Effectiveness of Teaching Nursing Students Environmental Health Curricula during Their Public/Community Health Rotation

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EFFECTIVENESS OF TEACHING NURSING STUDENTS ENVIRONMENTAL HEALTH CURRICULA DURING THEIR PUBLIC/COMMUNITY HEALTH ROTATION

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ABSTRACT

The purpose of this study was to explore the knowledge level of environmental health (EH) risk factors of senior baccalaureate nursing students enrolled in a public health course in a public university in northern Florida.

A convenient sample was used from one group of students enrolled in a mandatory public health course in the spring 2007 term. Seventy-five students were enrolled in this course and 65 students participated in the study. A quasi-experimental, pretest-posttest follow-up test design has been used to determine the effectiveness of an EH educational intervention with senior baccalaureate nursing students. Students were given a pretest prior to a 1.5 hour EH nursing intervention which included a lecture and PowerPoint presentation. Students were also given instruction on the use of a modified EH risk appraisal tool. They were encouraged to use this tool during their public health home visits. The objectives of the EH nursing intervention were based on the recommendations from the Institutes of Medicine’s 1995 report on nursing, health and the environment. A posttest was administered immediately after the EH nursing intervention. A follow-up test was given four weeks after the first intervention in order to assess what knowledge had been retained and if the students utilized the modified EH risk assessment tool.

The results of this study showed that almost half of the students did not have prior EH knowledge. A Paired t-test was utilized for the data analysis in order to assess for any difference between the scores before and after the EH nursing intervention. In addition, a one way analysis of variance was used to compare pre, post, and follow-up test scores of all students who completed any of the questionnaires. Students pretest scores showed a 69% pre-test knowledge level, a 72% posttest knowledge level, and a 79% follow-up test knowledge level. Results from the one way ANOVA showed a significant difference between the 3 testing times. The post hoc tests showed that the mean score on the pretest was significantly different from the mean score on the follow-up test. This study contributes to the body of knowledge on the topic of EH nursing and the need to incorporate EH into nursing curricula to help bridge the gap between nursing practice and the emerging health care needs and environment.
CHAPTER 1
INTRODUCTION

According to the World Health Organization (WHO), environmental health (EH) is made up of different aspects of human health, such as chemical, physical, biological, social, and psychological problems in the environment. Environmental health is also the theory and practice of assessing, correcting, controlling and preventing harm to human health today and in future generations (WHO, 1993). Since World War II, humans have introduced tens of thousands of man-made chemicals into the environment without first understanding their impact on man or nature. These synthetic chemicals can be found today in our food, air, soil, and water, and in our workplaces, schools, homes and communities (Sattler & Lipscomb, 2003). McGuire (1999) lists examples of the four common classes of EH hazards which effect humans, these are: lead, carbon monoxide, benzene and vinyl chloride (chemical), noise, ionizing radiation, electromagnetic fields and temperature extremes (physical), bacteria, parasites, viruses and vectors (biological), lifting, repetitive motion and vibration (mechanical), and finally violence, stress and high-demand/low-control occupations (psychosocial). Effects from these and other environmental hazards have caused an array of health problems including gastrointestinal illness, respiratory disease, skin disorders, birth defects and reproductive disorders, neurotoxic disorders, and cancer (Pope, Snyder, and Mood, 1995).

Environmental threats may occur in the home, at school, in the workplace, or in the community. People who live in poverty are more likely to be exposed to environmental threats. According to Desgupta (1995), poverty, population growth, and the local environment are closely linked to environmental threats and fuel one another. Research has shown that none of the three elements directly causes the others, but rather, each influence and in turn is influenced by the others (Desgupta, 1995).

Florence Nightingale, who is considered a pioneer in nursing, made valuable contributions to the understanding of EH and the importance of public health. Laying the foundation for the phenomena of health, person, nursing and the environment; Nightingale helped establish environmental health guidelines that nurses have used over the last 150 years (Sattler & Lipscomb, 2003).
Nurses may be the only contact that a patient has with a health care professional, placing them in a unique position to impart considerable support and teaching related to current EH issues. In 1995, the Institute of Medicine (IOM) promulgated core competencies for nursing education, practice and research. Since that time there is growing proof that the environment and human health are strongly interconnected (Sweeney & de Peyster, 2005). The support for the inclusion of EH in nursing curricula grows with each passing year. Unfortunately, even today, very few nursing programs include EH in their curriculum and knowledge regarding EH assessment skills is limited and many times nonexistent (Sweeney & de Peyster, 2005).

Several national initiatives have been launched over the past 5 years to reestablish nursing education in the area of EH. These efforts have been spearheaded by three organizations: the National Institute of Nursing Research (NINR) at the National Institute of Health, the Agency for Toxic Substances and Disease Registry (ATSDR), and the IOM. Nurses in these organizations have come up with ways to incorporate EH concepts developed within each of these agencies out to the general nursing population. The ideas that they put forth included requiring EH as a requirement in undergraduate nursing education, encouraging interdepartmental teaching teams, placing students at national organizations, e.g. the ATSDR, preparing nurse educators with expertise in EH, and instituting nursing awards in the area of EH (Sweeney & de Peyster, 2005). Core competencies developed by the IOM provide direction for the profession in the areas of EH assessment, referral, risk communication, and legislative issues (Larsson & Butterfield, 2002). EH is also listed as a priority in Healthy People 2010; promoting health for all through a healthy environment (Health People, 2010). Environmental health issues such as outdoor air and water quality, toxic substances and waste, the health of homes and communities, preventing health problems through infrastructure and surveillance and global environmental health are all part of the Healthy People 2010 goals.

According to McNally (2002), several solutions vital in preserving the environment and promoting health include: taking action in the prevention of further environmental degradation, changing the relationship between developed and undeveloped countries, and development of long-term educational strategies that will
change the mindset of individuals and institutions with respect to protecting the environment and promoting health. The environment is the responsibility of every citizen, and nursing professionals have the ability to educate others on environmental protection and health promotion (McNally, 2002).

**Statement of the Problem**

Environmental health is a major nursing issue in the United States, and many nurses are under-prepared since few nursing programs report to have incorporated EH into their curriculum (Sweeney & de Peyster, 2005). In spite of increased awareness of the correlation between environmental risks such as indoor pollution, contaminated water, lead, mercury, pesticides, radon and UV radiation, very few nursing programs in the United States have a sound EH curriculum. Nurses are the largest group of health care professionals and are frequently the only contact patients have with a healthcare provider. By working closely with clients, nurses have many opportunities to assess for EH risks and problems (IOM, CEECNP, 1995). Nursing programs do not prepare nurses adequately to understand the impact of the environment on health or to implement environmental interventions (Pope et al., 1995). As early as the 1980s, Mancino stated that “the nursing profession must take a leadership role in advocating environmental protection, illness prevention, and community awareness of EH hazards” (pp. 44-45). Nurses need to be able to apply their skills with the nursing process by identifying and analyzing possible environmental hazards and developing appropriate nursing interventions (Neufer & Narkunas, 1994).

**Significance of the Problem**

Environmental factors can raise the risk of patients developing a variety of disorders such as asthma, skin disorders, gastrointestinal disorders, cancer and even death. In 1993, the Institute of Medicine, with approval from the National Resources Council, created the Committee on Enhancing Environmental Health Content in Nursing Practice. The report, published in 1995, found the following three common themes throughout the study: (1) the environment is a primary detriment of health and affects every aspect of life and nursing practice, (2) nurses are in a position to address EH matters in the community since they are the largest health care providers who generally are well trusted and can advocate for disease prevention and social justice, (3) and finally
nurses need to help bring awareness to EH issues and the environmental threats to our population. Changes in practice, education and research are important to help bring awareness to nursing as a profession. Since the report was published, several nursing programs have developed a separate EH curriculum or have incorporated EH into different nursing courses. The University of Maryland School of Nursing in a partnership with Howard University, the Southern Regional Education Board, and the National League for Nursing has developed an EH website that provides EH information for nursing professionals. The website was designed to be interactive allowing nurses and educators access to credible scientific material on a variety of EH topics that are accurate, and timely. EH case studies were developed by Simmons College in partnership with Harvard University School of Public Health to integrate environmental and occupational health into their nursing curriculum (McGuire & Gerber, 1999). Overall, nursing programs have not developed or intergraded EH into their nursing curricula except for touching upon the topic in the public health curriculum. Nursing instructors are not being prepared to teach EH to undergraduate nursing students and feel inadequate when discussing current trends toward EH (Sweeney & de Peyster, 2005).

Purpose of the Study

The purpose of this study was to develop and administer an EH nursing intervention to senior baccalaureate nursing students enrolled in a public health nursing course and to compare pretest and posttest EH knowledge. This study also assessed the degree in which students utilize the modified EH Risk Appraisal tool during their interaction with patients during public health home visits. These findings will be used to assess the need to develop further EH nursing curriculum for students enrolled in nursing programs.

Research Questions

The following research questions guided this study:

1. What is the pretest level of knowledge of senior baccalaureate nursing students concerning environmental health?
2. What is the posttest level of knowledge of senior baccalaureate nursing students concerning environmental health after a 1.5 hour educational program?
3. After a 1.5 hour educational program what did baccalaureate nursing students teach public health patients on the subject of environmental health?

**Operational Definitions**

For the purpose of this study the following terms have been defined.

*Educational intervention:* A 1.5 hour EH PowerPoint presentation, with emphasis on basic environmental health nursing curriculum.

*Environmental health:* Freedom from illness or injury caused by exposure to toxic agents and other environmental conditions that increase risk of harm.

*Modified environmental health risk appraisal tool:* A tool that was designed to assist students in assessing for EH risks in the home.

*Environmental justice:* The belief that all people, regardless of race, background or economic status, should be treated fair regarding the development, environmental laws, regulations, and policies.

*Risk:* A potential threat to life and health.

**Theoretical Framework**

An EH educational intervention was provided to nursing students to increase their knowledge of basic EH concepts. The goal of the intervention was to assist future nurses in the understanding of basic principles regarding the control, exposure and prevention of environmental illnesses. During the nursing intervention, learning concepts as described by Malcolm Knowles (2005) were used to instruct the adult learner. An andragogical approach should be utilized when providing instruction to the adult learner (Knowles, 2005). Several assumptions must be made about adult learners when utilizing this theory: (a) they are self directed; (b) they can utilize life experiences as a resource for learning; (c) they must perceive a need to know; and (d) they are problem-centered and interested in immediate application of knowledge (Knowles, 2005). These assumptions will be used in order to guide the design and implement the educational intervention for this study.

Knowles (2005) described the assumptions of the andragogical approach to adult education. Adults need to know why they are learning content before they spend the energy to study and to understand. Adult learners believe themselves to be independent-leaners, they have the capacity to direct their own learning, and take responsibility for
their own decisions. Adult learners do not learn openly if they feel content is forced upon them. They will bring to an educational session their own life experiences that can influence them either positively or negatively.

When adult learners understand how they can apply knowledge to the real world, they openly learn concepts that they can incorporate as a part of society. They are problem-centered and interested in immediate application of knowledge in their orientation to learning. Adult learners tend to be naturally more internally motivated, than externally motivated. Baccalaureate nursing students qualify as adult learners and their learning should follow Knowles’ assumptions. They bring a wealth of experience with them related to EH and in learning the concepts of EH their ability to transfer that information into practice is the focus of this research study.

Assumptions
Several assumptions will be made about the data collected during the course of this study:

1. Nursing students have knowledge deficits on the topic of environmental health and environmental health nursing.
2. Nursing students have knowledge deficits on the use of a modified environmental health risk appraisal.
3. Students will answer honestly about their use of the tool in the community while teaching patients.

Limitations
There are several limitations in this research. The generalizability of the study will be limited since a nonrandom sample will be used to represent the target population. The EH nursing intervention will take place over 1.5 hours; this will not allow adequate time to teach all of the core concepts as recommended by the IOM. Students may share answers while completing pre and posttests. This researcher could not locate an EH questionnaire that could be duplicated for this study, therefore questions were developed and reviewed by the researcher and the thesis committee.
Summary

This chapter describes EH and its effects on human health and illness. No matter which area a nurse practices in, the likelihood of coming across patients with environmental illness will occur. Nurses are in a unique position as healthcare providers to assess patients for environmentally related disorders, but are not adequately prepared to do so. Unfortunately, nurses without knowledge or experience in EH are unaware of the potential link between the environment and disease. By implementing EH curriculum into nursing education, students may be better prepared as nurses to assess the patients they encounter for EH risks (Pope et al., 1995). Knowles Adult Learning Theory guided this research, nursing students were instructed on basic EH concepts as recommended by the IOM. A comprehensive review of the literature will be presented in Chapter 2.
CHAPTER 2
REVIEW OF LITERATURE

This chapter is organized into two sections: a theoretical review and an empirical review of the literature. A theoretical review using Malcolm Knowles’ Adult Learner Theory was used to guide this study. A brief review of EH nursing and the role of the nurse in EH have been used in order to accomplish these objectives. An empirical review was used to analyze the topic of EH and its’ effects on human health.

Theoretical Framework

Malcolm Knowles: Adult Learner Theory

An educational intervention was carried out with senior baccalaureate nursing students in an attempt to enhance their knowledge on basic EH nursing concepts. The education intervention utilized the learning concepts described by Malcolm Knowles to educate the adult learner.

An andragogical approach should be utilized when providing instruction to the adult learner (Knowles, 2005). Several assumptions must be made about adult learners when utilizing this theory; (a) they have a need to know; (b) they are self-directed; (c) learner’s experience must be taken into consideration (d) they have a readiness to know (e) the are problem centered and (f) they have internal motivation to learn (Knowles, 2005). These assumptions were used in order to guide the design and implement the educational intervention for this study.

Knowles (2005) described the assumptions of the andragogical approach to adult education. Adults need to know why they are learning content before they spend the energy to study and to understand. They want to know not only why but what it is they need to learn, and how they will accomplish this task. Adult learners believe themselves to be independent-learners, they have the capacity to direct their own learning, and take responsibility for their own decisions. Adult learner do not learn openly if they feel content is forced upon them. They will bring to an educational session their own life experiences that can influence them either positively or negatively.

When adult learners understand how they can apply knowledge to the real world, they openly learn concepts that they can put to use and that play a part in society. They are life centered, task-centered, and/or problem-centered in their orientation to learning.
Adult learners tend to be naturally more internally motivated, rather than externally motivated. Motivation to learn may have personal payoff for the adult learner and therefore, is usually successful. This can be in the form of an individual goal, an institutional goal or societal goal (Knowles, 2005).

Environmental Effects on Health

According to Butterfield (2002) the effects of environmental exposure on human health is not easily distinguishable. The Centers of Disease Control and Prevention released a report in 2001 that reported findings of measures of exposure for 27 hazardous chemicals. Some of these metals are cotinine which is a byproduct of nicotine, six metabolites of pesticides: malathion dicarboxylic acid, \textit{para}-Nitrophenol, 3, 5, 6-Trichloro-2-pyridinol, 2-Isopropyl-4-methyl-6-hydroxypyrimidine, 2-(Diethylamino)methylpyrimidin-4-ol/one and 3-Chloro-7-hydroxy-4-methyl-2H-chromen-2-one/ol, and a variety of phthalates, which are a group of chemicals that soften and increase the flexibility of vinyl and plastics. Butterfield states that we know that an approximate figure of global disease burden is 25\% to 33\%; that is, how much the environment can linked be to environmental exposure. It is also known that about 1.2 billion pounds of chemicals, many which are possible neurotoxic, have been dumped into our U. S. waterways systems and pumped into the air during the course of 1998. Blood lead levels continue to surpass the acceptable threshold for one million children in the U.S. A 58\% increase in the incidence of asthma in children has occurred since 1980, while mortality has increased by 78\%. At least 3 \% of developmental and neurological deficits in children can be attributed to specific toxins. Poor air quality for urban residents exceeds World Health Organization air quality standards for at least 1.4 billion people (Butterfield, 2002).

Nursing Knowledge of Environmental Health

Understanding what knowledge nurses have on the subject of EH is useful in order to develop effective educational programs. Van Dongen (2002) conducted a study to identify the beliefs regarding EH and nursing practice, perceived preparation related to EH, barriers to addressing EH in practice and factors that may facilitate integrating EH in practice of registered nurses (RNs) in the state of Wisconsin. The researcher used an instrument developed by Salant and Dillman (1994) which included questions regarding
clinical practice setting, specialty area, practice role, and previous education related to EH. An item on whether or not the subjects had children was included in order to determine if having children made research participants more concerned about EH factors. Of the 500 surveys sent to RNs who were chosen through stratified random sampling through the Wisconsin Department of Regulation and Licensing, 173 useable surveys were returned for a response rate of 39%. Baccalaureate prepared nurses were the most frequently reported educational level (41%), while Diploma degree nurses accounted for the second most frequent reported educational level which was 24%. The researcher used descriptive statistics to analyze both demographic and subscale data. In order to obtain accurate representation of data, four of the statements were negatively worded and required reverse scoring. The study revealed that nurses believed EH to be a vital determinant of health but felt that EH concerns should be addressed by disciplines other than nursing. Under the subscale Preparation, nurses felt poorly prepared to address EH concerns and they did not understand the relationship between EH hazards and human health. The study also showed that nurses could not identify a key resource person to turn to for expert knowledge on EH. The study did show that although EH knowledge was lacking, nurses were interested in gaining knowledge on the subject and were interested in Internet and distance learning as a way to accomplish this (Van Dongen, 2002). Nurses, in particular, are in an ideal profession to assess and monitor for environmental illnesses and hazards. There is a need for EH curriculum in nursing programs and integration of EH concepts into current practice which has been shown in this study. When looking at Barriers subscale results, the researcher found that the statement “Few or no resource people with expertise related to EH” (M = 3.45, SD = 1.15) whereas the lowest Barriers score was “Personal lack of knowledge about how the environment can affect human health and what to do about it” (M = 3.12, SD = 1.23). This study showed that nurses believed that the environment and human health are related and that it was part of their role to address EH problems. However, the subjects did not feel prepared to assess and address EH problems in their practice.

Nurses require basic knowledge of EH in order to enable them to practice in today’s world. Wright (2002) suggests that nurses must use critical thinking skills such as observation, examination, and analysis of EH. Wright (2002) conducted a
collaborative partnership with baccalaureate nursing students and graduate public health students in the EH department at Loma Linda University in California to find out if a partnership with public health students and the use of other teaching methodologies increased EH awareness in the nursing students. Prior to the two groups interacting, reading assignments, lectures, questions and discussions on EH issues were given to students. The students toured the ventilation system of the university medical center and held discussions afterwards. Graduate students prepared discussion topics and brief presentations on environmental topic. An environmental pretest was administered to nursing students, which consisted of six questions, and the posttest included several more questions to assess the effectiveness of the teaching strategies used. The researcher developed a Likert scale ranging from 1 (being aware) to 5 (being very aware). Forty-three students took the pretest (M = 3.8, SD = .742) and 31 students took the posttest (M = 4.2, SD = .683), the t-test (t = -2.44) gave a p-value of .017. These results showed statistically significant differences between the pretest given prior to the collaboration and the posttest given at the end of the course supporting that students’ awareness on EH issues would increase utilizing this collaborative partnership model for EH education. The nursing students had all expressed that the planned learning activities and the group interaction helped them to understand better how to work collaboratively with other disciplines. The researcher concluded from the results that the learning strategies implemented in this study were effective in helping to build the nursing student’s awareness of EH issues.

Empirical Review

Malcolm Knowles: Adult Learner Theory

Olson, Stedman-Smith & Fredrickson (2004) conducted a study that evaluated a technology enhanced distance-learning module to teach EH core concepts to nurses. The course was designed as an internet-based continuing professional education and used enhanced learning features such as interactive simulated clinical vignettes, i.e. case studies that focused on environmental justice and hyperlinks for easy access to related EH websites. The researcher used Knowles adult learning theory to guide this study. Thirty-four RNs participated in this study and a 6% mean gain in learning occurred between pre- and posttests (95% CI .51 to 1.37, p < .0001). The research found a strong
association between using the adult learning principles to develop the online curriculum and satisfaction of the students.

Foss (2004) used Knowles adult learning theory to improve outcomes in an RN-to BSN community health nursing competency-based model. In the traditional community health clinical course students are assigned to a preceptor and must meet a specific amount of clinical contact hours in order to meet the requirements of the course. This researcher found that faculty and students became dissatisfied for a variety of reasons, including, lack of preceptors for the each student. The faculty decided to use professional competencies to measure course learning outcomes and to choose several competencies identified by the Association of Community Health Nursing Educators. The competencies were grouped into units and provided learning activities and grading criteria based on critical knowledge, values, and clinical skills needed to demonstrate mastery of particular competencies. The nursing faculty assessed student outcomes and mastery of competencies. Student feedback on this method of learning was positive and they expressed they liked being self-directed. Students were able to master the competencies and were motivated to perform well.

**Summary**

Knowles Adult Learner Theory (2005) is shown to provide a model framework for this study. The Adult Learner Theory addresses assumptions that are made about the adult learner. These assumptions have been used in order to describe how adult learners take in information that is meaningful and that can be applicable in their daily lives. Learning that is internally motivated is a more naturalistic approach for the adult learner.

Nurses must have environmental health knowledge in order to practice in most areas of nursing today. Critical thinking skills as well as observation, examination and analysis of issues surrounding environmental health are vital in today’s health care settings (Butterfield, 2002; Sweeney, 2005; Wright, 2003). Nursing educators also have a responsibility to find ways to stress the environmental dimensions of current nursing curriculum (Pope et al., 1995).

Chapter 3 will provide a thorough explanation of the research methodology. This chapter will discuss the design, setting, population/sampling plan, protection of human subjects, instruments, procedures and data analysis.
CHAPTER 3

METHODOLOGY

This chapter outlines the design, instruments, setting, population and sampling plan, protection of human rights, protection of human subjects, procedure, and data analysis of the study. The instruments used include an EH pretest, an EH posttest, an EH follow-up test and a modified EH risk appraisal instrument. Use of these instruments attempted to discover if an educational intervention, guided by the National Institute of Medicine’s recommendations for EH, improved EH knowledge of senior baccalaureate nursing students. The participant’s human rights and voluntary participation were respected and regulated through approval from the Florida State University’s Institutional Review Board (IRB) and by the participant’s signed consent.

Design

The purpose of this study was to evaluate the current EH knowledge of senior baccalaureate public health nursing students and to discover the effectiveness of teaching nursing students’ basic EH principles during a one time educational intervention which focused on basic EH concepts. The study utilized a quasi-experimental, pretest - posttest design at one location. In order to measure pretest and posttest knowledge, a 10-item questionnaire was administered. A repeated measure was used by testing posttest knowledge on the day of the educational intervention and again six weeks after the intervention utilizing the same 10-item questionnaire. The independent variable (IV) for this study was a 1.5 hour teaching intervention on basic EH concepts as recommended by the 1995 Nursing Health and Environment report by the IOM. The dependent variables (DV) for this study were the 10-item pretest posttest results, and use of the modified EH risk appraisal in the clinical setting. This study compared EH knowledge levels before the educational intervention, and after. The modified EH risk appraisal was used to assess what EH teaching points students taught patients during public health home visits after the EH educational intervention.

Setting

The study was conducted in a public, state university located in the Florida Panhandle. This state institution had a total of 40,474 students enrolled in the fall semester of 2006. While the college of nursing had 301 baccalaureate students enrolled
in the 2006 fall semester. The sample for this study was obtained from the senior baccalaureate nursing students enrolled in the public health nursing course. The majority of students enrolled in this program are young females; the setting does serve students from all populations of race, age, and gender. The course curriculum did include EH content. The textbook used for this course is entitled, Community Health Nursing: Caring for the Public’s Health (Saucier-Lundy & Janes, 2003) which includes one chapter on EH. This course is mandatory for all nursing students at this state university in order to complete requirements for graduation.

Population/ Sample Plan

The target population was senior baccalaureate nursing students from one state university who were enrolled in the public health nursing course in the spring of 2007. The course enrollment was 76 students in the spring of 2007. A convenience sample of all students was the goal of this study. A nonprobability convenience sample of 65 students was collected on the day of the EH nursing intervention. The criteria for inclusion: students must be enrolled in the Public health nursing course, students must be 18 years and older, and students must to able to read, write and speak English. Participants were assured results were confidential, to the extent allowed by law, and only evaluated as group data, in effort to promote participation in January and in February.

Protection of Human Subjects

Approval from Institutional Review Board (IRB) at Florida State University was being obtained prior to the collection of data from the students. The nursing instructor for this course reviewed the contents of the intervention and the instruments to be presented. In addition, permission was obtained from the nursing instructor. Student consents were voluntary and the student had opportunity to cease involvement at any time throughout the study without penalty. Consents were given to students prior to administration of the EH nursing intervention. This researcher gave careful attention to remove any identifying information from the pretests and posttests in order to protect the participants’ confidentiality. Informed consents were handed out and collected separately from the pretest posttest questionnaires to ensure anonymity. Pretests and posttests were number coded for the purpose of data analysis. Only the researcher had access to the data
obtained during the educational intervention and the follow-up meeting. Pretest and posttest results are stored in the researchers’ personal computer. The results of this study will be destroyed via a shredding process April 7, 2010. No one other than the researcher and statistical consultant will have access to the data. Individual results will be kept confidential and will be reported only as aggregate data.

**Instruments**

Data for this study was collected by means of a pretest and posttest on the day of the EH nursing educational intervention. A posttest was repeated four weeks after the intervention in order to assess ongoing EH knowledge. As part of the educational intervention, a modified EH risk appraisal tool was be provided to students on the day of the nursing intervention for use throughout the semester to educate their patients. Instruction will be provided in writing and verbally on the use of the tool; students were encouraged to utilize the tool during their public health home visits.

Pretest - posttest knowledge assessed included: (a) definition of EH and environmental justice; (b) discussion of two environmental factors that have a major impact on human health; (c) discussion of the role of nursing on EH; (d) discussion of the role of advocacy in EH and environmental justice; and (e) principles of risk perception and risk communication.

**Procedure**

This study evaluated the effectiveness of an EH nursing intervention. This objective was ensured by using a quasi-experimental method of a pretest posttest design. 

*Initial EH Nursing Intervention*

A 1.5 hour EH educational intervention was given on January 15, 2006. Students were given a 10 item pretest questionnaire that addressed the following EH competencies recommended by the IOM 1995 report: (a) basic knowledge and concepts; (b) assessment and referral; (c) advocacy, ethic; and risk communication (d) legislation and regulation. This pretest took approximately 15 minutes to complete. Students also received verbal instruction on the use of the modified EH risk appraisal tool. Students were given a copy of this tool to be used during their interaction with patients on public health home visits. A posttest was administered to participating students four weeks after the EH educational
nursing intervention in order to assess the knowledge gained by students related to EH, and to assess their use of the risk appraisal tool in clinical practice.

**Follow-up Test**

The researcher made a return visit to the public health course in order to administer the follow-up test and to discuss the use of the modified EH risk appraisal tool and to answer any questions the students had related to EH issues.

**Data Analysis**

All analysis for this research study was performed using SPSS Release 14.0.2 statistical software. Both descriptive and inferential statistical techniques were used to address the research questions. Descriptive statistics were used to summarize the variables age, gender, and ethnicity. The sample size consisted of the number of students in attendance on the day of the EH intervention in the spring of 2007. Enrollment in this course was 76 students.

**Summary**

This chapter describes the research methodology utilized for the framework of this study. A quasi-experimental, pretest-posttest follow-up design has been used to determine the effectiveness of an EH educational intervention with senior baccalaureate nursing students. A 10 item questionnaire was used for the pretest-posttest follow-up. Students were given a modified EH risk assessment tool to use during their patient home visits. Descriptive and inferential statistics were used to analyze the effectiveness of the intervention. Individual results will be kept confidential and will be reported only as aggregate data. Analysis and study findings are presented in Chapter 4.
CHAPTER 4

RESULTS

The purpose of this study was to determine the pretest and posttest level of knowledge of senior baccalaureate nursing students concerning EH after a 1.5 hours educational intervention. This quasi-experimental study utilized a pre-post follow-up design. This chapter describes the results from the analysis of data in relation to the research questions that guided this study. The results include statistical findings regarding demographic characteristics and EH knowledge.

Description of the Sample

Descriptive statistics were used to reflect the participant’s age, gender, and ethnicity, the number of children in the home, and work and educational experience (Appendix D). There were 76 senior baccalaureate nursing students that were enrolled in the public health course who were eligible to participate in this study. This course was a requirement for graduation. Three EH questionnaires were administered to assess EH knowledge before and after the nursing intervention. Sixty-five of the original survey packets were returned on the day of the intervention. Only sixty-three pretest questionnaires were completed while sixty posttest questionnaires were completed in January. Sixty-four of the participants completed the second posttest follow-up in February. Since not all of the students placed their packet number on the student roster, it is not known how many of the same students actually completed all three tests. The mean age of the student participants was 21 years (minimum age = 21, maximum = 50). Forty-nine (75.4%) of the students were White (non Hispanic), 7 (10.8%) were African-American, 4 (6.2%) were Hispanic, 2 (3.1%) were Native-American, while 3 (4.6%) were Asian. Sixty-one (93.8%) of the students were female and 4 (6.2%) were male. Fifty-six (86.2%) of the students did not have children in the home and 6 (13.7%) had one or more children in the home. Fifty-one (78.5%) of the students did not have a previous degree and fourteen (21.5%) held a degree prior to attending this college. Twelve (15.3%) of the students reported to have earned an AA degree, while one (1.3%) student earned a Bachelors in biology and one (1.3%) student had a degree in Criminology. Forty-eight (73.8%) of the students had previous work experience; 27 (35.1%) students had experience in some area of healthcare including working in an area hospital as a nurse.
extern, and in physician’s offices. The mean number of years of work experience was two (17%) years while twenty-four (50.8%) had five or more years of work experience. Six (9.2%) students reported prior formal education in environmental health, while fifty-nine (90.8%) reported no prior environmental health education.

**Knowledge Levels**

A 10-item EH questionnaire was developed by the investigator using the core concepts as recommended by the IOM (Appendix E). Students were asked to complete the pretest prior to the nursing intervention. A Paired t-test was utilized for the data analysis in order to assess for any difference between the scores before and after the EH nursing intervention. In addition, a one-way analysis of variance was used to compare pre, post, and follow-up test scores of all students who completed any of the questionnaires.

*Research Question One: What is the pretest level of knowledge of senior baccalaureate nursing students?*

Research question one examined the pretest level of EH knowledge of senior baccalaureate nursing students using the 10-item multiple choice questionnaire. The purpose of this section is to determine what basic EH knowledge the research subjects had prior to the EH nursing intervention. The pretest scores had a mean of 6.86 (N=64, SD= 1.754). The scores indicate a 69% overall EH knowledge level.

*Research Question Two: What is the posttest level of knowledge of senior baccalaureate nursing students?*

Research question two examined the posttest knowledge of senior baccalaureate nursing students concerning environmental health after a 1.5 hour educational intervention. The purpose of this section is to explain what basic EH knowledge the research subjects had after a 1.5 hour EH nursing intervention. The posttest scores had a mean of 7.183 (N =60, SD= 1.882) or a 72% knowledge level. The follow-up scores had a mean of 7.938, (N =64, sd = 1.79) or a 79% knowledge level, from pretest to post-test (p = .484). The scores indicate a no significant difference in overall EH knowledge. There was a significant difference in mean test scores between the pretest and the follow-up test (p = .003) and a significant difference in mean test scores from the posttest to the follow-up test (p = .037).
<table>
<thead>
<tr>
<th>Question</th>
<th>difference mean</th>
<th>difference sd</th>
<th>t-value</th>
<th>df</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>.203</td>
<td>2.219</td>
<td>.704</td>
<td>58</td>
<td>.484</td>
</tr>
<tr>
<td>Posttest</td>
<td>1.096</td>
<td>2.546</td>
<td>3.105</td>
<td>51</td>
<td>.003</td>
</tr>
<tr>
<td>Follow-up test</td>
<td>.688</td>
<td>2.214</td>
<td>2.152</td>
<td>47</td>
<td>.037</td>
</tr>
</tbody>
</table>
Research Question Three: After a 1.5 hour educational program what did baccalaureate student teach public health patients on the subject of environmental health?

Research question three inquired what the baccalaureate nursing students taught public health patients on the subject of environmental health. Students were instructed to used the modified EH risk appraisal tool during their public health clinical home visit. Fourteen students returned the completed modified EH risk appraisal tool. Eighteen (94.7%) of the students who used the tool found that it was easy to use and indicated that it was helpful in identifying EH risks in the home during their clinical home visit. Eighteen of the students who returned their packets made comments regarding the user friendliness of the modified EH risk appraisal tool, but only 14 students completed and returned the tool in the packet. Table 2 represents the topics that students observed and discussed with families during home. Some students failed to put their identification code on the student roster and therefore, could not be matched across the testing times.

All tests were analyzed using a oneway analysis of variance (ANOVA) model to compare the mean score at the three testing times. Results from the oneway ANOVA showed a significant difference between the 3 testing times (F = 5.981, df = 2, p = .003). Post hoc tests (Turkey HSD) showed that the mean score on the pretest was significantly different from the mean score on the follow-up test.
<table>
<thead>
<tr>
<th>Environmental Health Risks</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peeling Paint</td>
<td>2</td>
<td>18.2</td>
</tr>
<tr>
<td>House not appropriately childproofed</td>
<td>7</td>
<td>63.6</td>
</tr>
<tr>
<td>Children not protected from cold</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td>Evidence of bugs, rodents, mold</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>Evidence of pesticides, medication unsecured</td>
<td>2</td>
<td>18.2</td>
</tr>
<tr>
<td>Smoking in the home</td>
<td>10</td>
<td>76.9</td>
</tr>
<tr>
<td>Too many pets, pet food in reach of children</td>
<td>2</td>
<td>18.2</td>
</tr>
<tr>
<td>Most meals form fast food restaurants</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td>Drinking water unsafe</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td>Inadequate heating</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td>Inadequate lighting</td>
<td>5</td>
<td>41.7</td>
</tr>
<tr>
<td>Inoperative telephone</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td>Absence of or malfunctioning smoke alarms</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td>Inadequate transportation</td>
<td>6</td>
<td>54.5</td>
</tr>
<tr>
<td>Drinking alcohol in the home</td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>Use of illicit drugs in the home</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>Use of illicit drugs during pregnancy</td>
<td>8</td>
<td>66.7</td>
</tr>
</tbody>
</table>

*Note: Sample Size = 14*
Summary

This chapter presented the results from the statistical analysis of data which answered the three research questions guiding this study. This study examined the EH knowledge level of baccalaureate nursing students. Pretest and posttest level of knowledge of senior baccalaureate nursing students concerning EH was assessed. A discussion of factors that could have had an effect on the outcomes of this study will be discussed in Chapter 5.
CHAPTER 5
DISCUSSION

This chapter presents a discussion of the findings; comparison of findings to the literature; limitations; assumptions; strengths; conceptual framework; implications for nursing practice, education, and administration; and recommendations for future nursing research.

Overview

The purpose of this study was to evaluate senior baccalaureate nursing student’s EH knowledge level of environmental risk factors. Environmental health is a major issue in the United State today and nursing students begin their nursing careers with limited knowledge of health risks to their patients. The correlation between chemical, physical, and biological agents and human health has been established (Pope, 1995) and nursing students are in a unique position to learn important aspects of EH and to carry this knowledge into their nursing practice. Nurses interact with patients in a unique way and have the ability to educate clients, consumers and communities. The students in this study participated in a 1.5 hour EH nursing intervention. An EH pretest was administered, and EH posttest knowledge was assessed on the same day of the intervention. One month after the nursing intervention, students were given the same posttest without any further EH instruction or information. On the day of the EH nursing intervention students were provided with a modified EH risk appraisal tool and encouraged to use the tool during their public health home visits. During the second interaction with students, an EH risk appraisal questionnaire was attached to the pretest and students were encourage to place check marks next to items that they already taught patients during public health clinical home visits. Students were also encouraged to discuss their own public health home visit experiences with the class and add any comments regarding their experience with participating in this research study. Although the number of students who participated in this study was (N=65), only 14 students utilized the modified EH risk assessment. Students may have misunderstood instructions and written instructions may have been necessary. This chapter presents a discussion of the findings; comparison of findings to the literature; limitations; assumptions; strengths; conceptual framework; implications for nursing practice, education, and administration;
and recommendations for future nursing research. From the data analysis and review of the literature, there is a consistent finding that baccalaureate nursing students need more EH teaching. The students in the current study pretest and posttest scores showed no difference after a 1.5 hour EH nursing intervention. The data revealed there was no significant difference.

The results of the modified EH risk assessment tool used by students during home visits indicated several safety concerns. The home visits were healthy start visits coordinated by the local health departments and are made to ensure that parents with newborns have everything they needed to care for their child. This visit is an excellent time for the nurse to answer questions regarding caring for the newborn, make suggestions about proper nutrition and care, and also to make a quick environmental survey in order to check that the home environment is safe for both mother and child. Ten students (see Table 2) identified smoking in the home. This finding brings up an important issue regarding the safety and health of family members, especially the newborn. Exposing newborns to second hand smoke places the child at risk for respiratory infections and asthma. The costs for healthcare are likely to be high due to frequent visits to the health department and potential hospitalizations. The second concern relates to illicit use of drugs during pregnancy and the use of illicit drugs in the home. The modified EH risk assessment tool did not ask for specific details regarding student findings on the topic of drug use. Therefore, the tool should be modified for future research to include specific information on drug use. The third area of concern was inadequate childproofing of the home. This places toddlers and young children at risk for injury and even death. All of the areas on the tool were noted at least once which indicates a need for more education and follow-up with parents of newborns. Student home visits were held in several counties and the modified EH risk appraisal tool did not indicate in which county the home visit was made. In the future this information could be useful for that specific health department in order to spearhead educational programs on childhood safety.

**Conceptual Framework**

Knowles Adult Learner Theory was the guiding framework for providing instruction to the adult learner. Knowles theory describes the andragogical approach to
adult education (Knowles, 2005). An andragogical approach should be utilized when providing instruction to the adult learner (Knowles, 2005). Several assumptions must be made about adult learners when utilizing this theory; (a) they have a need to know; (b) they are self-directed; (c) learner’s experience must be taken into consideration (d) they have a readiness to know (e) they are problem centered and (f) they have internal motivation to learn (Knowles, 2005). These assumptions were used in order to guide the design and implement the educational intervention for this study.

Knowles (2005) described the assumptions of the andragogical approach to adult education. Adults need to know why they are learning content before they spend the energy to study and to understand. They want to know not only why but what it is they need to learn, and how they will accomplish this task. The students who participated in this study commented on the fact that they were not prepared to assess for EH risks in their patients. They expressed themselves as not being adequately prepared and thus were not as enthusiastic to participate in discussion. Adult learners do not learn openly if they feel content is forced upon them. They will bring to an educational session their own life experiences that may influence them either positively or negatively.

Teaching is seen as the control of learning by the management of reward according to Thorndike (Knowles, 2005). Both instructor and students must have an understanding of which characteristics of learning are considered good performance so that practice may be appropriately arranged. When students select an incorrect item, understanding their errors is vital so that they are not repeated. Student who participated in this EH nursing intervention did not get feedback after administration of any of the three questionnaires. It was also noted that some of the students seemed disinterested in the material being presented. According to Knowles rewards will assist in strengthening the desired responses to test items. During the time lapse between the post-test given at the time of the EH nursing intervention and the follow-up test a month later, students were exposed to additional information on EH in their reading and coursework. This may have accounted for the increase in mean scores on the EH knowledge test.

Comparison to the Literature Review

The literature reviewed and presented for this study included numerous findings and recommendations related to integrating EH into baccalaureate nursing curriculum.
Based on the literature review EH knowledge, skills and awareness remains inadequate. This is despite the IOM 1995 report which identified a lack of content in EH across baccalaureate and graduate nursing programs in the United States (Butterfield, 2002: Larson & Butterfield, 2002: Olsen, Stedman-Smith, 2005: Van Dongen, 2002: Wright, 2003). The results of this study correlated with the literature review. Hewitt (2006) describes the challenges and successes experienced at one university that first incorporated EH into the master’s and undergraduate nursing programs in 2000. Only 10 - 15 % of the graduate students enrolled in the Environmental Health Scholars Program (EHSP) advanced health assessment course were aware that radon is the second leading cause of lung cancer prior to taking this course. Nearly 100% of the students were aware of radon’s role in pulmonary carcinoma upon completion of this course. The author states that there is a need to define critical EH knowledge and skills in order for nurse educators and practitioners to utilize this knowledge in both public health nursing and other nursing specialty areas. Olson and Stedman-Smith (2005) implemented a pilot EH and nursing learning module using a technology-enhanced distanced module to teach core concepts to nurses. Using an internet-based EH module for continuing professional education, an interactive simulation of clinical vignettes with focus on environmental justice was utilized. Registered nurses (N=34) who participated had a 6% mean gain in learning occurred between pre and posttests (95% CI .51 to 1.37, p < .0001). Similarly, this study revealed that learning is minimal with limited instruction and the need for EH education is vital for both nursing students and nurses in practice.

Limitations

There were several limitations experienced throughout this study. The sample size includes only one group of students currently enrolled in a mandatory public health course. The class roster included a total of 76 students, but only sixty-five students returned their packets. The sample was a convenience sample, therefore cannot be generalized to the entire population. Students were asked to place the three-digit code found on the upper right hand corner of the survey packets next to their name of the class roster. Seven students did not write in their code, which limited the number of students who could be compared from the posttest time period to the second follow-up test time period. One major limitation was the time allotted for the educational intervention. It
would be beneficial to allow more EH interventions during the course of a semester and to incorporate EH into the entire nursing curriculum. A total of fourteen students used the EH risk appraisal tool during a home visit during their public health clinical. A majority of students in the study had not gone on a home visit during their public health clinical rotation and were unable to practice using the modified EH risk appraisal tool or provide EH teaching to patients. The need for standardized testing is evident and would be beneficial.

Assumptions

There were three assumptions for this study which include the following: nursing students have knowledge deficits on the topic of EH and environmental health nursing; nursing students have knowledge of deficits on performing EH risk appraisals; and students will answer honestly about their use of the modified EH risk appraisals.

Implications to Nursing Education

The nursing educator plays an intricate role in the educational process of nursing students on the subject of environmental health. Every nurse educator can implement EH topics into their current curriculum. Having adequate time in class so that students could review EH videos or participate in EH group projects would also be recommended. Collaboration between students and the community has also been recommended by Olsen, & Stedman-Smith (2005).

Implications to Nursing Practice

This study is relevant to the nursing profession both locally and globally. Nurses in all settings would be well served by understanding the important implications of EH to their nursing practice. Nurses who have contact in rural communities could facilitate educational programs to teach patients and their families how to decrease EH risks. Nurses in clinical settings could improve diagnostic outcomes by using EH risk questionnaires and learning to assess patients for EH exposure.

Recommendations for Future Research

Research should continue to focus on identifying students’ educational needs to assure that the nursing profession as a whole succeeds in meeting the needs of patients. Recommendations for further research would include a similar format to this study with a
larger sample size for replication. A setting in which students meet with the instructor on several different occasions could also be beneficial.

**Conclusion**

This study contributes to the body of knowledge on the topic of EH nursing and the need to incorporate EH into nursing curricula to help bridge the gap between nursing practice and the emerging health care needs and environment. There is a vast amount of information regarding EH and its implications to nursing. Resources such as journal articles, books on EH and a multitude of websites by well established agencies exist.

**Summary**

This chapter has discussed the findings of the study, theoretical framework, limitations, assumptions, and strengths, implications for nursing education and practice, and recommendations for future research concerning this topic. This study demonstrated the need to incorporate EH into baccalaureate nursing curriculum in order to have effective learning. This study supports the use of Malcolm Knowles’ principles of andragogy (2005) as a theoretical framework to guide this study. Even though the EH pre and posttest results were not statistically significant, the EH follow-up test did indicate that a change occurred during that one month period from the time of the EH nursing intervention.
APPENDIX A

HUMAN SUBJECTS APPROVAL LETTER
Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 1/18/2007

To: Kathleen Reid
MC: 4310

Dept.: NURSING

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
   The effectiveness of teaching environmental health curriculum to baccalaureate nursing
   students during their community health rotation.

The forms that you submitted to this office in regard to the use of human subjects in the proposal
referenced above have been reviewed by the Secretary, the Chair, and two members of the Human
Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(b) 7 and has
been approved by an accelerated review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to
weigh the risk to the human participants and the aspects of the proposal related to potential
risk and benefit. This approval does not replace any departmental or other approvals, which
may be required.

If the project has not been completed by 1/17/2008 you must request renewed approval for
continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the
project to the Committee for approval. Also, the principal investigator must promptly report, in writing,
any unexpected problems arising risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is
reminded that he/she is responsible for being informed concerning research projects involving human
subjects in the department, and should review protocols of such investigations as often as needed to
insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The
Assurance Number is IRB00000446.

Cc: Laurie Grubbs
HSC# 2007.003
APPENDIX B

ENVIRONMENTAL HEALTH SUPPORT CORRESPONDENCE
From: Patricia Butterfield
To: kartist424@earthlink.net
Date: 8/28/2006 11:52:13 AM
Subject: Re: Environmental Health

Kathleen: You are to be commended for selecting such a relevant topic for your thesis. Indeed, I think it is extremely important that we begin to document the impact of our educational efforts addressing environmental health. Such evidence will be key to obtaining the support we need to have a stronger integration of environmental health into general public health nursing.

Regarding your specific question about pre- and post-tests, the only one I am familiar with is one by Carol Van Dongen at University of Wisconsin OshKosh. It has been several years since I saw her questionnaire, but I remember it as well drafted and thought out. I don't know if it's exactly what you need, but seems worth looking at and possibly modifying to address your specific needs. I can't find her on the UWisconsin OshKosh www site, so maybe she's moved. But I've included the general info for the School of Nursing ...I think they could probably help you hunt her down. Here's the info listed below....

Our Address

University of Wisconsin Oshkosh
College of Nursing
800 Algoma Blvd
Oshkosh, WI 54901 8660
Phone 920 424-2121
Fax 920 424-0123

Best of luck to you in your graduate education.

Patricia Butterfield
Title of research: Effectiveness of Teaching Nursing Students Environmental Health Curricula during their Public Health Rotation.

I freely and voluntarily, and without any element of force or coercion, consent to be a participant in this research project. I have been informed that this project is to be conducted, as part of the degree requirements, by Kathleen Reid, a registered nurse, who is currently enrolled in the graduate nursing program at Florida State University. The study will take place during the period of January 29, 2007 through February 26, 2007, under the guidance of Laurie Grubbs, PH. D., and Professor of Nursing in the College of Nursing.

I understand that the purpose of this study is to determine the effectiveness of teaching nursing students enrolled in the public health course environmental health concepts. I understand that by participating I will be expected to fill out a demographic form, take part in a 1.5 hour environmental health intervention which will include a lecture and PowerPoint presentation. I will also be expected to take a pretest and a posttest on the day of the educational intervention and will participate in a second posttest 4 weeks after the intervention.

I understand that my participation is voluntary and I may choose to exit the study at any time. I understand that my name will not be used and that only data related to the entire classroom will be used.

I understand that I may contact Kathleen Reid, RN, BSN, FSU student nurse educator at (850) 907-0977 or Dr. Grubbs at (850) 644-5363 for answers to questions about this project. In the event that I have questions related to my rights as a participant in this study, or if I feel that I have been placed at risk, I can contact the Chair of the Human Subjects Committee Institutional Review Board, through the office of the Vice President for Research at (850) 644-8633.

I have read and understand this consent form.

________________________
(Participant’s name)

________________________
(Participant’s signature)

________________________
(Date)
Demographic Instrument

Please answer the following questions about yourself and your experience.

1. Age: __________ years

2. Gender: Male _______ Female _______

3. Ethnicity: White (non Hispanic) _______ African American _______
   Hispanic _______ Native American _______ Asian _______ other _______

4. Number of children in the home _______

5. Do you hold a degree in any other area? Yes______  No ______

6. Type of degree or degrees ______________________________________

7. Do you have previous work experience? Yes______  No ______

8. If yes, in what type of business have you worked? __________________

9. How many years of work experience do you have? ___________________

10. Have you had any formal education in environmental health?
    Yes______  No ______

11. If yes, list any courses have you taken? ____________________________
    Through which school were these courses taken? _____________________
APPENDIX E

ENVIRONMENTAL HEALTH PRETEST
Environmental Health Pretest

Please circle the correct letter for each question.

1. Which statement best describes environmental health
   a. Environmental health pertains to how nurses need to become more aware of how chemical, physical, and biological agents affect the human body.
   b. Environmental health has little to do with cancer, neurologic conditions, respiratory diseases and disorders of immune functioning.
   c. Environmental health is the science of human health and how to maintain good nutritional status.
   d. Environmental health is a specialty area for public health nurses that pertains to maintaining safe environments for needy children and families.

2. Which statement best defines environmental justice.
   a. Environmental justice is carried out by the Environmental Protection Agency.
   b. Environmental justice is an important strategy carried out by all nurses in their daily work day.
   c. Environmental justice pertains to the practice of fair treatment to all people, including minorities, related to environmental contamination.
   d. Environmental justice is not an important aspect of environmental health.

3. Chemicals such as dioxins, polychlorinated biphenyls (PCBs), and DDT are dangerous compounds that do not break down, can travel thousands of miles on air currents and may stay in the environment for many years. These chemicals are known as:
   a. Endocrine disruptors
   b. POPs (Persistant organic pollutants)
c. Upstream pollutants
d. VOCs (Volatile organic compounds)

4. All of the following are true regarding the impact of environmental exposure to human health except:
   a. Different dependant on the age, race and sex of a person
   b. Has been proven to be detrimental in cases such as Love Canal, Chernobyl, and Oak Ridge National Laboratory
   c. Has been overly publicized by the media in order to thwart development and progress.
   d. Is not well documented and cannot be proven in most cases

5. The most common source/sources of lead poisoning in children include:
   a. Homes built before 1978
   b. Drinking water
   c. Toys manufactured in foreign countries
   d. Foods grown in the United States

6. Children and the elderly are especially vulnerable to environmental health hazards. Children practice all of the following habits that place them in the high risk category for environmental health exposure except:
   a. Pick up and ingest food that has been on the floor or other contaminated surfaces.
   b. They frequently wash their hands removing chemicals before handling food.
   c. They lick any object, surface or body part they can reach.
   d. They spend many hours close to the ground which exposes them to dust, soil, carpets and low lying vapors.

7. Nurses role in environmental health includes all of the following except:
   a. Advocacy, ethics and risk communication
b. Assessment and referral

c. Basic knowledge and concepts

d. Medical pathology

e. Legislation and regulation

8. Routes commonly associated with exposure to pesticides include all of the following except:

a. Household pesticide use

b. Ingestion of unwashed fresh foods such as lettuce and apples

c. Organic fruits and vegetables

d. Well water

9. Which statement best describes nursing advocacy for environmental health?

a. Influencing social institutions rather than securing services for individual

b. Influencing nurses to create change through local chapters and organizations.

c. Influencing communities to partake in local recycling programs.

d. Influencing patients to begin lifestyle changes such as exercising and dieting

10. Examples of National Legislative Initiatives for environmental health are:

a. Develop funding to support nursing expertise.

b. Shift funding priorities toward preventative, public health interventions.

c. Create national information systems to trigger environmental exposure.

d. All of the above
APPENDIX F

ENVIRONMENTAL HEALTH POSTTEST
Environmental Health Posttest

Please circle the correct letter for each question.

4. Which statement best describes environmental health

   a. Environmental health pertains to how nurses need to become more aware of how chemical, physical, and biological agents affect the human body.

   b. Environmental health has little to do with cancer, neurologic conditions, respiratory diseases and disorders of immune functioning.

   c. Environmental health is the science of human health and how to maintain good nutritional status.

   d. Environmental health is a specialty area for public health nurses that pertains to maintaining safe environments for needy children and families.

5. Which statement best defines environmental justice.

   a. Environmental justice is carried out by the Environmental Protection Agency.

   b. Environmental justice is an important strategy carried out by all nurses in their daily work day.

   c. Environmental justice pertains to the practice of fair treatment to all people, including minorities, related to environmental contamination.

   d. Environmental justice is not an important aspect of environmental health.

6. Chemicals such as dioxins, polychlorinated biphenyls (PCBs), and DDT are dangerous compounds that do not break down, can travel thousands of miles on air currents and may stay in the environment for many years. These chemicals are known as:

   a. Endocrine disruptors

   b. POPs (Persistent organic pollutants)
c. Upstream pollutants
d. VOCs (Volatile organic compounds)

11. All of the following are true regarding the impact of environmental exposure to human health except:

a. Different dependant on the age, race and sex of a person

b. Has been proven to be detrimental in cases such as Love Canal, Chernobyl, and Oak Ridge National Laboratory

c. Has been overly publicized by the media in order to thwart development and progress.

d. Is not well documented and cannot be proven in most cases

12. The most common source/sources of lead poisoning in children include:

a. Homes built before 1978

b. Drinking water

c. Toys manufactured in foreign countries

d. Foods grown in the United States

13. Children and the elderly are especially vulnerable to environmental health hazards. Children practice all of the following habits that place them in the high risk category for environmental health exposure except:

a. Pick up and ingest food that has been on the floor or other contaminated surfaces.

b. They frequently wash their hands removing chemicals before handling food.

c. They lick any object, surface or body part they can reach.

d. They spend many hours close to the ground which exposes them to dust, soil, carpets and low lying vapors.

14. Nurses role in environmental health includes all of the following except:

a. Advocacy, ethics and risk communication
b. Assessment and referral

c. Basic knowledge and concepts

d. **Medical pathology**

e. Legislation and regulation

15. Routes commonly associated with exposure to pesticides include all of the following **except**:  

a. Household pesticide use

b. Ingestion of unwashed fresh foods such as lettuce and apples

c. **Organic fruits and vegetables**

d. Well water

16. Which statement best describes nursing advocacy for environmental health?  

a. **Influencing social institutions rather than securing services for individual**

b. Influencing nurses to create change through local chapters and organizations.

c. Influencing communities to partake in local recycling programs.

d. Influencing patients to begin lifestyle changes such as exercising and dieting

17. Examples of National Legislative Initiatives for environmental health are:  

a. Develop funding to support nursing expertise.

b. Shift funding priorities toward preventative, public health interventions.

c. Create national information systems to trigger environmental exposure.

d. **All of the above**
APPENDIX G

ENVIRONMENTAL HEALTH POSTTEST AND RISK APPRAISAL QUESTIONNAIRE
Environmental Health Posttest

Please circle the correct letter for each question.

7. Which statement best describes environmental health

a. Environmental health pertains to how nurses need to become more aware of how chemical, physical, and biological agents affect the human body.

b. Environmental health has little to do with cancer, neurologic conditions, respiratory diseases and disorders of immune functioning.

c. Environmental health is the science of human health and how to maintain good nutritional status.

d. Environmental health is a specialty area for public health nurses that pertains to maintaining safe environments for needy children and families.


a. Environmental justice is carried out by the Environmental Protection Agency.

b. Environmental justice is an important strategy carried out by all nurses in their daily work day.

c. Environmental justice pertains to the practice of fair treatment to all people, including minorities, related to environmental contamination.

d. Environmental justice is not an important aspect of environmental health.

9. Chemicals such as dioxins, polychlorinated biphenyls (PCBs), and DDT are dangerous compounds that do not break down, can travel thousands of miles on air currents and may stay in the environment for many years. These chemicals are known as:

a. Endocrine disruptors

b. POPs (Persistant organic pollutants)
c. Upstream pollutants
d. VOCs (Volatile organic compounds)

18. All of the following are true regarding the impact of environmental exposure to human health except:
   a. Different dependant on the age, race and sex of a person
   b. Has been proven to be detrimental in cases such as Love Canal, Chernobyl, and Oak Ridge National Laboratory
   c. Has been overly publicized by the media in order to thwart development and progress.
   d. Is not well documented and cannot be proven in most cases

19. The most common source/sources of lead poisoning in children include:
   a. Homes built before 1978
   b. Drinking water
   c. Toys manufactured in foreign countries
   d. Foods grown in the United States

20. Children and the elderly are especially vulnerable to environmental health hazards. Children practice all of the following habits that place them in the high risk category for environmental health exposure except:
   a. Pick up and ingest food that has been on the floor or other contaminated surfaces.
   b. They frequently wash their hands removing chemicals before handling food.
   c. They lick any object, surface or body part they can reach.
   d. They spend many hours close to the ground which exposes them to dust, soil, carpets and low lying vapors.

21. Nurses role in environmental health includes all of the following except:
   a. Advocacy, ethics and risk communication
b. Assessment and referral

c. Basic knowledge and concepts

d. **Medical pathology**

e. Legislation and regulation

22. Routes commonly associated with exposure to pesticides include all of the following **except**: 

a. Household pesticide use

b. Ingestion of unwashed fresh foods such as lettuce and apples

c. **Organic fruits and vegetables**

d. Well water

23. Which statement best describes nursing advocacy for environmental health?

a. **Influencing social institutions rather than securing services for individual**

b. Influencing nurses to create change through local chapters and organizations.

c. Influencing communities to partake in local recycling programs.

d. Influencing patients to begin lifestyle changes such as exercising and dieting

24. Examples of National Legislative Initiatives for environmental health are:

a. Develop funding to support nursing expertise.

b. Shift funding priorities toward preventative, public health interventions.

c. Create national information systems to trigger environmental exposure.

d. **All of the above**
February 26, 2007

Environmental Health Risk Appraisal Questionnaire

Please place a mark in the appropriate box. All questions are specific to use of the environmental health risk appraisal.

1. I used this tool during a home visit. Yes □ No □

2. This tool was easy to use. Yes □ No □

3. This tool was helpful in identifying environmental health risks in the home. Yes □ No □

Please indicate which areas you provided teaching for your home visit clients

a. Peeling paint (indoors) (outdoors)) Yes □ No □
b. House not appropriately childproofed Yes □ No □
c. Children not protected from cold Yes □ No □
d. Evidence of bugs, rodents, mold Yes □ No □
e. Evidence of pesticides, medications unsecured Yes □ No □
f. Smoking in the home Yes □ No □
g. Too many pets, pet food in reach of children Yes □ No □
h. Most meals from fast food restaurants Yes □ No □
i. Drinking water unsafe Yes □ No □
j. Inadequate heating Yes □ No □
k. Inadequate lighting Yes □ No □
l. Inoperative telephone Yes □ No □
m. Absence of or malfunctioning smoke alarms Yes □ No □
n. Inadequate transportation Yes □ No □
o. Drinking alcohol in the home Yes □ No □
p. Use of illicit drugs in the home Yes □ No □
q. Use of illicit drugs during pregnancy Yes □ No □
Environmental Health Nursing
Core Concepts for Nursing Students
Presented by Kathryn Reid, RN, MSN Candidate

Objectives
At the end of this presentation, students will be able to:
• Define environmental health.
• Define environmental justice.
• Become familiar with environmental health terminology.
• Understand the impact of the environment on the public's health.
• Understand the role of nursing practice in promoting environmental health.

Objectives
At the end of this presentation, students will be able to:
• Understand the role of advocacy in environmental health and environmental justice.
• Understand the importance of legislation and environmental health.
• Understand the basic mechanism of exposure to environmental hazards.
• Discuss the impact of chemical exposure on growing children.

Environmental Health (EH)
How humans relate to the environment and the impact of both natural and man-made surroundings, including health effects of air pollution, water pollutants, noise pollution, solid waste disposal, and housing, occupational disease and injury; and those diseases related to sanitary surroundings. (Cent. Dept. of Health)

Historical EH Events
• Times Beach, Missouri
• Love Canal, New York
• Oak Ridge National Laboratory in Ten.
• Chernobyl, Ukraine

Environmental Justice (EJ)
• Certain segments of our population are more likely to be exposed to environmental health hazards than the rest of the population.
• These folks are usually overexposed and under represented.
• EJ seeks to address such social injustices by empowering & educating those who are part of this high risk population.
Exposure and Human Health
- Chronic diseases
- Lifestyle choices
- Common household products
- Prevention

Environmental Health Knowledge
- Epidemiology
- Toxicology

Childhood Intoxicants
- Lead
- Pesticides
- Household Chemicals

Environmental Impact
- "The dose makes the poison," ep, 2003
- Duration
- Dose
- Age
- Health
- Familial predisposition to disease

Populations At Risk
Besides the poor, children and the elderly are vulnerable to EHH risks
- The growing body
- Childhood practices
- The aging body

Lead Poisoning
- Environmental lead poisoning is a major preventable health concern.
- Children are at risk due to their developing nervous system.
- Lead can be found in some foods, drinking water, soil, painted toys, and homes built before 1978.
- Approx. 1 million US children have been found to have lead in their blood.
Preventing Lead Poisoning

- Identify lead hazards before children are exposed.
- Have your child screened for lead poisoning, especially children ages 1 and 2.
- Have a dust sampling done in your home and taken to a lab (1-800-421-8325).

Environmental Tobacco Smoke

- Don’t allow children to be exposed to secondhand smoke.
- Teach children about the dangers of smoking.
- Ensure that your child’s school is smoke free.
- Tell friends and family to talk to their doctor about smoking cessation programs.

What about chemicals in the home?

Let’s take a look inside!

Nursing role in Environmental Health

- To prevent illness caused by environmental factors rather than reacting only to cases.
- Educate patients regarding potential EH hazards at home and work.
- Become a resource person in your agency on EH hazard prevention and health promotion.

Nursing role in Environmental Health

- Advocacy
- Assessment
- Legislation

EH Terms

- “Upstream” (preventive) healthcare
- “Downstream” (illness-oriented) approach
- POPS
- Endocrine disruptors
Environmental Health Legislation

- air pollution
- water pollution
- toxic substances in the environment
- soil conservation
- solid waste disposal
- radiation
- noise pollution
- ocean dumping
- environmental research
- endangered species
- cleanup of hazardous substances (e.g., the Savannah River
  nuclear waste)

Environmental Health Risk Appraisal

- How the tool was designed
- How to use this tool
- Making the connection

Summary

Environmental health is a topic that many nurses are not aware of; it is vital for present and future populations to gain knowledge and awareness of the risks related to exposure and especially on steps of prevention.

References

APPENDIX I

MODIFIED ENVIRONMENTAL HEALTH RISK APPRAISAL
Modified Environmental Health Risk Appraisal Tool

Do any of the adults have known medical problem? ______
Please list: _____________________________________________________

Are the children in the home healthy? ______
If not, please explain: _____________________________________________

<table>
<thead>
<tr>
<th>Environmental Health Risks</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is the home overcrowded?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Is the home clean?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3. Does the Yard have debris?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4. Is the home sanitary?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5. Is the temperature in the home adequate?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6. Does the family use unsafe heating methods?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>7. Does the home have good lighting</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>8. Is the drinking water safe?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>9. Do you see bugs or bug sprays?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>10. Do the smoke alarms work?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>11. Does anyone smoke in the home?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>12. Are there any cleaning agents in reach of children?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>13. Are the children adequately dressed?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>14. House is childproofed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Is sunscreen used on the children when outdoors?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please provide any other information you would like to share: _____________________________________________________
_________________________________________________________________
_________________________________________________________________
REFERENCES


EnvirR.N. http://envirn.umaryland.edu/about/about.htm


BIOGRAPHICAL SKETCH

Kathleen Reid, graduated from Florida State University with a Bachelor of Science in Nursing December, 2002. She worked as a Licensed Practical Nurse for over 10 years. Kathleen has worked in Tallahassee as a hospice nurse for the last seven years. She and her husband will continue to reside in Tallahassee where Kathleen will continue to pursue her love for environmental health nursing and education.