5-7-2018

When Disaster Strikes: a Training Intervention to Improve Nurses' Confidence and Preparedness for the Surge

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WHEN DISASTER STRIKES: A TRAINING INTERVENTION TO IMPROVE NURSES' CONFIDENCE AND PREPAREDNESS FOR THE SURGE

by

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EVIDENCE-BASED PRACTICE PROJECT REPORT

Submitted to the College of Nursing and Health Professions

of Valparaiso University,

Valparaiso, Indiana

in partial fulfillment of the requirements

For the degree of

DOCTOR OF NURSING PRACTICE

2018

Student Date 6/1/18 Advisor Date 5-7-18

ACKNOWLEDGMENTS

I would like to first and foremost thank God for giving me the breath in my lungs and drive in my soul to remain ambitious. Accepting my worth in Christ allowed me to accept that nothing is impossible. I would also like to thank my amazing family for their understanding, support, and unfailing love through this process. My deepest gratitude is extended to Dr. Jeffrey Coto, my faculty advisor, for his insight and guidance. I would also like to thank all of the emergency department staff for not only what they do every day but aiding in the completion of this project.

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ABSTRACT

There has been an exponential rise in mass casualty incidents (MCI) internationally. These human induced and naturally occurring events have affected over 4.6 billion people, and are not discriminatory to region or community (World Health Organization, 2011). Governing bodies require training and education, but nurses continue to report suboptimal competence and self-reported readiness, and a need for standardized, evidence-based training remains. The purpose if this evidence-based practice project is to authenticate current research supporting implementation of competency-based education, to improve nurses' self- perceived preparedness and confidence in their ability to respond to MCI. The project results can be utilized for development of standardized disaster training with a focus on MCI. Eight articles were selected for critical review and appraisal utilizing the John Hopkins Nursing Evidence-Based Practice (JHNEBP) evidence rating scale and the John Hopkins Evidence Based Practice (JHEBP) Research Evidence Appraisal Tool. Strength of the articles were level one through three and were high or good quality. Kurt Lewin's Change Theory was used as the driving framework in a 22-bed Midwest emergency department which receives patients from several surrounding towns and cities ranging in complexity. All Emergency department nurses were invited to participate. A pretest was administered using a thirty-question modified Emergency Preparedness Information Questionnaire (EPIQ). All participants received a combination of both didactic, and hands on training including core disaster competencies, lecture materials, triage algorithms, and a hands-on table top drill. Immediately following, the modified EPIQ was re-administered, a dependent *t*-test was used to compare nurses' self-perceived confidence and preparedness. Implications for practice will be discussed.

CHAPTER 1

INTRODUCTION

Background

In the last decade, there has been an exponential rise in mass casualty incidents (MCI) internationally. Over the last 20 years, 2.6 billion people have been affected by naturally occurring MCI and another 2 million affected by human induced MCI globally (World Health Organization [WHO], 2011). With regards to these numbers, there has been a gained increase in attention to preparedness and training in the medical community. Whether human-induced (act of terrorism or a mass accident) or naturally occurring disaster, MCI require certain preparedness and response by nurses who are often a part of the front-line response team in these crisis events.

In the military, there is a phrase "prior planning prevents mediocre performance" and this phrase should be applied when training todays healthcare workers. Healthcare professionals should be training to a standard that when faced with MCI they feel prepared and confident in performance and mediocre performance should not be tolerated. Preparing for a MCI can be daunting; and is unique for everyone involved. It is required by The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) that medical centers complete a yearly hazard vulnerability analysis of the most likely to occur regional disasters and that MCI be included in this analysis (JCAHO, 2012). Furthermore, creating a plan for a MCI is not enough, these response plans or competencies must be tested so that weaknesses can be identified and to ensure nurses are confident during exercises and real-life MCI. With the increasing threat of MCI, it is vital for emergency nurses to have critical understanding and self-confidence.

Problem Statement

Mass casualty incidents are not discriminatory to region nor community and the threat of a potential MCI is real. With the increased frequency and the lasting affects communities accrue post incident, nurses' preparedness and confidence when responding to these incidence is of critical importance. Lambrague et al. (2017) concluded that nurses in the United States reported suboptimal competence and self-reported readiness for disasters which included MCI. Although governing bodies require training and education, nurses continue to report low levels of preparedness, and the need for standardized evidence-based training and education remains. It has been shown that hospital personnel that practice and have regular education are more likely to perform well when responding to actual MCI (Collander et al., 2008). Despite this evidence, training is insufficient, unavailable, and not standardized. There has been limited studies evaluating the method of training whether it be didactic lectures, or hands on training (HOT) including skills session, table top drills, exercises, or simulation to determine how to properly train nurses to respond to MCI and have self-perceived confidence and preparedness.

Supporting Data from Current Literature

In addition to exceptional clinical and organizational skills, nurses also play a vital role in planning and responding to MCI. It is imperative that nurses better prepare themselves for what the future may hold and be equipped with both knowledge and confidence to care for the victims in their individual nursing environments. Several studies have been completed utilizing the Emergency Preparedness Information Questionnaire (EPIQ) in conjunction with educational interventions to evaluate nurse's familiarity with competencies and self-perceived confidence when responding to MCI. In 2005, there was an experimental modified table top exercise which confirmed that a short interactive table top exercise, was an effective, inexpensive, and adaptable

way to implement multiple competency training to prepare healthcare professionals for MCIs (Silenas, Akins, Parrish, & Edwards, 2008). Bartley, Stella, and Walsh (2006) discovered that after completing a MCI simulation, there was a statistically significant increase in the pass rate from 18% to 50% ($p<.001$) on the factual knowledge survey and perception of personal preparedness shifted from 32% of the nurses disagreeing to being prepared to 45.2% of the nurses agreeing they were prepared.

Few studies have been completed post MCI that evaluate the relationship between the training nurses receive and the outcomes of MCIs regarding patient mortality. In a pilot quality improvement project, Georgino, Kress, Alexander, and Beach (2015) found that institutions with active educational programs and training via table top exercise or live drills centered around core competencies that increased nurses' self-perceived readiness had low mortality rates during actual MCIs (p. 241). The Boston Marathon Bombing in 2013 was one of the first MCIs where prior training and education were directly correlated to low fatality rates (Georgino et at., 2015). Additionally, the authors identified that after implementing eight competencies into current mandatory training, not only were more lives saved, but trauma nurses had a significant improvement in self-confidence when caring for patients post MCI (Georgino et al., 2015).

Supporting agencies

JCAHO (2012) has made emergency planning, based on hazard vulnerability analysis, which encompasses MCI, a requirement. The Agency for Healthcare Research and Quality continues to emphasize emergency preparedness with emphasis on MCI in their research agenda (The Agency for Healthcare Research and Quality [AHRQ], 2012). The Department of Homeland Security (2009) has funded initiatives designed to improve emergency preparedness. The U.S. Department of Health and Human Services (2016) continues to lead the country in

preparing for, responding to, and recovering from the adverse health effects of emergencies and disasters including MCI. The Center for Disease Control and Prevention (2010) stresses that effective preparation will help maintain critical systems and can improve both the clinical and psychological outcomes of the people affected by MCI. The priorities of these agencies are to educate and prepare health care professionals and first responders, including nurses, to confidently act and save lives during emergencies and disaster events that exceed day-to-day capacities and capabilities.

Core Competencies

The International Nursing Coalition for Mass Casualty Education (2003) developed essential competencies that apply to all professional nurse roles and practice settings that have been utilized and adapted throughout the literature. Other agencies such as the American Association of Colleges of Nurses (AACN), the American Red Cross, and the Association of Community Health Nurse Educators (ACHNE) have all outlined training essential education that nurses should acquire to effectively respond to MCI. In 2009, the International Council of Nurses (ICN) developed a framework that is comprehensive consisting of four key points and ten competencies. Throughout the literature it has been shown that despite the method of training these competencies should be included.

Purpose of the Evidence-Based Project

The purpose if this evidence-based practice project is to authenticate current research supporting implementation of competency-based education focused on MCI in return to improve nurses' self- perceived preparedness and confidence in their ability to respond to MCI, and determine the best method of training either didactic, or hands on training (HOT) to improve nurses' self-perceived preparedness, and confidence when responding to MCI. The project results

can be utilized for development of standardized disaster training with a focus on MCI throughout the organization.

PICOT Question: Do nurses in a rural community emergency department located in the Midwest have improved self-perceived confidence and preparedness (increased EPIQ scores) in responding to human-induced and naturally occurring mass casualty event after completing an educational intervention including competencies specific to mass casualty incidents delivered via didactic method and HOT method?

Significance of Project

This project aims to establish a protocol for MCI specific education to be implemented into disaster training. Using the data collected changes in self-perceived confidence and preparedness can be evaluated immediately post intervention. By review available training methods, recommendations for developing and delivering effective MCI training can be made to prepare nurses for disruptive events that can overwhelm staff when responding to the demands of a MCI. This EBP projects successful evaluation on effective MCI training can improve the preparedness of all nurses involved.

CHAPTER 2

THEORETICAL FRAMEWORK, EBP MODEL, AND REVIEW OF LITERATURE

Theoretical Framework

Overview of Theoretical Framework

The effect of implementing an educational program to improve the self-perceived confidence and preparedness of nurses has been studied by several researchers. This Evidence Based Practice (EBP) project will utilize current research to build upon the known evidence and emphasize best practice for improving emergency room nurse's confidence post education when responding to MCI's. This groundwork for this project will encompass Kurt Lewin's (1947) Change Theory, The John Hopkins Evidence Based Practice (JHNEBP) Model, and an extensive literature search and review to shape the platform for a practice change. A review of these frameworks as well as evidence that has been critically appraised is included as the foundation for practice change. A PICOT question was developed to define the current problem.

Application of Theoretical Framework to EBP Project

Theoretical Framework: Kurt Lewin

The theoretical base for this project is Kurt Lewin's (1947) Change Theory. Developed and presented by social psychologist Kurt Lewin in 1947, components of the theory define the concepts of unfreezing (preparation for), transition (engagement in), and refreezing (solidification and permanency) in reference to the stages that human beings psychologically negotiate in the process of change (Petiprin, 2015). Also defined in the theory are the concepts of driving forces (forces that promote), restraining forces (forces that counter), and equilibrium (no change), described as factors that can inhibit or promote the change process.

Lewin's (1947) change theory was selected as the theoretical basis for this proposal because the concepts can be applied to changing the process of educating nurses on the competencies surrounding MCI's to promote increased self-perceived confidence and

preparedness. The conceptualization begins with attempting to identify the need to implement an educational intervention to increase nurse's confidence in MCI's. In the transition stage, the implementation of both didactic and hand on education will be implemented. Gradually, nurses move to adopt and refreeze the practice change, leading to eventual equilibrium. Nurses are driven towards a need to adopt a practice change by the increasing occurrence of MCI's around the world and desire to become better prepared to confidently respond to them.

Strengths and Limitations of Theoretical Framework for EBP Project

Lewin's model is very rational as well as goal and plan oriented. Lewin's change model does attempt to analyze the forces (driving or restraining) that impact change and in this project those factors include resistance to change in current protocols and organizing the attendance of staff nurses on all shifts to attend the training. Kurt Lewin's theory has been utilized throughout medical research to understand human behavior and its relationship to patterns of resistance to change and the change itself. The model incorporates three phases including unfreezing, moving and refreezing. The model is utilized to identify factors that can hinder change, as well as the forces that drive change. The ability to identify these factors can lead to positive implementation. The unfreezing stage is utilized to identify key personnel that will be affected by the change, in this project is will be emergency department nurses. The moving stage is where the actual change in practice takes place, which is the implementation of the didactic and hands on training on MCI. Finally, once the desired change has occurred, the refreezing stage is used to evaluate the stability of the change and the overall effectiveness within practice.

Evidence-based Practice Model

Overview of EBP Model

Evidence-Based Practice Model

The John Hopkins Evidence Based Practice (JHNEBP) Model is a prevailing problem-solving approach to clinical decision-making. It is designed specifically to meet the needs of the practicing nurse and uses a three-step process called PET: practice question containing five steps, evidence, steps six through ten, and translation the final eight steps (Dearholdt & Dang, 2012). The practice question is framed using a PICO question. Included in this question is the patient, population, or problem of interest, the intervention, a comparison with other interventions, and the outcome of interest (Dearholdt & Dang, 2012). The first step in the PET process is to assemble a team which includes members who have expertise with the problem or question, and the EBP question is developed and refined. Once your team is assembled, an exhausted search of the literature is completed using controlled vocabulary for keywords and phrases. Using the JHNEBP research evidence appraisal tool, questions are answered regarding research to determine the strength or level of evidence (Howe & Close, 2016). The translation step determines the transferability of evidence, and if it is appropriate, evidence is put into action, by implementing and evaluating it in the clinical setting and disseminating results (Howe & Close, 2016)

Application of EBP Model to EBP Project

This project has used the JHNEBP model as a guideline for making a practice change. After the team of individuals were recruited to assist in the project, A PICO question was developed; Is there a difference between Emergency Preparedness Information Questionnaire (EPIQ) scores after emergency department nurses are educated via didactic teaching and hands on teaching as measured immediately after the intervention? An exhaustive search of the

literature was completed using six databases. After reviewing the abstracts, eight pieces of literature were selected and critically appraised using the Melnyk and Fineout-Overholt pyramid of evidence and John Hopkins Evidence-Based Practice (JHNEBP) tool (JHNEBP, 2012). Recommendation for change based on the evidence synthesis was identified which included the use of a combination of didactic and HOT to deliver competency-based education to improve nurses self-perceived confidence and preparedness when responding to a MCI. During the translation stage, a plan was developed with the disaster management team to implement a multiple day in-service training event including both didactic and HOT. The nurses would complete the EPIQ prior to the training event and immediately after completing the training event. A finely detailed methods section will outline the complete method utilized for data collection. Once the data is collected, it will be evaluated, and outcomes reported to key stakeholders, followed by dissemination.

Strengths of EBP Model for EBP Project

The JHNEBP model helps to transition research findings quickly and appropriately into practice. The model is easy to understand, and the tools are an asset when working through the process step by step. The model provides a clear framework for conducting evidence-based practice inquiry. The project management guide was easy to navigate, and the question development tool aided in developing the PICOT question used for this project. The evidence appraisal tool was also valuable in the critical appraisal of the evidence and establish the consistency across the evidence as well as the applicability to this project. Finally, the guide provided information on utilizing the tool to implement practice change.

Literature Search

Sources Examined for Applicable Evidence

Articles that were utilized in this project were found after an exhaustive search of CINAHL, ERIC, PubMed, Joanna Briggs Institute EBP database, Cochrane Library, MEDLINE, and citation chasing. The following search terms and Boolean operators were used to narrow the search results: disaster prepare*" or "emergency prepare*" or "disaster management" or "disaster response" or "emergency preparedness" or "disaster training" or "disaster readiness") AND (educ* or competen* or confiden*) AND (“mass casualty" or "mass gathering”) AND nurs*. Search limiters were set including Scholarly (Peer Reviewed) Journals; Published Date: 2006/01/01-present; and published in the English Language. The inclusion criteria for articles in this project included articles that evaluated the self-perceived confidence or preparedness of healthcare professionals utilizing educational methods including: didactic lecture encompassing mass casualty or disaster education, audio visual presentations, and HOT including: role playing, simulation, skills sessions, table top drills, and virtual training in the in-hospital environment. Articles were excluded that were educational interventions for pre-hospital personnel.

Results

The search completed in the Joanna Briggs Institute did not produce any relevant results. CINAHL produced 38 results that matched the search terms and limiters. The abstracts were reviewed, and six articles were selected for review and critical appraisal. Next, the search terms and limiters were applied to MEDLINE, resulting in 19 results and two were selected for further review and critical appraisal. ERIC yielded four results none of which were included. The Cochrane library produced two results, one which met inclusion criteria and was already included for critical appraisal. Pubmed had 58 articles, three of which were duplicated, and one

duplicate that was previously analyzed. An evidence summery table was created to summarize the articles included in this project (see Table 2.2).

Table 2.1 Levels of Evidence

Strength of Evidence	Number Included	Quality of Evidence
Level I- Experimental Study/ RCT or meta-analysis of RCT	1	A
Level II- Quasi experimental study	4	A, A, B, A
Level III- Non-experimental, qualitative, or meta-synthesis	3	A, A, B
Level IV- Opinion of nationally recognized experts	0	
Level V- Expert opinion	0	

Appraisal of Relevant Evidence

The eight articles selected for critical review were appraised utilizing the JHNEBP evidence rating scale (JHNEBP, 2012, pp. 238-240). The hierarchy or strength of the evidence was leveled on scale from one, being the strongest, to five, being the weakest (Table 2.1). Furthermore, the quality of the evidence was established utilizing the JHEBP Research evidence appraisal tool and given a rating of high (A), good (B), or low quality or major flaws (C) (Table 1). A rating of high (A) was applied to articles that in research were consistent, or adequate sample size, adequate control, and had a definitive conclusion, all based on an inclusive literature review. In Organizational articles, a rating of high (A) was assigned to studies with well-defined methods, and use of both reliable and valid tools. A rating of Good (B) was given in a research study where results were reasonably consistent, there was a sufficient sample, and fairly

definitive conclusions, or when there were reasonably consistent recommendations based on a reasonable amount of scientific evidence. There were no articles included in this project that were of low quality or included major flaws (C).

Level one. Andreatta et al. (2010) compared the impact of two simulation-based training methods either, virtual reality (VR) or a standardized patient (SP) or live disaster drill, in a randomized control trial to evaluate a feasible alternative for training emergency personnel in mass casualty triage. The authors identified that Simple Triage and Rapid Treatment (START) was the most commonly utilized triage tool in mass casualty events. After attending a one-hour lecture pertaining to START and its application to MCI a pretest was administered. They then used stratified random assignment and assigned participants training using START with either VR or a live disaster drill. All participants had the same MCI scenario. The VR site was an exact replica of the SP site to assure direct comparison. During the scenario the participants were evaluated for triage performance and correctness. After completion of the scenario, a post test containing identical material to the pretest was administered. Although the sample size was small (n=15), it was sufficient, and measure of associate was calculated using the Cohen's *d* to determine the effect of the triage activity on the participants knowledge and performance. When assessing triage, they examined both performance and correctness. The mean (±SD) triage performance rating of the SP group was 3.47 (±0.41), compared to the mean for the VR group of 3.55 (±0.17), with a small effect (Cohen's d=0.25) which favored the VR groups performance. Likewise, the mean total of correctly triaged patients from the SP group was 11.38 (±1.92) for 81% correct, compared to the mean for the VR group of 11.86 (± 1.57) for 85% correct, indicating a small effect (Cohen's d=0.27) in favor of the VR group performance. The authors also evaluated the post test results. Data collected revealed a large effect (Cohen's d=0.63) in

favor of the SP group performance on the posttest, with 75 % correct the SP group had a mean score of 18.50 (±2.62), compared to 67% correct in the VR group with a mean score of 16.71 (±3.04). The difference between the pre- and posttest scores improved for the SP group, representative that the drill had a medium effect on the participants' knowledge (Cohen's d = 0.48). This RCT promoted the use of carefully created VR training to simulate disaster scenarios that are realistically comparable to live disaster drills. The findings further suggest that VR provides MCI training on demand in a stable and repeatable environment that will elicit comparable results of SP drills or that can be used in conjunction with SP to prepare the healthcare team to confidently respond to an MCI. The only limitations were the sample size, however since it was a descriptive study, it is sufficient for this project. This article was critically appraised as a level I and of high (A) quality on the JHNEBP evidence rating scales.

Level two. Bartley, Stella, and Walsh (2006) completed a quasi-experimental study to test the hypothesis that an audiovisual presentation the current institution disaster plan, followed by a simulated disaster exercise and debriefing improved staff knowledge, confidence, and hospital preparedness when responding to MCI. 50 members of the staff were chosen to participate. The pre-test evaluated factual knowledge as well as perceptions about individual and departmental preparedness. The participants then completed a one-hour lecture, and a compressed disaster simulation drill with 45 moulage patients. The drill concluded with a debriefing. In the posttest, the same 50 staff members were asked to repeat the survey, which included additional questions including their involvement in the exercise. The intervention resulted in a significant improvement in test pass rate: pre-intervention pass rate of 18% (95% confidence interval (CI= 16.1-19.9%) versus post-intervention pass rate of 50% (95% CI = 42.4-57.6%; chi2 test, p = 0.002). Emergency department (ED) staff had a stronger baseline

knowledge pre-test scores = 12.1 versus non-ED staff scores of 6.2 (difference 5.9, 95% CI = 3.3-8.4); t-test, p <0.001. There was no significant increase in the general perception of preparedness. However, the majority of those surveyed, 53.7%, described the exercise of benefit to themselves (95% CI = 45.5-61.8%) and 63.2% believed their department benefited (95% CI = 53.5-72.8%). The intervention led to an upgrade of all disaster plans institution wide. This study supports that simulation is valuable integration to MCI training, but more must be done to establish improved training. This article was critically appraised as a level II and of high (A) quality on the JHNEBP evidence rating scales.

Bistaraki, Waddington, and Galanis, (2011) conducted a quasi- experimental study to test their hypothesis that a brief educational intervention would improve hospital staff's knowledge about the hospital disaster plan and procedures. The intervention group included 56 professionals and the comparison group included 35 professionals. The intervention group attended a five-hour course that addressed principles of hospital disaster management and the comparison group did not attend but filled out the questionnaire. A structured questionnaire including eight demographic questions and 19 multiple-choice knowledge questions, was used to estimate the participants' differences in knowledge. Repeated measures analysis of variance (ANOVA), t-test, one-way ANOVA and chi-square test were used to analyze the data. Attendance of the five-hour didactic course resulted in a significant improvement in knowledge. The mean score was significantly higher (86) immediately after the intervention program standard error (SE) of 2 than before (44.5; SE: 1.7) ($p < 0.001$). The mean score 1 month later was significantly lower (77.2; SE: 2.3) than that immediately after the intervention program ($p < 0.001$), but significantly higher than the mean score before the intervention program ($p < 0.001$). Participants in the control group achieved a score of 40 (SE: 2.4), which was significantly lower than the scores of

the intervention group after the course ($p < 0.001$). The disaster training course had a great benefit for the participants. This study suggests that a brief educational intervention is beneficial in improving self-perceived preparedness and knowledge, despite the limitations of a small number of participants, and lack of follow up assessment to verify knowledge retention. This article was critically appraised as a level II and of high (A) quality on the JHNEBP evidence rating scales.

Collander et al. (2008) utilized a quasi-experimental study to evaluate a hospitals disaster preparedness training course which integrates a combination of didactic lecture and HOT including skills sessions, tabletop sessions, and a disaster exercise. The participants attended a two-day, 16-hour course (Hospital Disaster Life Support [HDLS]) which was designed around the seven core competencies. Day, one included two lectures followed by a tabletop exercise. Four additional didactic lectures were completed and day one culminated with a two-hour MCI exercise. Day two started with a lecture followed by a skills session, followed by an additional lecture and a HAZMAT skills session. The conclusion of day two was a second MCI exercise followed by two lectures. 84 healthcare professionals were included. Pretest results has an average score of 69.1 ±12.8 and posttest average was 89.5 ±6.7 an improvement of 20.4 (p<0.0001, 17.2-23.5). This was a high-quality design that presented an effective means of educating hospital personnel on MCI response using multiple training modalities despite the limitation of the study lacking follow up to determine retention of knowledge. This article was critically appraised as a level II and of good (B) quality on the JHNEBP evidence rating scales.

Silenas, Akins, Parrish, and Edwards (2008) conducted a quasi-experimental exercise to evaluate the effect of four, half day exercises which included lectures and integrated modified table top exercises to educate health care professionals on core competencies needed to respond

to MCI. A total of 69 medical professionals were included in the study. Prior to the three-hour exercise, a pretest was administered which examined knowledge and attitudes. There was then a brief lecture presented with power point to emphasize the objectives put out in the pre-reading material. Each participant was sent to their designated role, they were then presented with three to five pieces of information regarding the strain that the scenario placed on their role. They reconvened and then worked together as a team in a second role-playing session. The exercise had three evaluation processes. First, a written posttest on the content of the lectures, pre-readings, and exercises to measure understanding of the key concepts. The pretest and posttest were identical. The results of the pretest and posttest were analyzed by paired *t* tests using SPSS. Second, comments were requested from the students and facilitators about their experience. Third, was an attitude scale, to assess changes in student attitudes their roles in a disaster. The analysis of these results exposed that the attitude instrument did not have adequate reliability so there were no results. All tested knowledge areas except one, the posttest means decreased implying correct answers, and the standard deviation decreased, so there was less deviation. There was a statistical difference ($p<.001$) in eight of the nine knowledge areas from pretest to posttest. Results confirmed the findings from a previous study that a short, 3-hr interactive exercise is sufficient for improving self-perceived preparedness. This study is easily adaptable using time sufficient, relevant scenarios, role playing, and didactic education. This article was critically appraised as a level II and of high (A) quality on the JHNEBP evidence rating scales.

Level three. In a non-experimental, cross-sectional survey Alzahrani and Kyratsis (2017) assess emergency room nurses' self-perceived knowledge, role awareness and skills in disaster response to MCI in Mecca. 106 registered nurses in Mecca emergency departments were surveyed using an online self-administered questionnaire including open-ended and structured

questions. Data was collected using SPSS V.22. after being downloaded from survey monkey. Descriptive statistics were generated including mean, median, mode, SD, frequency counts, and crosstabs. Although emergency nurses' clinical role awareness in disaster response was reported to be high, nurses reported limited knowledge and awareness disaster plans. Over half of the emergency nurses had not read their plan, and almost 1 in 10 were not even aware of its existence. Emergency nurses reported seeing their key role as providing clinical assessment and care and fewer emergency nurses saw their role as providing surveillance, prevention, leadership or psychological care in MCI. Emergency nurses' responses to topics where there are often misconceptions on appropriate disaster management indicated a significant knowledge deficit. All respondents indicated that they had received prior training. Participants indicated that the top three most beneficial types of education and training courses for disaster response preparedness were: The most beneficial being hospital education sessions (43%): hospital education sessions involve free courses provided by the Training and Education Centers in Saudi hospitals. Secondly, The Emergency Management Saudi Course and Workshop, which was suggested (27%): the Saudi Emergency Management course is delivered in Mecca and provides special training for nurses over 2–3 days to help them improve their knowledge of handling emergencies in preparation for the Hajj. And the third was a short course in disaster management, which were suggested by 1 in 10 participants (11%). These are courses provided by private organizations. In contrast, university training in disaster management was perceived as important by only a minority of respondents (8%), as was online education about disaster management (6%) and self-learning (3%). The study provides valuable information on the self-perceived preparedness of emergency nurses during MCI. Furthermore, it identifies specific health education and training programs deemed appropriate and relevant by the emergency nurses. Which is applicable to this

study. Limitations of this study include its cross-sectional design, the relatively small and nonrandomized sample, and the use of self-reported data. This article was critically appraised as a level III and of high (A) quality on the JHNEBP evidence rating scales.

To better prepare hospital staff for a patient surge, Greci et al. (2013) developed an educational curriculum focusing on the emergency department for a patient surge drill. A multidisciplinary team developed a curriculum to train novice users to function in their job class in a multi-user virtual environment (MUVE). The MUVE is simulation-based training, that are patient centered, standardized, and allow for playback for reflective practice. Prior to the MUVE drill they provided pre-drill disaster preparedness training. The team exercises in a MUVE followed the pre -drill training. Finally, they reflected on their performance after the drill. A total of 14 students participated in one of two iterations of the pilot training program; seven nurses completed the emergency department triage course, and seven hospital administrators completed the Command Post (CP) course. Participant feedback was elicited through a series of open-ended questions. Final course evaluation scores were completed by each participant and were based on a five-point Likert scale (1=Strongly Disagree, 5=Strongly Agree) and were reported as means; standard deviations were not included as the results were not normally distributed. Students' self-reported changes in knowledge pre- and post-course (eight questions for the emergency department course, and six questions for the CP course) also utilized a five-point Likert scale (1=Strongly Disagree, 5=Strongly Agree). Individual differences were averaged over all students for each question pre- and post-intervention. The class knowledge shift (mean delta) was averaged for each question as well as overall for each course. All participants reported positive experiences in written course evaluations and structured verbal debriefings, and self-reported increase in disaster preparedness knowledge. Disaster preparedness knowledge scores increased

0.3-2.3. Post-intervention knowledge score changes for emergency department triage showed improvements ranging from .3-1.4 on the 5-point scale. Students also reported improved team communication, planning, team decision making, and the ability to visualize and reflect on their performance. Data from this pilot program suggest that the immersive, virtual teaching method is well suited to team-based, reflective practice and learning of disaster management skills. This was a test of a concept for a new and innovative emergency preparedness curriculum with places limitations on the study. The sample size was small, due to these small numbers, there was limited quantitative analysis. It benefits this project because it identifies the influence of team-based, reflective learning. It gives valuable information on combining virtual and real-world teaching and learning for MCI. This article was critically appraised as a level III and of good (B) quality on the JHNEBP evidence rating scales.

Al Thobaity, Plummer, Innes, and Copnell (2015) conducted a non-experimental, descriptive, quantitative, study to explore nurses' knowledge and the source of their knowledge and skills as it related to disaster preparedness and MCI. This study was one of the first to look at nurses' perceptions on what educational method was the most beneficial in preparing them for MCI. Emergency room nurses from six hospitals including civilian and military completed questionnaires anonymously. Data was collected using the Disaster Preparedness Evaluation Tool (DPET). This included 56 items, 45 which were measured on a Likert scale, with one equaling strongly disagree and six was equivalent to strongly agree. 11 of the items were open-ended. Reliability of the tool was established using Cronbach's alpha coefficient of knowledge (0.90). The validity was tested again using Cronbach's (0.90). data was analyzed using SPSS version 20. The mean and SD. Weak knowledge is defined between 1.00 and 2.99; moderate between 3.00 and 4.99; and strong was a mean between 5.00 and 6.00. Results were calculated

using an independent-sample *t*-test. Results showed that military nurses perceived themselves and more prepared than civilian nurses (mean difference= 0.50, 95% CI: 0.31-0.71). Through the questionnaire they found that the most common source of from which participants received their knowledge (*n*=280; 71%) was during drills. The second most important source (*n*=148; 37.47%) was through didactic continuing education courses. Only 26% reported that they gained their knowledge from actual disasters situations. Limitations include that data was collected through self-reporting and does not translate into actual knowledge, but this is applicable to this EBP project because we are measuring self-perceived knowledge. This article was critically appraised as a level III and of good (A) quality on the JHNEBP evidence rating scales.

Table 2.2 Appraisal of Evidence

Reference & Level of Evidence	Design, Intervention & Procedure	Educational Intervention Type	Evaluation
Al Thobaity, A., Plummer, V., Innes, K., & Copnell, B. (2015). Perceptions of knowledge of disaster management among military and civilian nurses in Saudi Arabia. *Australasian Emergency Nursing Journal*, *18*(3), 156-164. doi:10.1016/j.aenj.2015.03.001 III/A	non-experimental, descriptive, quantitative study Explored nurses' knowledge and the source of their knowledge and skills as it related to disaster preparedness and MCI. Looked at nurses' perceptions on what educational method was the most beneficial. Emergency room nurses from six hospitals including civilian and military completed questionnaires anonymously. Data	HOT, Didactic, Actual Involvement in MCI	independent-sample *t*-test that the most common source of from which participants received their knowledge (*n*=280; 71%) was during drills. The second most important source (*n*=148; 37.47%) was through didactic continuing education courses. Only 26% reported that they gained their knowledge from actual disasters situations.

	was collected using the Disaster Preparedness Evaluation Tool (DPET). This included 56 items, 45 which were measured on a Likert scale.		
Alzahrani, F., & Kyratsis, Y. (2017). Emergency nurse disaster preparedness during mass gatherings: a cross-sectional survey of emergency nurses' perceptions in hospitals in Mecca, Saudi Arabia. *BMJ Open*, *7*(4), e013563. doi:10.1136/bmjopen-2016-013563 III/A	non-experimental, cross-sectional survey To assess emergency room nurses' self-perceived knowledge, role awareness and skills in disaster response to MCI in Mecca, 106 registered nurses were surveyed using an online self-administered questionnaire including open-ended and structured questions.	Didactic	Descriptive statistics including mean, median, mode, SD, frequency counts, and crosstabs. Clinical role awareness in disaster response was reported to be high, but nurses reported limited knowledge and awareness disaster plans. Over half of the emergency nurses had not read their plan, and almost 1 in 10 were not even aware of its existence. Participants indicated that the top three most beneficial types of education and training courses for disaster response preparedness were: hospital education sessions (43%), The Emergency Management Saudi Course and Workshop (27%), and a short course

			in disaster management, which were suggested by 1 in 10 participants (11%). Only a minority of respondents (8%), as was online education about disaster management (6%) and self-learning (3%).
Andreatta, P., Maslowski, E., Petty, S., Shim, W., Marsh, M., Hall, T., & ... Frankel, J. (2010). Virtual reality triage training provides a viable solution for disaster-preparedness. *Academic Emergency Medicine, 17*(8), 870-876. doi:10.1111/j.1553-2712.2010.00728.x 1/A	RCT After attending a one-hour lecture pertaining to START and its application to MCI a pretest was administered. They then used stratified random assignment and assigned participants training using START with either VR or a live disaster drill. All participants had the same MCI scenario. The VR site was an exact replica of the SP site to assure direct comparison. During the scenario the participants were evaluated for triage performance and correctness.	Didactic & HOT via VR and SP (moulage drill)	Cohen's d to determine the effect of the triage activity on the participants knowledge and performance. When assessing triage, they examined both performance and correctness. Promoted the use of carefully created VR training to simulate disaster scenarios that are realistically comparable to live disaster drills. The findings further suggest that VR provides MCI training on demand in a stable and repeatable environment that will elicit comparable results of SP drills or that can be used in conjunction with SP

			to prepare the healthcare team
Bartley, B., Stella, J., & Walsh, L. (2006). What a disaster?! Assessing utility of simulated disaster exercise and educational process for improving hospital preparedness. *Prehospital & Disaster Medicine, 21*(4), 249-255. II/A	Quasi-Experimental Study Tested the hypothesis that an audiovisual presentation, the current institution disaster plan, followed by a simulated disaster exercise and debriefing improved staff knowledge, confidence, and hospital preparedness when responding to MCI.	Didactic and HOT via simulated disaster exercise	Chi Squared/ Confidence Interval Resulted in a significant improvement in test pass rate: pre-intervention pass rate of 18% (95% confidence interval ((CI) = 16.1-19.9%) versus post-intervention pass rate of 50% (95% CI = 42.4-57.6%; chi2 test, p = 0.002). 53.7%, described the exercise of benefit to themselves (95% CI = 45.5-61.8%) and 63.2% believed their department benefited (95% CI = 53.5-72.8%).
Bistaraki, A., Waddington, K., & Galanis, P. (2011). The effectiveness of a disaster training programme for healthcare workers in Greece. *International Nursing Review, 58*(3), 341-346. doi:10.1111/j.1466-7657.2011.00898.x II/A	Quasi-Experimental Study Tested their hypothesis that a brief educational intervention would improve hospital staff's knowledge about the hospital disaster plan and procedures. The intervention group included 56 professionals and the comparison	Didactic	Repeated measures analysis of variance (ANOVA), t-test, one-way ANOVA and chi-square test Attendance of the five hour didactic course resulted in a significant improvement in knowledge. The mean score was significantly higher (86) immediately after the

	group included 35 professionals. The intervention group attended a five-hour course that addressed principles of hospital disaster management and the comparison group did not attend.		intervention program standard error (SE) of 2 than before (44.5; SE: 1.7) ($P < 0.001$). Participants in the control group achieved a score of 40 (SE: 2.4), which was significantly lower than the scores of the intervention group after the course ($P < 0.001$).
Collander, B., Green, B., Millo, Y., Shamloo, C., Donnellan, J., & DeAtley, C. (2008). Development of an 'all-hazards' hospital disaster preparedness training course utilizing multi-modality teaching. *Prehospital & Disaster Medicine*, *23*(1), 63-67. II/B	Quasi-experimental study 84 healthcare professionals were included. Investigators evaluated the hospitals disaster preparedness training course which integrates skills sessions, tabletop sessions, and a disaster exercise. The participants attended a two-day, 16-hour course (Hospital Disaster Life Support [HDLS]) designed around the seven core competencies. Day, one included two lectures followed by a tabletop exercise. Four additional didactic lectures were completed and day one culminated	Didactic and HOT via skills sessions, tabletop sessions, and disaster exercise	Paired *t* test An improvement of 20.4 ($p<0.0001$, 17.2-23.5) from pre to post test was identified.

	with a two hour MCI exercise. Day two started with a lecture followed by a skills session, followed by an additional lecture and a HAZMAT skills session. The conclusion of day two was a second MCI exercise followed by two lectures.		
Greci, L. S., Ramloll, R., Hurst, S., Garman, K., Beedasy, J., Pieper, E. B., & ... Agha, Z. (2013). vTrain: a novel curriculum for patient surge training in a multi-user virtual environment (MUVE). *Prehospital And Disaster Medicine, 28*(3), 215-222. doi:10.1017/S1049023X13000083 III/B	Pilot A multidisciplinary team developed a curriculum to train novice users to function in their job class in a multi-user virtual environment (MUVE). The MUVE is simulation-based training, that are patient centered, standardized, and allow for playback for reflective practice. Prior to the MUVE drill they provided pre-drill disaster preparedness training.	Didactic and HOT via MUVE	Five-point Likert scale (1=Strongly Disagree, 5=Strongly Agree) and were reported as means All participants reported positive experiences in written course evaluations and structured verbal debriefings, and self-reported increase in disaster preparedness knowledge. Disaster preparedness knowledge scores increased 0.3-2.3. Post-intervention knowledge score changes for emergency department triage showed improvements ranging from .3-1.4 on the 5-point scale. Students also

			reported improved team communication, planning, team decision making, and the ability to visualize and reflect on their performance. Data from this pilot program suggest that the immersive, virtual teaching method is well suited to team-based, reflective practice and learning of disaster management skills.
Silenas, R., Akins, R., Parrish, A., & Edwards, J. (2008). Developing disaster preparedness competence: an experiential learning exercise for multiprofessional education. *Teaching & Learning In Medicine*, *20*(1), 62-68. II/A	Quasi-experimental Evaluated the effect of four, half day exercises which included lectures and integrated modified table top exercises to educate health care professionals on core competencies needed to respond to MCI. A total of 69 medical professionals were included in the study. Prior to the three-hour exercise, a pretest was administered. There was a brief lecture presented with power point to emphasize the objectives put out in the pre-reading	Didactic and HOT vis table top exercises	paired *t* tests, comments were requested from the students and facilitators about their experience, and an attitude scale, to assess changes in student attitudes their roles in a disaster. The attitude instrument did not have adequate reliability so there were no results. All tested knowledge areas except one, the posttest means decreased implying correct answers, and the standard deviation decreased, so there was less deviation. There was a

	material. They worked together as a team in a second role-playing session. The exercise had three evaluation processes. First, a written posttest on the content of the lectures, pre-readings, and exercises to measure understanding of the key concepts.		statistical difference (p<.001) in eight of the nine knowledge areas from pretest to posttest. Results confirmed the findings from a previous study that a short, 3-hr interactive exercise is sufficient for improving self-perceived preparedness.

Construction of Evidence-based Practice

Synthesis of Critically Appraised Literature

In the studies selected for inclusion in this project, a combination of both didactic, and HOT training including core disaster competencies have been consistently shown to improve nurse's self-perceived preparedness and confidence when responding to MCI. The studies selected were all high or good quality and showed significant improvement in testable knowledge and preparedness. These are methods that can be easily implemented and adapted for inclusion to promote a change in policy to promote adequate preparedness and confidence when responding to naturally occurring and human induced MCI.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

In collaboration with management and key administrative personnel, a combination of both didactic and HOT training will be implemented over a three-month time frame. The goal of this EBP project is to authenticate current research supporting implementation of competency-based MCI training delivered using didactic lecture and hands on training to improve nurses' self- perceived preparedness and confidence in their ability to respond to MCI.

Participants and Setting

Implementation will occur in a 22-bed emergency department located in the Midwest. This hospital receives patients from several surrounding towns and cities. The complexity of the patients ranges from low acuity to critical in nature. All the Emergency department nurses (n=40) will be invited to participate in this study. Nurses will all consent to participate in the study. A pretest will be administered using a modified EPIQ, all participants will receive both didactic lecture and hands on training, immediately following the EPIQ will be re-administered. 30 days post training the same modified EPIQ will be re-administered to test retention of knowledge.

Outcomes

Written consent was obtained by the original author of the EPIQ to modify and utilize the EPIQ for data collect for this project. Outcomes will be measured using the modified EPIQ, consisting of 30 questions which are measured on a five-point familiarity scale. The same modified EPIQ will be utilized for the pre and post intervention data collection. The reliability

and validity has been previously determined by the study completed by Garbutt, Peltier, and Fitzpatrick (2008). SPSS will be used for data analysis.

Intervention

The JHNEBP model was utilized to transition research findings quickly and appropriately into practice. In the first step in the PET process a team which include members who have expertise with the problem or question including the facility Emergency Medical Services (EMS) Director, and members of the Emergency Preparedness department was gathered. The EBP question was developed and refined. An exhaustive search of the literature was completed. The JHNEBP research evidence appraisal tool, was used to determine the strength or level of evidence. The translation step determines the transferability of evidence, including incorporation of both didactic and HOT training to prepare nursing staff to respond to MCI. Nursing staff was educated during a monthly staff meeting on the importance and benefits this program will offer. At this time nurses were presented with the written agenda for the training. Several training days were arranged to ensure attendance. After informed consent was obtained nurses completed both the didactic and HOT training. Training focused on the core competencies of disaster management, disaster triage, the institutions policy and procedures during mass casualty events, and a hands-on table top drill. Immediately after completing the EPIQ posttest was administered.

Planning

The main investigator in this project met with key administrators one year prior to interventions to discuss current training needs. The project proposal was submitted to the project site facilitator. This project offered an evidence-based approach for training that was in line with the needs of the facility.

Data

Measures

Data was collected using paper copies of the modified EPIQ and outcomes were assessed using SPSS. The tool utilized (EPIQ) had previously been critiqued for reliability and validity in previous studies completed by Garbutt, Peltier, and Fitzpatrick (2008). The reliability of the resulting emergency preparedness dimensions was assessed by using Cronbach's a values. EPIQ was shown to be very powerful for explaining respondents' self-reported preparedness in the case of large-scale emergency events ($r^2 = 0.734$, $F = 2.64$, $p < 0.001$). Each of the eight revised EPIQ dimensions had a strong significant impact in explaining overall familiarity (all significant at $p < 0.001$). In combination, the factor analysis, reliability analysis, and regression results achieved the goal of assessing the reliability and validity of the revised EPIQ.

Collection

The educational intervention will take place on multiple dates throughout the months of December 2017 and January 2018. The education session will focus on core competencies and coincided with suggested education on emergency preparedness and disaster response for nurses proposed by Federal Emergency Management Agency (FEMA) and the Centers for Disease Control and Prevention (CDC). The hospital’s policy and procedures that were obtained from the facility intranet and relevant Emergency Operation Plans (EOP) specific to MCI will also be provided. Triage training that focuses on the SMART Incident Command System will be provided with approval from the manufacturer. A badge reference card will be provided for all attendees. Immediately prior to the education, a pretest consisting of the EPIQ will be

administered. Immediately following the educational intervention, the same EPIQ will be administered.

Management and Analysis

The only person that collected data was the main investigator. The data was compared pre-intervention and post-intervention. The data was analyzed using SPSS and a paired t test.

Protection of Human Subjects

The project proposal was submitted to Valparaiso University Institutional Review Board (IRB). IRB approval was obtained. The proposal was then brought hospital administration for approval. Participation in this study was voluntary. Participants that agreed to participation signed a written consent prior to the intervention. Participants had the right not to participate at all or to leave the study at any time. Deciding not to participate or choosing to leave the study did not result in any penalty or loss of benefits to which they were entitled, and did not harm their relationship with the organization, affect their job, job performance evaluation, damage their financial standing, employability, or reputation. The only person that will collect data is the main investigator. The main investigator will be the only person with access to the data.

The information from this EBP project will be disseminated and published. No identifiable information will be collected or published. All participants consented to participate, and all information was maintained in a password protected computer.

CHAPTER 4

FINDINGS

Implementation of competency-based education focused on MCI via didactic and HOT in a stable repeatable environment has been shown to improve nurses' self- perceived preparedness and confidence in their ability to respond to MCI. This EBP project utilized didactic and HOT training focused on the core competencies of disaster management, disaster triage, the institutions policy and procedures during mass casualty events, and a hands-on table top drill to authentic current research findings that nurses would have increased self-perceived preparedness and confidence. The PICOT question that was the foundation of this project was, "Do nurses in a rural community emergency department located in the Midwest have improved self-perceived confidence and preparedness (increased EPIQ scores) in responding to human-induced and naturally occurring mass casualty event after completing an educational intervention including competencies specific to mass casualty incidents delivered via didactic method and HOT method?" This project was implemented and both subject characteristics and outcomes were analyzed.

Participants

Size. There were 40 emergency room nurses that were invited to participate in the educational intervention. Of the 40 nurses, 20 of them gave written informed consent to participate. There were multiple dates scheduled from December 1, 2017 to January 31, 2018 to complete the in-service. A total of 12 nurses out of the potential 40 attended the educational in-service for a response rate of 30%. Each participant received the same educational in-service including review of the core competencies of disaster management, mass casualty triage training, a review the institutions policies and procedures related to mass casualty, a badge reference card, and

participated in a table-top drill. Twelve participants completed the pre-test, the educational intervention, and the post-test. The results from these 12 pre and posttest were included in the data analysis.

Characteristics. The ages of the participants ranged from 27-40 years old. Of the participants (N=12), three of them were males and nine of them were females (see figure 4.1). Seven of the nurses who participated were bachelors prepared, while five of the nurses had earned associates degrees (see figure 4.2). Years of nursing experience was also analyzed. Five of the participants had between 0-5 years of experience, four of the nurses had 5-10 years of experience, and three of the nurses had ten years or more of nursing experience (see figure 4.3). 66.7% of all of the participants reported that they had previously attended disaster training including management of MCI (see figure 4.4).

Figure 4.1. Gender

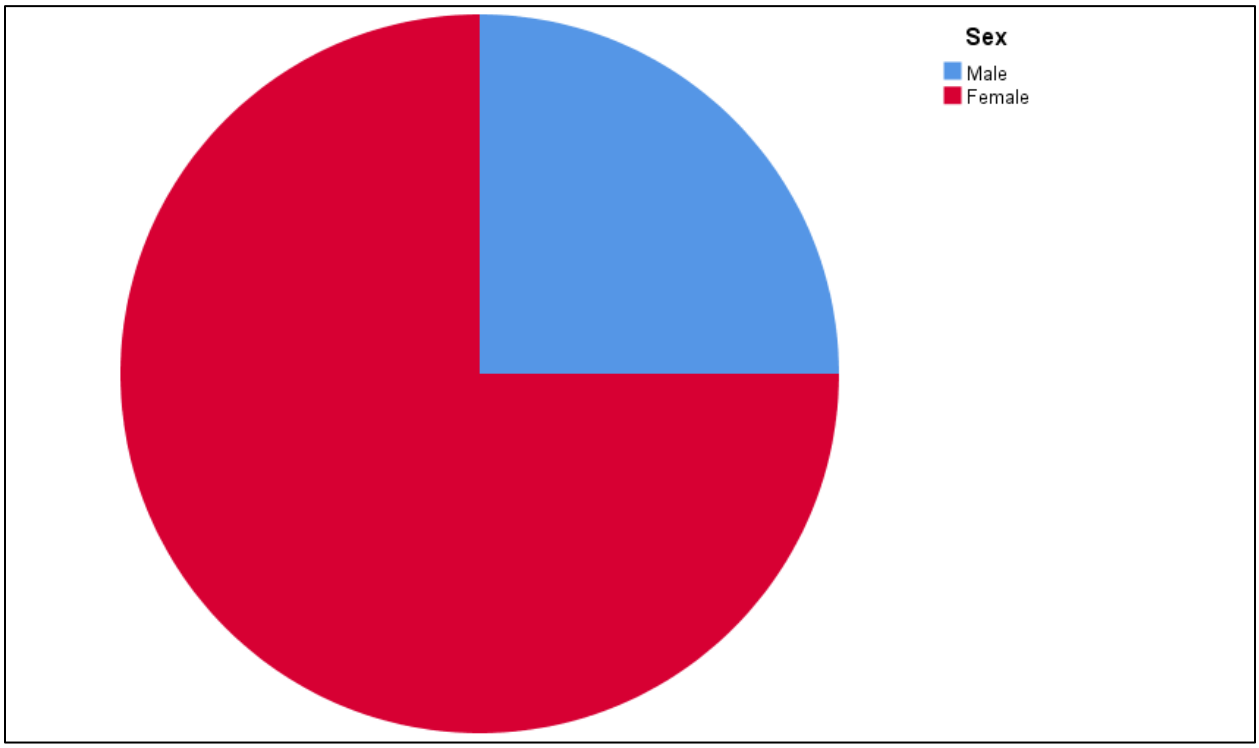


Figure 4.2. Educational Level

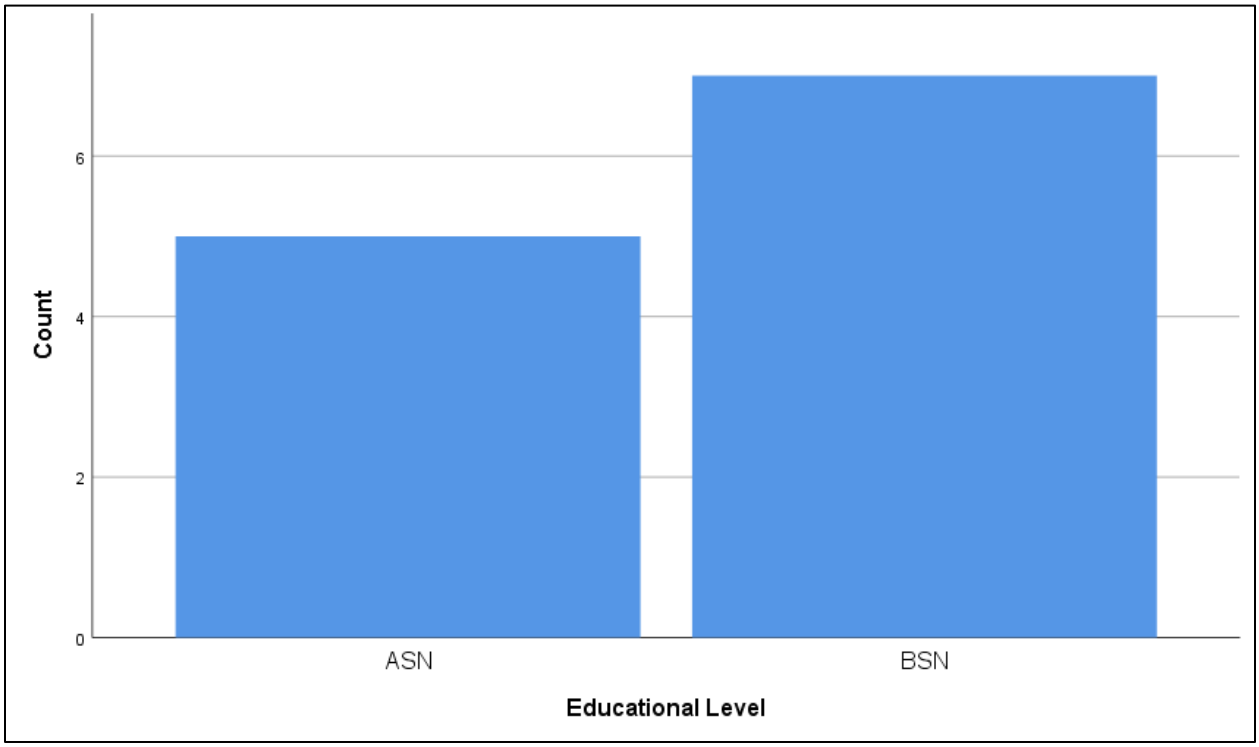


Figure 4.3. Years of Nursing Experience

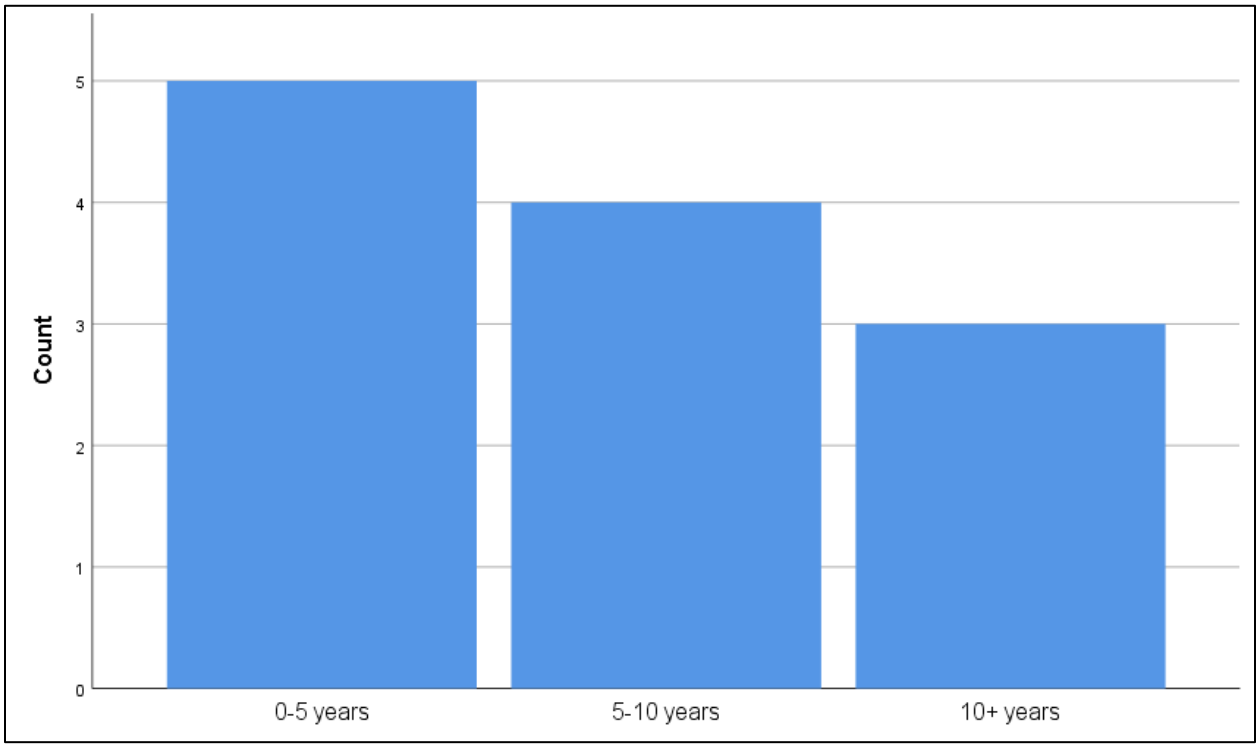
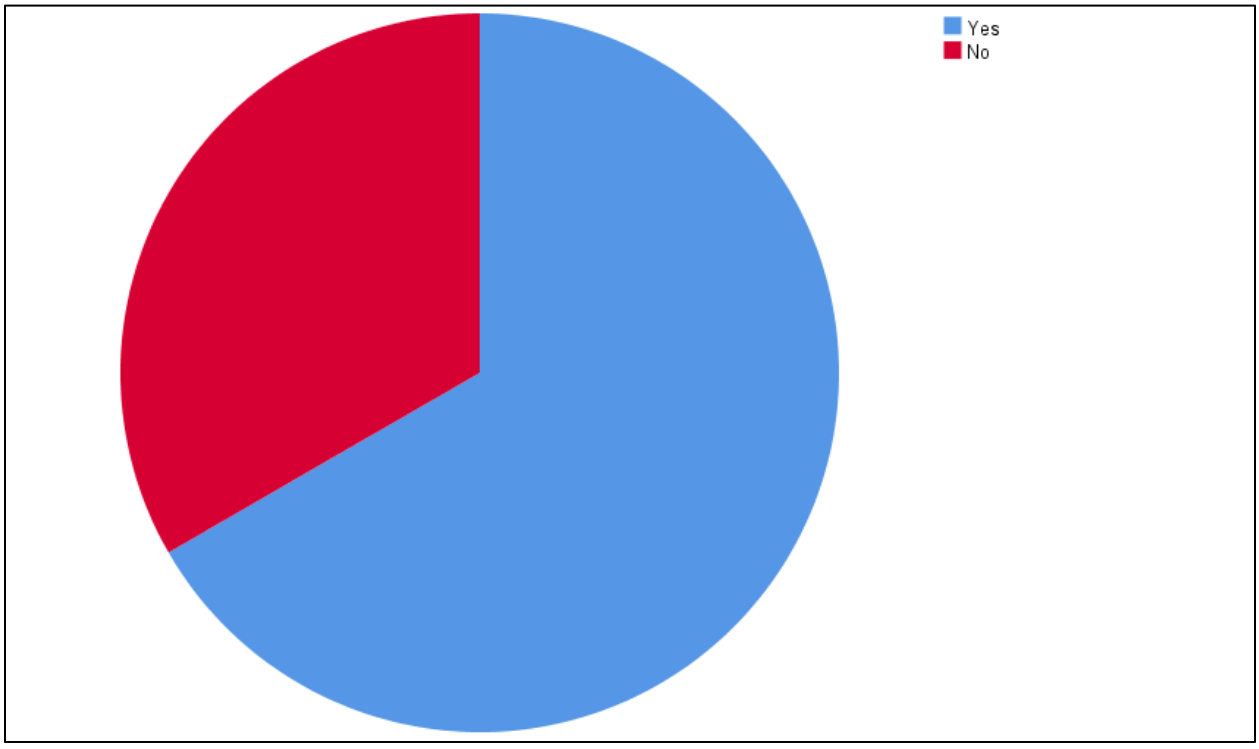


Figure 4.4. Previous Disaster Training



Changes in Outcomes

Statistical Testing. Data was entered into the Statistical Package for the Social Sciences (SPSS) to be statistically analyzed. A t-test was utilized to compare nurses self-perceived preparedness and confidence pre and post educational intervention.

Significance. The data was collected using the 30-question modified EPIQ. The modified EPIQ is a 5-point Likert scale. The scale is measured from 1 (very familiar) to 5 (not familiar). The reliability of the resulting emergency preparedness dimensions was assessed by using Cronbach's a values. EPIQ was shown to be very powerful for explaining respondents' self-reported preparedness in the case of large-scale emergency events ($r^2 = 0.734$, $F = 2.64$, $p < 0.001$). Each of the revised EPIQ dimensions had a strong significant impact in explaining overall familiarity

(all significant at $p < 0.001$). In combination, the factor analysis, reliability analysis, and regression results achieved the goal of assessing the reliability and validity of the revised EPIQ (Garbutt, Peltier, & Fitzpatrick, 2008). Question number 30 of the modified EPIQ asks participants to, “Please provide an assessment of your Overall Familiarity with response activities/preparedness in the case of a large-scale emergency event.” The responses to this question were analyzed by first finding the difference between two means. Mean one being the pretest (M=3.75; SD=1.138) and mean two being the posttest (M=2.50; SD=0.904). The mean difference equals 1.25. A paired t-test was completed (t=5.745; p=0.000). The result is significant for the alpha of 0.05. There was a significant improvement in nurses scores when analyzed. Answering the PICOT question, that after the educational intervention nurses had significant improvement in self-perceived confidence and preparedness when responding to mass casualty incidents.

CHAPTER 5

DISCUSSION

Findings from this EBP project answered the projected PICO question which queried, "Do nurses in a rural community emergency department located in the Midwest have improved self-perceived confidence and preparedness (increased EPIQ scores) in responding to human-induced and naturally occurring mass casualty events after completing an educational intervention including competencies specific to mass casualty incidents delivered via didactic method and HOT method?" The educational intervention was found to have a statistically significant ($p<0.05$) improvement in nurses' self-reported preparedness and confidence when responding to MCI as noted by improved EPIQ scores. Strengths and limitations with this project as well as evaluation of the use of Kurt Lewin's (1947) Change Theory and The John Hopkins Evidence Based Practice (JHNEBP) Model will be explored. Future implications for use of this project to guide the development of a protocol for standardize training will also be discussed.

Explanation of Findings

Overall self- perceived confidence and preparedness improved after the implementation of this project. Prior to implementation of this project the mean score was 3.75 and post implantation was 2.5 suggesting that participants felt more confident and prepared to respond to a MCI. The goal of this project was met with respondents replying that they felt somewhat familiar and very familiar with their emergency preparedness after attending the in-service. The emergency department nurses would likely be the first caregivers to care for patients in the event of a MCI. The improvement in the nurses' self-perceived preparedness highlights the importance of continued future education and training.

Demographic analysis highlights that 66.7% of the participants had completed previous disaster training, which further stresses the importance of continued training and the positive impact that continuing education has on improving confidence and preparedness with emergency room nursing staff. Despite the fact that many of the nurses have had training in the past, they all had improvement after attending the educational in-service.

Evaluation of Applicability of Theoretical and EBP Frameworks

Theoretical Framework. Kurt Lewin's (1947) Change Theory was the driving framework behind this project. During the unfreezing stage the researcher identified a driving force or need for standardized education to increase emergency department staff's confidence and preparedness when responding to MCI. Communication was key during the unfreezing stage. Informing the staff about the imminent change, and answering questions concerning the project and the benefits of participation and implantation was key in acceptance of the change. In the transition phase, the institution and staff were introduced to educational intervention. During a monthly meeting the educational intervention was discussed, as well as questions answered regarding the implementation. During several scheduled in-services, the nurses were given didactic education which outlined the institutions policies and procedures, the core competencies of disaster management, education regarding mass casualty triage, and information regarding where supplies that are pertinent to management MCI is located and deployed during these events. Following the didactic portion of the education the nurses completed a hands-on table top drill where they triaged multiple casualties and were asked to follow the institutions procedure for initiating what the institution refers to as a code black (MCI). Refreezing symbolizes the act of reinforcing, stabilizing and adopting the practice change. Nurses were driven to accept the

new practice change by the increasing occurrence of MCI worldwide, and the desire to become better prepared to confidently respond to them.

Lewin's (1947) change theory was selected as the theoretical basis for this proposal because the concepts can be applied to changing the process of educating nurses on the competencies surrounding MCI's to promote increased self-perceived confidence and preparedness. The conceptualization began with attempting to identify the need to implement an educational intervention to increase nurse's confidence in MCI's. In the transition stage, the implementation of both didactic and hand on education was implemented. Gradually, nurses move to adopt and refreeze the practice change, leading to eventual equilibrium.

EBP Framework. The John Hopkins Evidence Based Practice (JHNEBP) Model was the prevailing problem-solving approach to clinical decision-making used as the framework. This model was valuable to this project because it is designed specifically to meet the needs of the practicing nurse and uses a three-step process called PET: practice question containing five steps, evidence, steps six through ten, and translation the final eight steps (Dearholdt & Dang, 2012). The first step in the PET process was to assemble a team which included members with expertise with the problem or question, including members of the safety and disaster committee and the emergency medical services management team. The EBP question was developed and refined. The practice question was framed using a PICO question, ""Do nurses in a rural community emergency department located in the Midwest have improved self-perceived confidence and preparedness (increased EPIQ scores) in responding to human-induced and naturally occurring mass casualty events after completing an educational intervention including competencies specific to mass casualty incidents delivered via didactic method and HOT method?" An

exhaustive search of the literature was completed using six databases. After reviewing the abstracts, eight pieces of literature were selected and critically appraised using the Melnyk and Fineout-Overholt pyramid of evidence and John Hopkins Evidence-Based Practice (JHNEBP) tool (JHNEBP, 2012). Recommendation for change based on the evidence synthesis was identified which included the use of a combination of didactic and HOT to deliver competency-based education to improve nurses self-perceived confidence and preparedness when responding to a MCI. During the translation stage, a plan was developed with the disaster management team to implement a multiple day in-service training event including both didactic and HOT. The nurses completed the modified EPIQ prior to the training event and immediately after completing the training event.

Strengths and Limitations of the EBP Project

Strengths. This EBP project aimed to improve nurses self-perceived confidence and preparedness when responding to MCI. During the development phase of this project nursing staff was enthusiastic to take part in an opportunity to not only benefit themselves but prepare the institution for the what has become a more prevalent occurrence globally. There was significant talk about the facilities preparedness and feelings of being unprepared for MCI. Many nurses showed great interest in attending the event.

During the implementation phase the institutions protocol was printed and made accessible for all participants. A badge reference card was developed which included the MCI triage algorithm and other key points as an available reference. All participants felt that the materials provided were easy to follow and assessable for future use.

In-services were scheduled on multiple days during multiple shifts to accommodate the participants schedules. The educational material provided was printed legibly and participants

were made aware how to access information for future reference. Interruptions were kept to a minimum and all education was provided in a stable repeatable environment.

Limitations. The main investigator was the only person providing the educational intervention, leading to constant interaction with all participants. Although in-services were scheduled on multiple days during multiple shifts, the timing of the in-service was during a very high census time in the emergency department. The small original sample size along with voluntary participation and high patient census resulted in fewer participants than anticipated. Although all education was provided in the same repeatable fashion each time, there were interruptions for nurses to take phone calls on the unit and attend to patient's needs.

Other limitations include the different educational backgrounds, experiences, and prior training among the participants. The results could have been slightly skewed with some nurse's having more experience and training than others. Lastly, the questioner itself. Despite being previously analyzed for reliability and validity a modified version was used. Despite the EPIQ being 30 questions long, the time it took to complete varied among the participants and was completed by hand. The numbers were circled and an explanation of the variables was given with each question, but misinterpretation could have led to skewed results.

Implications for the Future

Practice. Preparing for a MCI can be daunting. Although required by JCAHO, just planning for MCI is not enough. The education has to be implemented in a standardized repeatable fashion, and the response plans or competencies must be tested to identify weaknesses and ensure confidence not only during MCI drills but more importantly actual MCI. With the increasing threat the community's well-being relies on the understanding and self-confidence of the front-line staff.

With the requirements in place by JCAHO to make emergency planning including preparation for MCI a priority, the emphasis on MCI in the AHRQ research agenda, and the funding initiatives in place from the Department of Homeland Security, a standardized required training program is key for implementation throughout the institution. The priorities of these agencies have trickled down to the individual institutions to prepare personnel through standardized training to confidently act and save lives.

One hindrance on the implementation of a standardized training program is the lack of requirement by the institution to implement MCI training into required onboarding educational requirements. This project offers the beginning of an educational intervention that can be easily implemented in any healthcare facility. It can be expanded upon or adjusted to meet the needs of each individual facility or unit. With the unfortunate yet seemingly unavoidable increase in MCI globally institutions need to address the lack of standardized education and training to increase preparedness and confidence in responding to these events that exceed the day-to-day capabilities and capacities.

Theory. Lewin's Change Theory and The John Hopkins Evidence Based Practice Model were used as the fundamental frameworks for this EBP project. Following these theoretical frameworks allowed for the development of a successful educational intervention which was implemented leading to a potential change in nursing practice and bettering the future of nursing care. Following these frameworks allowed for recognition of the lack of knowledge, confidence, and self-perceived preparedness.

The goal-oriented change model allowed for analysis of the driving and restraining forces that could impact the change, including resistance to change in the current educational protocols, and also the organization of standardized training events. It allowed for patterns of resistance to

be identified and for a better understanding of human behaviors. The ability to identify these factors aided in a positive implementation. During the unfreezing stage the nurses were informed on the intent of the change. The moving stage included the implantation of the didactic and HOT. Finally, after the change occurred the refreezing stage allowed for evaluation of the stability and sustainability of the change in practice.

The JHNEBP model aided to successfully transition all research findings appropriately into practice. The model offered a clear understanding for conducting practice inquiry. The project management guide was navigated easily and aided in the development of the PICO question. The evidence appraisal tool offered valuable easy to follow guidance in the appraisal of the selected literature. After completing data collection, the data was synthesized and appropriately disseminated. Future development of educational interventions to be used to improve preparedness and confidence in MCI should be grounded in a solid theoretical framework such as Lewin's Change Theory and the JHNEBP model.

Research. The most current research on MCI analyzes multiple modalities of education as well as the content of the educational interventions and their effect on disaster preparedness with emphasis on MCI. In the realm of nursing research practice should be based on the highest level of research. Although there is research available, there is limited research done post MCI to evaluate the educational technique used prior to those MCI to analyze how that preparation prepared them for a real-life MCI.

The unpredictability of MCI related to their location, scope, and impact makes training for these incidents unique. During response to an MCI there with be improvisation, but one thing that can be difficult to improvise is a plan of action. Future research should also aim to analyze retrospectively how disaster plans and training impacted the result of MCI.

The literature also suggests that most agency are reporting that they are offering training more often that practitioners confirm that they are actually receiving the training. Furthermore, when training occurs not all individuals are invited or available to participate. Continuing to produce training protocols which require all personnel to be trained in a standardized, repeatable environment, with standardized training including institutional policies and procedures, core competencies, and HOT can aid in future research analysis of training programs.

The literature review consistently showed that a combination of didactic and HOT with a focus on core disaster competencies improved nurses self-perceived preparedness and confidence when responding to MCI. The studies suggested different modalities for HOT including VR, live training drills, MUVE, table top drills, and simulation. There were limited studies which compared one modality of HOT to another. The limited research available did discuss the cost, complexity, purpose, and approach, and some of the specific benefits of each, but this is an area for future research. Lastly, units outside of the emergency departments should also be included in future research to further improve the emergency preparedness, and verify that all staff members are familiar with their roles and responsibilities in the event of a MCI

Education. There is an unceasing need for standardized education. Utilizing this projects method and expanding on the educational intervention to encompass the needs of every department. Education should be standardized using plain seamless terminology and follow the same core competencies. While education can have associated cost, it is important for institutions to plan for all members of their staff to attend mandatory training and provide coverage so that is possible. Not only should staff be provided with education, but they should also be given frequent refresher courses, highlighting changes in the literature and keeping the education up to date with current best practice recommendations.

In regards to HOT, all members of the healthcare team should regularly participate in drills and drills should encompass mutual aid and cooperation among all local agencies. Education will not be beneficial if training is mediocre and does not include all front-line responders. Institutions should not become complacent when it comes to education regarding disaster preparedness especially when it comes to MCI. It is vital that institutions provide education remaining proactive rather than reactive.

Conclusion

Emergency preparedness with an emphasis on MCI preparedness has come to the forefront of disaster management over the last several years with exponential rise in MCI globally. The purpose of this EBP project was to authenticate the current research and develop an educational intervention delivered via didactic and HOT to improve nurses' self-perceived preparedness and confidence when faced with responding to these unfortunate events. The education intervention was prepared with Kurt Lewin's Change Theory as the theoretical foundation. Concepts of the theory were applied to changing the process of educating nurses on the competencies surrounding MCI's to promote increased self-perceived confidence and preparedness. The conceptualization began with attempting to identify the need to implement an educational intervention to increase nurse's confidence in MCI's. In the transition stage, the implementation of both didactic and hand on education was implemented. Gradually, nurses moved to adopt and refreeze the practice change. The JHNEBP model helped to transition research findings quickly and appropriately into practice. The model and tools within the model were an asset when working through the process step by step. The model provided a clear framework for conducting this evidence-based practice inquiry.

This project was successful, as evidence by the statistical analysis, in improving nurse's preparedness and confidence when responding to MCI. The project supports future implementation and expansion of the educational intervention to not only nurses but all hospital personnel. Secondary outcomes from the data collected from this project can be used to evaluate several different situations including: How past disaster training impacts the effects of the educational intervention, how years of experience impact the effects of the training, and lastly reviewing the individual questions to see what areas of MCI were the most impacted by implementing this training intervention.

This EBP project stands in support of the literature that training should occur in a stable repeatable environment and include a combination concise lecture and hands on training. Education should be designed around core disaster competencies and provide content materials and educational handouts highlighting key points including institutional policies and procedures. Nurses stand at the forefront of innovation and education, using this project as a foundation, training programs can be developed and expanded to not only improve nurses confidence and preparedness but the overall preparedness of institutions.

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BIOGRAPHICAL MATERIAL

Ms. Weber is a six-year army veteran who served as an Army Medic with the 101st Airborne Division. After returning to Northwest Indiana in 2010, she completed the accelerated nursing program at Valparaiso University, receiving her Bachelor of Science in Nursing in 2013. She has worked in the Emergency Department since her graduation, obtaining advanced training in Trauma Nursing Core Course, Emergency Nursing Pediatric Course, and serving on the Professional Development Shared Governance Committee. She has also served as an adjunct clinical instructor for undergraduate nursing students at Valparaiso University. Her evidence-based practice project involves an educational intervention for Emergency Department nursing staff to prepare them for mass casualty disasters. Nichole's project in progress was the first-place poster presentation winner at the 2017 Northwest Indiana Research Consortium. Nichole anticipates graduation in May 2018 with her Doctorate of Nursing Practice. She is an active member of the Emergency Nurses Association and the American Nurses Association. Nichole is passionate about caring for patients and their families during crisis situations, managing complex health conditions, and giving back to her community including local Veterans and their families.

ACRONYM LIST

AACN: Association of Colleges of Nurses

ACHNE: The Association of Community Health Nurse Educators

AHRQ: The Agency for Healthcare Research and Quality

CDC: Centers for Disease Control

CI: Confidence Interval

CP: Command Post

DPET: Disaster Preparedness Evaluation Tool

EBP: Evidence Based Practice

EMS: Emergency Medical Services

EOP: Emergency Operating Procedures

EPIQ: Emergency Preparedness Information Questioner

FEMA: Federal Emergency Management Agency

HDLS: Hospital Disaster Life Support

HOT: Hands on Training

ICN: International Council of Nurses

IRB: Institutional Review Board

JCAHO: The Joint Commission on Healthcare Organizations

JHEBP: John Hopkins Evidence Based Practice

JNNEBP: John Hopkins Nursing Evidence Based Practice

MCI: Mass Casualty Incident

MUVE: Multi User Virtual Environment

SE: Standardized Environment

SP: Standardized Patient

START: Simple Triage and Rapid Treatment

WHO: World Health Organization

Appendix A

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Dr. Coto and Nichole,

Feel free to use the EPIQ and good luck. Of course, please cite appropriately.