complaints. **Select the correct ESI acuity level below:** a) ESI level 1 b) ESI level 2 **c) ESI level 3** d) ESI level 4 e) ESI level 5 **Rationale:** This patient will consume a number of resources including labs, intravenous fluids, an ultrasound and perhaps	Temperature 98.6 Heart rate 86 Respiratory rate 16 Blood pressure 120/80

Intravenous analgesics. Her generalized abdominal cramping and stable vital signs do not place her at high risk for an ectopic pregnancy	

2. "I have been sick for 4 days with the GI bug that is going around. Today, I am really dizzy." Reports multiple episodes of vomiting and diarrhea for 4 days, denies fever or chills, lips are dry and cracked and his skin is cool and moist. This 29-year-old male is healthy, takes no medications and has no allergies.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
Rationale: A high risk situation. This 29-year-old patient has been sick for 4 days with vomiting and diarrhea. He is now dizzy, has cracked lips, a heart rate of 132 and a blood pressure of 78/palpable. It would be unsafe for this patient to wait for more than a few minutes for care.
	Vital Signs: Temperature 37.3 C (99.2 F) Heart rate 132 Respiratory rate 24 Blood pressure 78/palpable

3. A 45-year-old male is brought to triage by the police. He was found in the park and appears intoxicated. There is a small laceration to his forehead; he cannot remember how he got this, but denies trauma.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
Rationale: This patient has visible signs of trauma, has no recollection of what happened and smells of alcohol. This is a high risk presentation. The triage nurse cannot attribute his lack of memory and disorientation to alcohol given the fact he has obvious head trauma.
	Vital Signs: GCS is 14 Temperature 98.2 Heart rate 96 Respiratory rate 18 Blood pressure 150/90

4. "I can't seem to get the bleeding stopped and I have been pinching my nose for the past hour" reports a 63-year-old patient on warfarin (Coumadin) for atrial fibrillation. "About an hour ago it just started pouring blood. I can feel it running down the back of my throat and I think I am going to vomit." The patient's skin is cool and diaphoretic.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
	Vital Signs: Within normal limits

e) ESI level 5 **Rationale:** This is a high risk situation. The patient will continue to bleed unless interventions are initiated. She is high risk for hypovolemic shock and her skin is already cool and diaphoretic.	

5. EMS brings in an elderly patient from the nursing home. They were called to the scene for a "possible stroke." The patient is unresponsive with an obvious facial droop. She has a long medical history and no other information was sent with the patient from the nursing home.
Select the correct ESI acuity level below:
    a) ESI level 1
    b) ESI level 2
    c) ESI level 3
    d) ESI level 4
    e) ESI level 5
Rationale: This patient is unresponsive, with a respiratory rate of 10 and an oxygen saturation of 89%. This patient will require immediate life-saving interventions, including possible intubation.
	Vital Signs:
	Heart rate is 96
	Respiratory rate 10
	Oxygen saturation is 89%

6. A 39-year-old obese male presents to triage with a chief complaint of chest heaviness, "like someone is sitting on his chest" but denies chest pain. His wife made him come. Associated symptoms include mild nausea, shortness of breath. Symptoms woke him from sleep. Skin is warm and moist. **Select the correct ESI acuity level below:** **ESI level 1** ESI level 2 ESI level 3 ESI level 4 ESI level 5 **Rationale**: This patient requires immediate life-saving interventions including possible initiation of fluids, vasoactive medications to increase his blood pressure, and transcutaneous pacing	**Vital Signs:** Temperature 98.4 Heart rate 30 Respiratory rate 16 Blood pressure 75/50

7. "Mom thinks I broke my finger. I was playing baseball and caught a fly ball without a mitt." A healthy 11-year-old male points to his right 3rd finger with a deformity. His mother tells you that he takes no medications and has no allergies.
Select the correct ESI acuity level below:
    a) ESI level 1
    b) ESI level 2
    c) ESI level 3
    d) ESI level 4
	Vital Signs:
	Temperature 36.9 C (98.4F)
	Heart rate 82
	Respiratory rate 18 BP 102/78

e) ESI level 5 Rationale: This child's finger will probably be x-rayed to determine if there is a fracture. X-ray is one resource.	

8. "My heart is pounding in my chest" reports a 26-year-old female with a history of supraventricular tachycardia. Note Vital Signs at triage. "I feel like I am going to pass out" she tells you.
Select the correct ESI acuity level below:
    a) ESI level 1
    b) ESI level 2
    c) ESI level 3
    d) ESI level 4
    e) ESI level 5
Rationale: This patient requires immediate life-saving interventions. She needs to be seen immediately by a physician and a nurse. The patient is currently unstable and requires intravenous access, intravenous medications and perhaps cardioversion.
	Vital Signs:
	Heart rate 188
	Blood pressure 70/palpable

9. A 59-year-old female presents to triage complaining of nausea and epigastric distress. She feels like this is a GI problem. She denies SOB but complains of "feeling so tired".
Select the correct ESI acuity level below:
    a) ESI level 1
    b) ESI level 2
    c) ESI level 3
    d) ESI level 4
    e) ESI level 5
Rationale: This is a high risk situation. Her symptoms are classic for presentation of acute coronary syndrome in females. She needs an electrocardiogram and rapid evaluation.
	Vital Signs:
	PMH: high cholesterol, DM
	Temperature 97.8
	Heart rate 84
	Respiratory rate 18
	BP 150/90

10. A 55-year-old female presents to triage with a sudden onset of acute loss of vision in left eye. She has normal visual acuity in her right eye. She denies any medical history or medication use.
Select the correct ESI acuity level below:
    a) ESI level 1
    b) ESI level 2
    c) ESI level 3
    d) ESI level 4
    e) ESI level 5
Rationale: High risk. Any sudden loss of vision is a high risk situation.
	Vital Signs:
	Temperature 37C (98.6 F)
	Heart rate 88
	Respiratory rate 18
	Blood pressure 140/85

11. The police arrive in the triage area with a disheveled young man in handcuffs who is talking rapidly to himself. The police report that they were called to his home because he was standing on the front lawn naked screaming obscenities to the neighbors and threatening to kill them all. Select the correct ESI acuity level below:
 	
    a) ESI level 1
    b) ESI level 2
    c) ESI level 3
    d) ESI level 4
    e) ESI level 5
 	
Rationale: This patient is high risk. He is a danger to himself and others and needs to be placed in a safe environment. Departmental protocols will determine where and when the patient should be placed in the treatment area.
	Vital Signs: Within normal limits

12. A 19 year old requests to see a doctor for treatment of an in grown toenail. The nail area is red, tender and draining pus. He denies any medical problems, is on no medications and has no allergies. **Select the correct ESI acuity level below:** ESI level 1 ESI level 2 ESI level 3 **ESI level 4** ESI level 5 **Rationale**: This patient does not meet the criteria for ESI level 1 or 2. He will need an incision and drainage of his toe - one resource. Therefore he meets ESI level 4 criteria	**Vital Signs:** Temperature 37 C (98.6 F) Heart rate 82 Respiratory rate 16 Blood pressure 118/72

13. EMS arrives with a 76-year-old female who tripped over her dog and injured her right hip. On exam her right leg is shortened, externally rotated with good circulation, motor and sensation. The patient rates her pain as 5 on a scale from 0 to 10. She denies any complaints prior to tripping over her dog. She has a history of hypertension and medications include a diuretic. She has no allergies.
Select the correct ESI acuity level below:
    a) ESI level 1
    b) ESI level 2
    c) ESI level 3
    d) ESI level 4
    e) ESI level 5
 	
Rationale: This elderly patient probably sustained a fractured hip. On arrival in the emergency department her pain is 5 out of 10. She does not meet ESI level 2 criteria. If there was no clear history as to why she fell and concern
	Vital Signs: Temperature 35.7 C (96.2 F) Heart rate 78 Respiratory rate 18 Blood pressure 148/90

	Vital Signs:
about possible mental changes, or if her pain was more intense she might be assigned to ESI level 2. This patient will consume 2 or more resources; x-ray, lab tests, intravenous pain medication and an orthopedic consult.	

14. A 40-year-old female presents to triage complaining of a sudden onset of a severe frontal headache after moving her bowels. States the headache is associated with nausea. She denies other symptoms.
Holding her head, appears very uncomfortable. Denies medical history.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
Rationale: This patient is high risk and in severe pain. The sudden onset of her headache, in combination with nausea, increases the suspicion of a subarachnoid hemorrhage.
	Vital Signs:
	Temperature 98.6
	Heart rate 110
	Respiratory rate 24
	Blood pressure 140/95

15. A 70-year-old male presents to triage with difficulty emptying his bladder, voiding in very small amounts. He states he is "dribbling".
Complains of 4/10 pain.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
Rationale: He will require urethral catheterization and a urinalysis, 2 resources. He is not in severe pain or distress and therefore does not meet ESI Level 2 criteria.
	Vital Signs:
	Temperature 97.7
	Heart rate 72
	Respiratory rate 20
	Blood pressure 110/80

16. A 17-year-old male walks into triage stating: My boss won't let me come back to work until I get a note from a doctor. I work in a grocery store stocking shelves. Yesterday I was moving stock and several boxes fell and hit my foot. I'm fine, it doesn't hurt but my boss made me come. There are no obvious signs of trauma to the foot. Vital signs are within normal limits.
Select the correct ESI acuity level below:
   a) ESI level 1
   b) ESI level 2
   c) ESI level 3
   d) ESI level 4
   e) ESI level 5
	Vital Signs:
	Within normal limits

Rationale: This patient has no complaints and has no obvious signs of trauma. The patient needs to be seen by a physician or mid-level provider, examined and discharged. No resources are needed so the patient meets ESI level 5 criteria.	
17. "I shouldn't have eaten those fried clams" the patient tells you as you begin her triage assessment. Her chief complaint is abdominal pain that started two hours ago, which she rates as 6 on a scale of 0 to 10. She has vomited once and continues to be nauseous. She is 48 years old with no past medical history, takes no medications and has no known allergies. **Select the correct ESI acuity level below:** ESI level 1 ESI level 2 **ESI level 3** ESI level 4 ESI level 5 **Rationale**: This 48 year old healthy female has abdominal pain that started two hours prior to admission. She vomited once but continues to be nauseous. Her vital signs are within normal limits. This patient does not meet the criteria for ESI level 1 or Level 2. She will need two or more resources; lab tests, intravenous fluids and medications for nausea and pain as well as other diagnostic studies.	**Vital Signs:** Blood pressure 142/84 Heart rate 98 Respiratory rate 20 Temperature 37.2 C. (99 F)
18. Med flight arrives with a 32-year-old female who was the restrained driver in a high-speed motor vehicle crash. The patient is 7 months pregnant and complaining of pain in her right lower leg and abrasions on her face from the airbag. She appears in no acute distress. Her skin is warm and dry. She asks you if her baby is going to be ok. **Select the correct ESI acuity level below:** ESI level 1 **ESI level 2** ESI level 3 ESI level 4 ESI level 5 **Rationale:** This is a high-risk situation based on the mechanism of injury and the patient needs to be closely monitored for subtle changes. She will meet the criteria for a high level trauma alert, based on your protocols. However, her ESI triage level remains a Level 2. She does not meet ESI Level 1 criteria. Trauma and ESI triage levels are two distinct categorization systems.	**Vital Signs**: Heart rate 100 Respiratory rate 26 Blood pressure 140/82
19. A 62-year-old male is brought in by his daughter with a complaintof generalized weakness. The patient was due for dialysis today, but missed the appointment because he feels weak. Denies other problems.	**Vital Signs:** Temperature 99.0

Select the correct ESI acuity level below: ESI level 1 **ESI level 2** ESI level 3 ESI level 4 ESI level 5 **Rationale:** This is a high risk patient. He has a significant medicalhistory, is a dialysis patient and feeling weak. The triage nurse does not know what his potassium is nor does she know what his electrocardiogram looks like. Therefore he meets the criteria for ESI level 2.	Heart rate 92 Respiratory rate 22 Blood pressure 100/68
20. My daughter forgot to pack her inhaler", states the mom of a 13-year-old girl. PMH of asthma. The daughter denies any shortness of breath or wheezing. They are on vacation and the mom just wants to be prepared. **Select the correct ESI acuity level below:** ESI level 1 ESI level 2 ESI level 3 ESI level 4 **ESI level 5** **Rationale**: This patient requires a prescription refill, which does not meet the definition of a resource. She has no physical complaints. She will be examined by a physician or physician extender and then discharged with the needed prescription	**Vital Signs:** Temperature 98.6 Heart rate 74 Respiratory rate 16 SPO2 100% on RA.

Appendix H

Likert Scale Measuring Level of confidence NASC-CDM

Please rate your confidence level of ESI triage

1. Not at all

2. Just a little

3. Somewhat

4. Mostly

5. Almost totally

Item	Response Format				
	Not at all	*Just a little*	*Somewhat*	*Mostly*	*Almost totally*
Assessment Domain	1	2	3	4	5
1. I am ---self-confident and --- anxious in my ability to assess a patient verbal clue	1	2	3	4	5
2. I am …. self-confident and --- anxious in my ability to assess the patient non-verbal clue	1	2	3	4	5
3. I am …. Self-confident and --- anxious to a patient at risk of life death	1	2	3	4	5
3. I am ___self-confident and ___anxious to assess patient from different ethnic, religion or other social cultural background unfamiliar to me.	1	2	3	4	5
4. I am _____ self-confident and _____ anxious in my ability to use active listening skills to gather information about the client's current problem.	1	2	3	4	5
5. I am _____ self-confident and _____ anxious in my ability to recognize important signs and symptoms in a patient	1	2	3	4	5
6. I am _____ self-confident and _____ anxious in my ability to identify a patient at risk even when the ED is crowded.	1	2	3	4	5
7. I am _____ self-confident and _____ anxious in my ability to follow my gut feeling that something is wrong with a patient and act on it.	1	2	3	4	5

8. I am _____ self-confident and _____ anxious in my ability to perform additional system assessments to gather more information regarding the patient's current problem.	1	2	3	4	5
9. I am _____ self-confident and _____ anxious in my ability to identify the severity of the patient base on the vital signs, chief complaint and presenting symptoms.	1	2	3	4	5
10. I am _____ self-confident and _____ anxious in my ability to assess pediatric patients from age 0-17 years	1	2	3	4	5
Domain of interpreting vital information.					
11. I am _____ self-confident and _____ anxious in my ability to independently triage a patient	1	2	3	4	5
12. I am _____ self-confident and _____ anxious if assigned to ED triage session without a support person or a reference log	1	2	3	4	5
13: I am _____ self-confident and _____ anxious in my ability sort patients out even when the ED is overcrowded	1	2	3	4	5
14. I am _____ self-confident and _____ anxious in my ability use the five level ESI triage accurately	1	2	3	4	5
15. I am _____ self-confident and _____ anxious in my ability to identify the information not related to the patient's problem.	1	2	3	4	5
16. I am _____ self-confident and _____ anxious that my decision to decide who to see first is of sound nursing judgment reference on ESI algorithm.	1	2	3	4	5
17. I am _____ self-confident and _____ anxious in my ability to know when enough information about the current problem has been gathered from the patient	1	2	3	4	5
18. I am _____ self-confident and _____ anxious in my ability to interpret the meaning of a specific assessment finding related to the patient's current problem	1	2	3	4	5
19. I am _____ self-confident and _____ anxious in my ability to detect when verbal	1	2	3	4	5

and nonverbal cues from the client do not match					
20. I am _____ self-confident and _____ anxious in my ability decide if the information presented by the patient or family is important to the patient's health condition.	1	2	3	4	5

Appendix I

Project Timeline

Appendix J

Project Cost

Expense	Cost	Total Cost
Recruitment fliers	60 x 0.10	$ 6
Educational Materials /printing	$2 x 40	$ 80
Statistician Consultant	$60 x 1 hr	$ 60
Binding of final project	$50 x 5 copies	$ 250
Dissemination Posters	$70	$ 70
Total Budget		$ 1,006.00