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Evaluation of a School Based Disaster Preparedness Program

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The project and manuscript have been successfully completed and meet the standards of the School of Nursing at San Jose State University. The project demonstrates the application of professional knowledge, clinical expertise, and scholarly thinking. An abstract of the project and two copies of the manuscript are attached.

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Virginia Young Cureton — 5-17-06

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EVALUATION OF A SCHOOL BASED

DISASTER PREPAREDNESS PROGRAM

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EVALUATION OF A SCHOOL BASED DISASTER PREPAREDNESS PROGRAM

Abstract

This study evaluated a school based intervention designed to better prepare teachers and staff members in an elementary school to improve their knowledge and confidence of disaster preparedness. Participants included 19 teachers and 10 staff members of an elementary school in San Mateo County, CA. With hundreds of schools scattered in the communities and the recent disasters in our country there is a growing awareness of the need for disaster preparedness in schools. A pretest-posttest was administered to measure changes in knowledge and confidence following a school based intervention of disaster preparedness education. There was a significant improvement in scores that appeared in the paired t tests which demonstrated that the school based disaster preparedness intervention increased their knowledge and confidence. This school based intervention provides a framework for other school nurses to implement similar interventions that address the disaster preparedness needs of the school, staff and student's safety.

Key words: **disaster preparedness, disasters. school safety, adult learners**

INTRODUCTION

Disasters can occur suddenly and without warning. Millions of children gather daily at schools. The National Advisory Committee on Children and Terrorism (2004) reports that "every day 53 million young people attend more than 119,000 public and private schools where 6 million adults work as teachers or staff members. Counting students and staff members on

any given weekday, more than one fifth of the United States population can be found in schools. (p. 2)."

Parents trust the school staff members to teach their children and to keep their children safe while at school. Schools provide for the mental, physical, social, and emotional growth of students in a safe and caring environment. Besides being a place where students and teachers can work together without feeling threatened physically or psychologically, a safe school has security procedures in place, including established disaster preparedness plans with routine disaster training drills. Evers and Puzniak (2005) state, "Most importantly, we need to protect children from harm, whether natural or intentional (p. 232)."

Disasters can be natural which include earthquakes, fires, floods, and storms or man-made which include fires, acts of terrorism, bombs or intruders. The Loma Prieta earthquake of 1989 heightened our awareness of the growing danger of how ill prepared we are to deal with either a natural or man-made disaster in our schools. Researchers agree that schools and teachers were not adequately prepared for the September 11, 2001 attacks (Pfefferbaum et al., 2004; Evers & Puzniak, 2005; Graham, Shirm, Liggin, Aitken, & Dick, 2006).

The findings of Bissell, Pinet, Nelson, and Levy (2004) confirm that preparedness does make a difference. There is a need to know what to do about these hazards. Preparedness is defined as "the set of measures that ensure the organized mobilization of personnel, funds, equipment, and supplies with a safe environment for effective relief" (Bissell et al., p. 193).

Numerous events have led to the realization and awareness of the need for better disaster preparedness in schools. The problem is we are ill prepared to deal with disasters of all types. The purpose of this research was to increase knowledge and awareness on disaster preparedness for teachers and staff members in an elementary school with about 460 students.

LITERATURE REVIEW

Review of the National Center for Education Statistics (NCES) of the US Department of Education verified that there were 17,000 public school districts in the United States in 2005. In California in 2004-2005 there were 9,000 schools and 6 million students; and in the northern California research specific county there were 170 schools, 25 school districts and about 88, 270 students. According to the Ed-data Partnership website the research study school district showed there were 14 schools, about 6250 students, and about 288 teachers.

Because of this large number of students and staff in our schools, we need to keep them safe by being prepared for any possible disaster. We have learned from previous disasters, the Loma Prieta Earthquake, Columbine High School Massacre, terrorist attacks of September 11, 2001, that our schools and teachers were not prepared for these events.

(Pfefferbaum et al., 2004; Evers & Puzniak, 2005; Graham et al., 2006). During the 1960's, disaster events totaled only 89 a year, by the year 1990 annual disasters totaled 392, an increase of over 400% (Bissell et al., 2004). It is impossible to prevent all disasters but it is possible to prepare for these types of multiple disasters.

In the FEMA web page addressing parents and teachers the director of emergency services for the Los Angeles Unified School District was quoted as saying "You can't teach in an unsafe, potentially dangerous situation. If you aren't taking steps for mitigating you are morally and legally at fault. If you're not prepared to expect the unexpected, you're rolling the dice"
(p. 3).

Research as early as 1829 by William A. Alcott recognized the importance of safe and sound school buildings. (Graham et al., 2006) In the past school health concentrated mainly on hygiene and communicable disease follow-up and treatment. In recent decades school health has broadened its field to include preventive education, school based clinics, and health screenings. Even though school disaster planning for natural disasters has been in place for many years it is not until recently that the focus has also been on preparing for manmade disasters. The findings of Langan and James (2005) indicate that the key to effective, successful, and efficient disaster management is pre-disaster planning and preparation.

Researchers' agree that rehearsing a disaster drill is the best preparation. (Evers & Puzniak, 2005; Klingman, 1978; Langan & James, 2005). Klingman (1978) demonstrated that through prior situations of coping with natural disasters, that drilling,

or practicing an emergency disaster preparedness plan is the most efficient system for decreasing unwanted behavior and psychological reactions in disaster situations.

The findings of Pfefferbaum et al., (2004) indicate that teacher's disaster related needs must be identified and addressed. Researchers agree that if a disaster directly impacts a school, the teachers and staff members will be the first responders on the scene; the teachers and staff members will be responsible for keeping the students safe (Gagliardi et al., 1994; National Advisory Committee of Children and Terrorism, 2004). Safety in school has many facets: safe buildings, safe teaching, safe choices, and feelings of being safe in the case of a possible disaster.

Effective emergency response requires well-oriented teamwork in which each member knows the lines of communication (Gebbie & Querishi, 2002). Each teacher and staff member has a role in the disaster preparedness plan and needs to be aware of the disaster teams, the chain of command, and the disaster response drills at the school site. Disaster preparedness plans and drills should be developed and practiced to help with either natural or man made disasters (Evers & Puzniak, 2005). By practicing the drills the teachers and staff members will become more confident in dealing with the possibility of a disaster.

To prepare the teachers and staff members school leaders must prioritize the need to educate teachers and staff members on disaster responses. Kline, Schonfeld, and Lichtenstein (1995) state the best strategy to ensure schools devote adequate attention to crisis prevention and response planning involves the support of administrators and the school board.

The support of school superintendents is evidenced in a 2006 study by Graham et al. that researched preparedness of public schools in the United States for the prevention and response to a disaster. A survey was sent to randomly selected school superintendents of public school districts. The response rate was 58%, 2,148 of 3,670 surveys were returned. Research findings indicated that 57% of school districts reported they had a written plan for the prevention of a mass casualty incident, almost all (96%) of the schools have a plan for the evacuation of the school if necessary; most schools (92%) reported having a plan for lockdown of the school; and most school districts (99%) reported having a master list of students. The school in this research is in a district that exemplifies these findings.

Graham et al. (2006) continued by discussing the additional planning needs required of a school to be well prepared for a disaster. These needs included physical security and vehicular access to the school, two way communication systems, identification badges for teachers, and identification badges for visitors on campus, conducting periodic disaster drills, and a system for correctly identifying and releasing children to their parents or guardians.

Disaster preparedness in the schools is a team effort and the school nurse should be part of that team. The National Association of School Nurses (NASN) (2001) promotes the position that school nurses should play a vital role in all phases of emergency preparedness in schools. Strategic planning by the nurse within the school environment represents a vital resource to those planning for comprehensive emergency management for schools. The Disaster Preparedness Intervention developed by this

school nurse intended to increase the knowledge of school teachers and staff members when dealing with a disaster in the school setting.

Preparation is the responsibility of every school, community and state. No one can afford to subscribe to an "It won't happen here mentality" (National Advisory Committee on Children and Terrorism, 2004, p. 2).

This literature review reinforces the necessity of disaster preparedness for teachers and staff members in the schools. Studies emphasize that teachers are the first responders in a school and how they respond will affect the health and safety of the children. One approach for addressing teacher's and staff member's lack of knowledge and preparation is to provide a school based program on disaster preparedness that will increase their knowledge and improve their confidence in responding to a disaster.

THEORETICAL FRAMEWORK

Malcolm Knowles' Theory of Adult Learning (1970) provides a framework for this school based intervention on disaster preparedness. The theory of adult learning is based on four assumptions on the characteristics of adult learners that are different from the assumptions about child learners. Adults learn in response to pressures they feel from current life situations where as children learn things to advance from one developmental stage to another.

These four assumptions are that, as a person matures:

> (a) the learner's self concept moves from being a dependent personality to that of a self-directing human being; (b) the learner accumulates a growing body of experience that has increasing value for their own learning and the learning of others; (c) the learners readiness to learn becomes increasingly determined by the

> developmental tasks of their emerging social roles, and they learn better when learnings are timed to coincide with the needs and interests stimulated by these role requirements; and (d) the learners time perspective changes from one of postponed application ("Gather subject matter now for possible later use")-subject centeredness to one of immediate application ("Learn things now that will help in dealing with today's life problems")-problem centeredness, so they learn better knowledge, skills, attitudes and values that are related to the problems they face in life, at this moment (Knowles, 1970, p. 371).

Knowles' Theory of Adult Learning (1970) is a fitting framework for this intervention because the participants were adult teachers and staff members in an elementary school. Their need to learn about their role in the event of a disaster comes from an increased interest and awareness of this problem, an increased desire to improve their management skills, and the increased need for more knowledge to feel better prepared to cope with disaster situations that they may face. The goal can be achieved because adults are learners who are autonomous and independent learners, unlike children who are dependent learners and adults can recall their gained life experiences to enhance their learning. Their position as teachers and staff members in a school places them in a position where they are the first responders in a disaster and the need and desire to be prepared is prevalent. Coping with the possibility of a disaster is a real situation and, learning the skills and possessing the knowledge to respond to a disaster can enable these adult learners to face life with more confidence. Teachers and staff members can become more knowledgeable and confident about disaster preparedness issues and can be valuable team members along with school nurses.

METHODS

This study examined the effectiveness of a school based disaster preparedness program on the knowledge and confidence in teachers and staff members in an elementary school. The disaster preparedness objectives were:

1. Compare the knowledge and confidence of teachers and staff members' pre and post intervention.
2. Increase teacher and staff members' knowledge and confidence on disaster preparedness management of a disaster in an elementary school.

Research Design

A pre-experimental design with a pretest prior to the program and a post-test after the program was used. The school nurse researcher developed and presented a power point presentation on specific disaster preparedness information for teachers and staff members employed at this elementary school. A pre and post-test was administered measuring both knowledge and confidence before and after the power point presentation. The staff members attended a morning session and the teachers attended an afternoon session. Information for both of these sessions was identical. The districts' Director of Certificated Personnel and Student Services, the Principal of the school, and the Institutional Review Board of San Jose State University gave permission to conduct the study.

Sample and Setting

The participants were teachers and staff members, both male and female, of an elementary school (grades Kindergarten to 6th grade) in northern California. Of a

possible 35 participants, there were 29 participants who answered the pre and post-tests, 83% of the possible participants. Formal consent to participate in the study was obtained from all participants. There were two sessions presented. Morning and afternoon sessions for the staff members and teachers, respectively, took place in an empty classroom on the school site.

Intervention: Power Point Presentation

The disaster preparedness power point presentation began with an oral introduction by the district nurse followed with the disaster preparedness power point slide presentation. The nurse researcher created the disaster preparedness program presented to the teachers and staff members. The following information was given to the participants: (a) definition of natural and man made disasters; (b) school safety plan contents and location; (c) functions of school crisis teams; (d) emergency drill procedures for fire, earthquake, intruder/lockdown, bomb threats;
(e) rolling blackout procedures; (f) evacuation procedures and instructions; (g) definition of a crisis team; (h) function, types and members of the different teams—search and rescue, site security and traffic control, first aide and triage, fire safety, and parent liaison; (i) phone numbers and communication means; (j) disaster essentials for backpacks in classroom; (k) location of gas valve, water valve and electrical main switch; (l) shut off procedures for gas, water, and electrical services; and (m) Code of Regulations, Title 5, Section 560 from the California Education Code. Participants were given a copy of the power point presentation, and a copy of the school's evacuation map to be placed in the classroom disaster backpack. The classroom disaster back pack is a backpack that is to be kept in the classrooms, in the library, in the multi-use room, and in the main office at

all times. It is to be taken with the teacher or staff member in the case of an emergency. It contains several things that would possibly be needed in the case of a disaster at school. These items are: a list of students, first aide kit, flashlight with batteries, light stick, hard hat, orange vest, dust mask, nylon rope, poncho, name tag, pry bar, and blanket._Some additional items such as walkie-talkie's, additional first aide supplies, and caution tape will be in certain backpacks depending on the team member's job.

Instrumentation

Both the tests for knowledge and confidence were created by the District Nurse. An 11-question test for knowledge was based on information related to disaster preparedness at the elementary school (Appendix A). The test was positively evaluated by some of the staff members in the northern California area. The principal determined the correct answers with four possible correct answers for number 11, for a total of 14 points. Correct answers were given 1 point and incorrect answers were given 0 points.

Confidence was measured by a 9-item questionnaire asking the participants to rate their confidence level from 1-4 (1= completely lacking confidence, 2=somewhat lacking confidence, 3= somewhat confidence, 4= very confident) regarding their ability to manage and respond to a disaster (Appendix B). The participants were asked about their feelings and confidence on questions concerning communication, management, triage and first aide, and ability to perform disaster related team duties. Each of the 9 items had 4 possible points with a total score for the confidence questionnaire equaling 36 points. The data from participants who did not answer all the questions were excluded from the study.

RESULTS

Data from the pretest and post-test were analyzed using the paired samples t test. Table 1 shows the paired samples T-Tests for Knowledge and Confidence.

Table 1. Paired Samples Statistics

		Mean	n	Std. Deviation
Pair 1	Pretest Knowledge Score	5.8	26	1.99
	Posttest Knowledge Score	10.7	26	1.85
Pair 2	Pretest Confidence Score	25.4	24	4.82
	Posttest Confidence Score	32.4	24	3.72

The results of the 2 paired samples t test for knowledge was statistically significant ($p<.001$). The mean knowledge score of 5.8 (SD=1.99) at pretest increased to 10.7 (SD=1.85) after the power point presentation (maximum possible knowledge score =14). The increase in means almost doubled, an increase of 46%. The pretest scores ranged from 2-10 correct answers. Post-test scores ranged from 2-14 correct answers. Seven (20%) of the participants scored >= 50% on the pretest. The other 21 (75%) of the participants scored <= 50% on the pretest. There was a large improvement in knowledge on questions 9 and 10. Question 9 asks, "What is your role on the crisis team to ensure the safety of your students?" Ten participants answered correctly on the pretest and on the post-test 22 answered correctly. Question number 10 asks, "Where is the designated meeting place to meet for your crisis team?" Three participants answered correctly on

the pretest and 20 answered correctly on the post test. The results of the post-test showed an improvement with 88% of the participants (n=24) scoring the correct answers.

The analysis yielded a significant difference of the 2 paired sample t test for confidence ($p<.001$). The pretest for confidence mean score of 25.4 (SD=4.82) increased to 32.4 (SD=3.72) after the power point presentation on disaster preparedness (maximum possible score for confidence=36). This increase was 21%. The pretest confidence scores ranged from 17-35 points and the post-test confidence scores ranged from 26-36 points. Eleven (39%) of the participants scored 29 points or above (80% correct) on the pretest. Seventeen (61%) of the participants scored below 29 points. Eighteen (72%) of the participants scored 29 points or above on the post-test and 7 (28%) scored below 29 points.

DISCUSSION

The significant improvement in scores that appeared in the 2 paired samples t tests for knowledge and confidence demonstrated that the school based program was successful. The participants are more knowledgeable and confident of their disaster preparedness management of a possible disaster in an elementary school. Communication was one of the factors studied. There was an increased level of confidence in communicating with team members post intervention. In the literature Gebbie (2002) noted that teamwork requires knowing the lines of communication. Langan and James (2005) support the importance of predisaster planning. The importance of disaster preparedness was demonstrated in my findings with the increase in scores both in the knowledge and confidence tests.

As first responders we need to remain calm in order to adequately manage a disaster, this behavior will ease post disaster changes (Klingman, 1978). The likelihood that the teachers and staff members will be calm is reflected with the increase in confidence scores post intervention. As Gagliardi (2004) states keeping the students safe are a responsibility of first responders; safe buildings and safe choices are a result of being prepared. Recently, Graham et al. (2006) indicated essential factors required for disaster preparedness be in place including a written plan for disasters, disaster drills for evacuation of the school, a lockdown procedure, and a master list of students. Disaster preparedness involves team effort. The school nurse plays a vital role in the planning and preparation for a disaster and is an important resource and a valuable team member.

Limitations

The convenience sample was small. This study included one school in the district so the results can not be generalized. Because of a time factor in completing this study the long term retention of knowledge and feelings of confidence could not be measured. We are unable to know if the teachers and staff members can demonstrate their learned knowledge at a later date. We do not know how they will react in an actual disaster. Even though the knowledge and confidence tests were evaluated by some of the staff members these questions had not been used previously. Participants may have answered the questions, especially the questions on confidence, in the manner they may have believed the district nurse or administrator wanted.

Conclusions

Children are our future. Teachers are the most direct link to children in schools. Besides meeting the educational needs of students they also act as caregivers keeping

children safe. The children's health and safety require that appropriate programs and interventions be available to teachers and support staff members. One of these interventions that should keep teachers and students safer is a school based program on disaster preparedness.

Significant improvements in knowledge and confidence were identified through the scores on the pre and post-tests. These findings suggest that a disaster preparedness intervention is beneficial and increases the knowledge and confidence of first responders in a disaster. It is this researchers' hope that these skills continue to be proficient and well practiced. This program can be used with other schools in the future to promote a proactive program so we can all be prepared for a natural or man-made disaster.

IMPLICATIONS FOR SCHOOL NURSING PRACTICE

Future research in this area should include a larger random sample, pre and post-test evaluations that would measure long term knowledge and confidence retention for teachers and staff members. Each school year there should be an educational update and practice of emergency drills to keep teachers and staff members current, knowledgeable and confident. Future researchers may modify the use of this educational intervention, in helping the teachers and staff members to maintain knowledge and confidence in their disaster preparedness skills

The need for disaster preparedness in schools has been in the forefront in the last several years (Loma Prieta Earthquake, September 11, 2001, Columbine School Massacre). Schools are places where large numbers of children and adults gather daily. A disaster can occur without warning at any time on any day and will impact the lives of

all people. Being prepared is essential to having an organized response to a crisis situation.

Teachers and nurses have something in common; they both will be the first responders in a crisis situation. Both teachers and nurses need to be aware of their roles and responsibilities on the crisis team. According to the NASN position statement on the School Nurse Role in Emergency Preparedness (2001) the school nurse can help establish emergency plans and take part in the reviews and drills of these plans. The school nurse is important in the planning and responding phase of emergency management. Nurses are crucial members of the crisis team. The Scope and Standards of Professional School Nursing Practice charges the school nurse with engaging in collaboration and collegiality to benefit both staff members and students (National Association of School Nurses and American Nurses Association, 2001). In collaboration with the administration, teachers and school staff members the school nurse can help develop a school specific plan. Schools need a simple, to the point crisis plan to guide teachers and staff members during a disaster.

A benefit of this research is the positive responses received from both the teachers and staff members. Both groups expressed appreciation for this program; they felt it was both necessary and beneficial to being prepared in the case of a disaster. The teachers and staff members increased confidence about their participation and responsibilities as first responders may encourage other schools and school districts to develop and implement a protocol to focus on disaster preparedness.

We do need to be prepared. Knowledge and confidence in the skills needed to be adequately prepared for a disaster are vital for an adequate response. This education on

disaster preparedness provides for action that will minimize injuries and loss of life to students, provide for maximum preparedness of teachers and staff members, ensure safety and protection of students and school staff members, and increase the confidence needed to act calmly and appropriately during a disaster. It is my hope that the school district's and/or school nurses will implement this program on disaster preparedness. Communicating this information is critical. I am willing to share my program with others schools to help with their disaster preparedness.

What is an ounce of prevention worth to you?

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Appendix A

Disaster Preparedness Questionnaire

Number: _____ Date: _____

The following questions relate to disaster preparedness at school. Please answer the questions and fill in the blanks with the information you have at this time.

1. Who would be in charge of a disaster at your school site?

_____

2. Where is the location of the Comprehensive School Safety Plan?

_____

3. Where is the "Campus Map" posted in the school?

_____

4. What telephone number do you dial to get the secretary?

_____

5. What telephone number do you dial to get the principal?

_____

6. Describe the bell sequence for the earthquake drill:

_____

7. Describe the bell sequence for the fire drill:

_____

8. Describe the bell sequence for an intruder drill:

_____

9. What is your role on the crisis team to ensure the safety of your students?

_____

10. Where is the designated meeting place to meet for your crisis team group? _____

In case of disaster you are to take an emergency backpack that is kept in your classroom or storage area with you as you exit the classroom.

11. What items should you have in this emergency backpack?

_____

Appendix B

Disaster Preparedness Questionnaire

The following questions are on disaster preparedness and your feelings and ability to deal with disasters at school. Please circle the most appropriate response for each item below using the following scale:

1= Completely Lacking Confidence
2= Somewhat Lacking Confidence
3= Somewhat Confident
4= Very Confident

How confident are you to:

1. Communicate with your team leader during a disaster?	1	2	3	4
2. Move your class or group of students to the designated area of safety?	1	2	3	4
3. Move your class or group to a second area of safety if your designated area is unsafe?	1	2	3	4
4. Communicate to the chain of command that there is a student missing from your group?	1	2	3	4
5. Identify and triage injured students?	1	2	3	4
6. Administer first aid when necessary?	1	2	3	4
7. Assign your group of students to an adult once you are at your group's designated area?	1	2	3	4
8. Perform assigned duties for your disaster team?	1	2	3	4
9. Improvise and create substitute disaster supplies if the designated disaster supplies are not available or have been exhausted?	1	2	3	4

Thank you for completing this disaster preparedness questionnaire.