

THE PERCEIVED EFFECT OF A WORKPLACE EDUCATION PROGRAM ON  
REDUCING NEEDLESTICK INJURIES AMONG SOPHOMORE AND  
JUNIOR YEAR, BACHELOR OF SCIENCE NURSING STUDENTS  
ATTENDING INCARNATE WORD COLLEGE,  
SAN ANTONIO, TEXAS

A Dissertation

by

BARBARA GLENN COVINGTON

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of  
DOCTOR OF PHILOSOPHY

May 1996

Major Subject: Educational Human Resource Development

The Perceived Effect of a Workplace Education Program on  
Reducing Needlestick Injuries Among Sophomore and  
Junior Year, Bachelor of Science Nursing Students  
Attending Incarnate Word College,

San Antonio, Texas

A Dissertation

by

BARBARA GLENN COVINGTON

Submitted to Texas A&M University  
in partial fulfillment of the requirements  
for the degree of

DOCTOR OF PHILOSOPHY

Approved as to style and content by:

Kenneth Gapprock  
(Chair of Committee)

Paulette T. Beatty  
(Member)

James E. Christiansen  
(Member)

William A. McIntosh  
(Member)

Lloyd Korhonen  
(Head of Department)

May 1996

Major Subject: Educational Human Resource Development

## ABSTRACT

The Perceived Effect of a Workplace Education Program  
on Reducing Needlestick Injuries Among Sophomore  
and Junior Year, Bachelor of Science Nursing  
Students Attending Incarnate Word College,  
San Antonio, Texas. (May 1996)

Barbara Glenn Covington,  
B.S.N., University of Florida;  
M.S.N., University of Pennsylvania

Chair of Advisory Committee: Dr. Kenneth Paprock

Needlestick injuries continue to occur at an alarming rate among nursing students and hospital personnel across the United States. The first exposure to these injuries occurs when the individuals are in school learning the needle-handling skills and procedures. Nursing students, faculty, and nursing personnel are the largest group of hospital employees who frequently handle instruments or supplies contaminated with blood and are the most at risk for exposure to bloodborne pathogens. Needlestick and sharps injuries present a higher risk for occupational exposure to HIV. The risk of hepatitis B virus infection is approximately 30% for unvaccinated healthcare workers and higher for nursing students and nursing personnel working in hospitals. Risk of HIV infection from a single needlestick injury was .4% in 1989, had risen to 1% by 1990, and continues to rise. Nursing students and

practicing nurses are also expensive resources for the nursing schools and hospitals. The infections and diseases resulting from even a single needlestick injury range from serious to deadly.

Most needlestick injuries have been found to be preventable, but they continue to occur even if the nursing school or hospital invests time, money, and personnel in environmental changes and student or staff education.

This evaluation study was done to determine the perceived effects of an adult self-directed education program completed in an overlapping manner while the Sophomore and Junior Baccalaureate nursing students attended regular classes and clinical labs. Their perceptions of the effect of the knowledge, skill, and problem-solving portions as well as their attitude were assessed using the Ball State University Nursing Bloodborne Pathogen and Universal Precautions test.

The results of this study identified specific adult education approaches that are perceived by the students to have affected their achieving a sustained decrease in needlestick injuries. The results at last allow nursing schools and hospitals to concentrate their prevention efforts. They will save financial resources and decrease the number of nursing students and hospital personnel previously lost to their program or hospital staff due to diseases contracted after experiencing a needlestick injury.

## DEDICATION

This dissertation is dedicated to God and to my family: My husband, Bob, and our children, Diane, David, Britney, and Carri, for their never-wavering faith in my ability to finish my course of study. Also, for their love, support, and sacrifices over these last years so my learning experience could be a quality one.

To all past, present, and future nursing students, faculty, and professional nurses, especially those who make up the statistics and provided professional guidance for constructing the information used in this study. Their sacrifices provided the insights in this study and someday hopefully will allow us to find a way to stop occupational needlestick injuries. May they know that their dedication, suffering and even, at times, their deaths have not been forgotten and have worth.

## ACKNOWLEDGEMENTS

To each member of my dissertation committee, I offer my deepest appreciation and thank you:

Dr. Kenneth Paprock whose knowledge, wisdom, and always present patience helped make this research a reality in the face of overwhelming odds.

Dr. Paulette T. Beatty for possessing both high professional standards and the ability to help students look honestly at both their strengths and weaknesses so our personal learning becomes one we truly will carry with us always.

Dr. James E. Christiansen whose insights, change experiences, and devotion to the individuals who are living through changes showed me a new and more careful way to approach my own teaching efforts.

Dr. William McIntosh whose health care systems knowledge and experience helped ensure that my research and learning remained rooted firmly in reality.

## TABLE OF CONTENTS

	Page
ABSTRACT.....	iii
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
TABLE OF CONTENTS.....	vii
LIST OF TABLES.....	ix
CHAPTER	
I INTRODUCTION.....	1
Statement of the Problem.....	1
Purpose of the Study.....	6
Limitations.....	7
Delimitation.....	8
Assumptions.....	8
Definitions.....	9
Statement of Significance.....	11
Contents of the Dissertation.....	14
II REVIEW OF RELEVANT LITERATURE.....	15
Bloodborne Diseases.....	15
Educational Programs.....	16
Key Factors Related to Occupational Injury.....	18
Adult Education.....	21
Self-Planned or Self-Directed Learning.....	24
The Role of Self-Efficacy in Compliance.....	27
Barriers to Change.....	28
Personal Perceptions Related to Compliance Rates.....	29
Summary of the Review of Literature.....	31
III METHODOLOGY.....	35
Population.....	35
Procedures.....	36
Summary.....	42

## TABLE OF CONTENTS (continued)

CHAPTER		Page
IV	FINDINGS.....	43
	Design.....	44
	Attrition Rate.....	45
	Demographics.....	46
	Hypothesis.....	48
	Research Question One.....	49
	Research Question Two.....	57
	Research Question Three.....	64
	Research Question Four.....	71
	Research Question Five.....	76
V	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.....	80
	Summary.....	80
	Conclusions.....	87
	Recommendations.....	90
	REFERENCES.....	95
	APPENDIX A.....	105
	APPENDIX B.....	112
	APPENDIX C.....	121
	APPENDIX D.....	128
	APPENDIX E.....	130
	VITA.....	132



## LIST OF TABLES

TABLE		Page
1	Demographic Description.....	46
2	Perception Bivariate Intercorrelated Matrix.....	54
3	Knowledge Portion of the Questionnaire: Group Averages at Each Time Interval and Percentile of Correct Scores for the Control and Experimental Groups.....	56
4	Correct Responses by Group Membership at Test Time 1, 2, 3, and 4 for the Healthcare Workers: Knowledge about Universal Precautions and Bloodborne Pathogens.....	63
5	Perceived Availability of Equipment and Supplies at Time 1 for Both Control and Experimental Groups.....	66
6	Perceived Availability of Equipment and Supplies at Time 2 for Both Control and Experimental Groups.....	66
7	Perceived Availability of Equipment and Supplies at Time 3 for Both Control and Experimental Groups.....	67
8	Perceived Availability of Equipment and Supplies at Time 4 for Both Control and Experimental Groups.....	67
9	Bi-directional Relations of the Four Key Separate Parts Adult Nursing Students Perceive to Be Involved in Their Decision to Carry Out Safe Needle-Handling Procedures.....	70

## LIST OF TABLES (continued)

TABLE		Page
10	The Students' Perceived Most Important Reasons for No Needlestick Injuries.....	72
11	Healthcare Workers' Perceptions about the Application of Universal Precautions (U.P.) by Experimental and Control Group at the Start of the Study and 30, 60, and 90 days.....	73
12	Correlations Addressing Beliefs and Actions: Belief Attitude Bivariate Intercorrelated Matrix.....	78

## CHAPTER I

### INTRODUCTION

#### Statement of the Problem

In the United States, the wide variety of diseases transmitted through blood products extends well beyond hepatitis and acquired immune deficiency syndrome (AIDS). Frequently, malaria, tuberculosis, herpes simplex, tetanus, and syphilis are the transmitted organisms contracted from blood or body fluid contact (Ryan, Jones, & Miller, 1996; deCarteret, 1987). These diseases often have periods of incubation from 27.5 months to 4.5 years, during which the infected individual would display none of the symptoms but could transmit the disease to others (Schultz, Harris, & Shultz, 1994). A nursing student could contract one of these diseases and not have it manifest symptoms until months or years after graduation.

Each year, some 800,000 healthcare workers (including students) are injured by needlesticks, sharps, or splashes of blood and body fluids carrying some pathogen. In June 1990, over 5,425 cases of AIDS alone had been reported by healthcare workers (including

---

The style and format for this study follow that of the Journal of Educational Research.

students) in the United States (Chamberland, Conely, Ciesielski, Hammett, & Jaffe, 1991). Healthcare workers (including students) in the United States with Hepatitis B from occupational exposure to needlestick or sharps injuries numbered about 8,700. Of this number, approximately 200 will die while others will carry the infection and pass it to family, friends, peers, or their patients (U.S. Department of Labor Occupational Safety and Health Administration, 1994). By 1993, the number of healthcare workers (including students) infected due to occupational exposure to infectious body and blood fluids had increased to approximately 9,500. The numbers are not decreasing (Agerton, Mahoney, Polish, & Sharpiro, 1995; deVries & Cossart, 1994; Levin, 1995; Schultz et al., 1994; Weltman, Short, Mendelson, Lilienfeld, & Rodriguez, 1995).

A survey conducted by Goetz and Yu in 1990 found that of 626 American nursing schools, 402 (89.7%) reported students who had been exposed to the blood and body fluids carrying infections including HIV and Hepatitis B virus. Clinical nursing students sustained injuries from needlesticks at a comparable rate to other hospital employees. Nursing students in skills labs and clinical situations are presented with very real risks of exposure to transmissible pathogens, including but not limited to Hepatitis B and C viruses and HIV (Agerton et al., 1995).

Nursing student educational programs include specific needle-handling skills and task-performance training that they supplement with didactic information about the bloodborne diseases and occupational injuries. The objective they are trying unsuccessfully to achieve is a decrease or the elimination of needlestick injuries to their students. Equipment improvements are also being made in the schools and clinical settings to increase both patient and staff or student safety when handling needles, sharps, and blood or body fluids. None of these changes alone have been effective in decreasing needlestick injuries among nursing personnel or students (Lim, Chou, Hsu, & Chen, 1990).

National trends for both healthcare workers and healthcare students show the incidence of reported preventable needlestick injuries remains the same, about 800,000, each year or even increases following the implementation of environmental and procedure changes specifically designed to ensure a safer environment. The cost in both time lost from work and the dollars spent in treatment, counseling, prophylaxis, and testing ranges from \$800.00 - \$1,000.00 per individual. Worker's compensation associated with bloodborne diseases and injuries is up to millions of dollars a year. These injuries and diseases are especially profound in the nursing profession (Gurevich, 1994; Jensen, 1987; Wachs & Parker-Conrad, 1989).

Many studies have been completed and reported in the literature that looked at key factors they believe to be associated with the occupational injuries of nursing personnel. These key factors include educational (knowledge and skills) needs, risk-taking behaviors, their attitudes, and equipment or procedure problems. But the literature also reported that attempts to implement recommendations to improve one or more of these factors have been either unsuccessful or achieved only a temporary change in the incidence of needlestick injuries (Sellick, 1991; Whitby, 1991).

One of these studies was able to identify specific equipment and procedures most often causing the injuries to nursing staff. The study was done in 1988 by Jagger, Hunt, Elnaggar, & Pearson. It found that one third of the 326 reported injuries to nursing staff were from needles. Interviews with the injured employees found that the needlestick injury occurred most when they were attempting to recap their needles. These injuries occurred before and after needle designs were made safer and needle-disposal procedures were improved. Follow-up studies have supported these findings repeatedly. They add the fact that 35% of all hospital-related injuries to staff are caused by needlestick and sharps injuries occur despite the traditional employee orientation and numerous educational efforts which focused on teaching the staff

ways to avoid these preventable injuries. Two thirds of all the staff injured were again nursing personnel (Holloway & Surrey, 1992).

The review of literature found reference to only two preventive education programs for healthcare providers whose designs appeared to include any recognizable adult education principals. These programs had achieved some temporary change in the incidence of needlestick injuries but fell short of achieving sustained decrease in the injury rates (Gerberding, 1991; Sellick, Hazamy, & Mylotte, 1991; deCarteret, 1987; Neuberger, Kammerdiener, & Wood, 1988; Jackson & Lynch, 1986). Many of the items the researchers recommended for future education programs were identical to ones listed in self-planned or directed adult learning (Jackson & Lynch, 1986; English, 1992). In 1982 Allen Tough published his extensive literature review of adult education programs. The programs that were designed to help people achieve a sustained change in their were grouped as self-planned learning. The programs were developed around Spear and Mocker's Self-Planned Learning, organizing circumstances, which is widely recognized for its success when used in adult education programs (Spear & Mocker, 1984; English, 1992).

### Purpose of the Study

The purpose of this study was to determine if nursing student participation in a lab and clinical adult education needle-handling program would result in a sustained decrease in the incidence of preventable needlestick injuries by the participants.

### Hypothesis

There will be a difference in the incidence of preventable needlestick injuries between the nursing students in the randomly assigned control group and the experimental group of nursing students who participated in the workplace adult education needle-handling program.

More specifically, answers to the following research questions were sought in regard to the incidence of needlestick injuries among the nursing students at Incarnate Word College (IWC):

1. What perceived effect does the workplace adult education needle-handling program have on helping achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College?
2. What perceived effect does the knowledge portion of the workplace adult education needle-handling program have on helping achieve a sustained decrease of prevent needlestick injuries among nursing students at Incarnate Word College?



3. What perceived effect does the specific problem or task-solving portion of the workplace adult education needle-handling program have on helping achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College?
4. What perceived effect does the skill portion of the workplace adult education needle-handling program have on helping achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College?
5. What perceived effect does the individual's attitude have on helping achieve a sustained decrease of preventable needlestick injuries among students at Incarnate Word College?

#### Limitations

1. The size of the population was 104. Of the initial 57 volunteers, only 20 volunteers remained in the study for the full three-month duration. The reason for this was the educational requirement to complete the traditional U.P. classes was unexpectedly removed for the sophomores.
2. Generalization of the results can only be to a population with similar characteristics.

3. The study was limited to nursing students and did not include any other students (laboratory, physician, emergency technician, etc.) in the health science division.
4. The study was limited to the participants' perceptions included in their self-reporting on the questionnaires.
5. The educational level of the nursing students in the study may differ from other nursing schools and hospitals because there are Professional Registered Nurse-producing schools that require no college courses (Diploma), two years of college (Associate Degree) and four years of study (Bachelor of Science Nursing Degree).

#### Delimitation

The study was limited to sophomores and juniors at one private Catholic College Bachelor of Science Nursing Program in San Antonio, Texas.

#### Assumptions

1. The instrumentation used in this study would measure the effect of the adult education, needle-handling program on sustained decrease in preventable needlestick injuries among the nursing students at Incarnate Word College Bachelor of Science Nursing School.

2. The perceptions and effects collected would accurately reflect that which was intended by those surveyed.
3. The nursing students who dropped out of the study would have answered the questionnaires in the same way as those who remained in the study.
4. The students included in the study were full-time students who participated in lab and clinical classes that involved handling needles for patient-related procedures.

#### Definitions

Accident: An unplanned event that might result in personal injury or illness.

Adult Education: A vehicle (for individual development) for persons experiencing adulthood (which is a process).

Clinical/Lab Adult Education Program: Designed learning activity engaged in at the location where students carry out their activities during their lab or clinical experience day within the medical facility or nursing skills labs. The program has broad objectives to be achieved. It is flexible and allows the students to set their own learning pace and own learning style using manual, audio, visual, and/or written resources in an effort to gain and

retain specific knowledge and skill or to change in some way.

Knowledge: The fact or condition of having information or of being learned.

Learning: Is a consciously deliberate, dynamic/active, self-directed process that includes a purpose, action, and plan. It can occur throughout life and results in an enduring change within the individual.

Needlestick: A cutaneous cut, scratch, or puncture from a needle regardless of whether the wound bled.

Nursing Student: Sophomore, Junior and Senior year students at in Incarnate Word College Bachelor of Nursing program including students who might also be Registered Nurses, Licensed Vocational\Practical Nurses, Nursing Assistants, or Ward Clerks.

Perceived Effect: An adult's believed impact or understanding of, result(s), reality, fact.

Sharps: Instruments used in providing healthcare which have a point of edge which can puncture or cut through substances including skin or cloth.

Skill: The ability to use one's knowledge effectively and readily in performing a task.

Sustained: Behavior that occurs or does not occur for at least 90 days.

Task: Work/learning activity imposed by circumstance, with obligation and responsibility, to perform and

complete according to identified standards of safety and practice.

#### Statement of Significance

Graduating nursing students are depended upon to replace nurses leaving the workforce each year. These new graduates are both a highly educated and specialized scarce resource (Jensen, 1987; Wachs & Parker-Conrad, 1989).

Healthcare providers, including nursing personnel, such as Registered Nurses (R.N.'s), Licensed Practical Nurses (L.P.N.'s), Nurse Assistants (N.A.'s), physicians, interns, and health career students in skills labs and clinical practice experience exposures to both blood and body fluid. The fact is well documented that up to 91.8% of the exposures involve blood contact. Interns and students reported the most common exposures were during their participation in intravenous manipulations and venipunctures. R.N.s report that the most common procedures in which they participated that resulted in exposure to blood and body fluids were intravenous manipulations and glucometer fingersticks; whereas the L.P.N.s and N.A.s experienced more exposures when they were involved in non-procedural patient care (Stotka, Wong, Williams, & Markowitz, 1991; Weatherly, Young, & Andresky, 1991).

Most needlesticks are, in fact, preventable; but they continue to occur across the United States at a startling rate even when hospitals and nursing schools invest time, money, equipment, and/or personnel in making engineering and work-practice modifications, and environmental changes, including personal protective equipment, preventative vaccinations, and staff education. Despite the large number of studies available that concentrate on the topic of needlestick injuries among nursing personnel, none identify complete staff or student educational programs that achieved a sustained decrease in needlestick injury rates (Levin, 1995; Schultz et al., 1995; Sanborn, Luttrell, & Hoffmann, 1988; Kransinski, 1987; Edmond, 1988).

#### Role of Accurate Knowledge

Throughout the health and educational literature, the fact is reported that individuals who gain accurate knowledge about diseases and how they are transmitted along with safe procedures and skills can shift individuals' attitudes and increase the actual number of times they carry out the preferred activity, such as communicable disease prevention measures (Schultz et al., 1995; Levin, 1995). Identification of adult education approaches that actually result in a sustained decrease in needlestick injuries would allow schools of nursing

and other healthcare organizations to concentrate their prevention efforts on saving both human and financial resources.

Why needlestick injuries continue to occur among nursing students and hospital personnel across the United States is evading researchers. Nursing students and nursing personnel today remain the largest group of workers in hospitals. These personnel are expensive resources and need to be maintained as healthy workers. The many scientific and mechanical advances in the field of medicine require experienced and often highly educated nursing personnel to perform safely the required patient-care procedures (Jensen, 1987; Wachs & Parker-Conrad, 1989; Levin, 1995).

The diseases an individual can acquire as a result of exposure to bloodborne pathogens range from serious to fatal (Hepatitis B and C, HIV, AIDS, and Creutzfeld-Jakob, which causes premature senility, etc.). As these diseases progress, they cause the infected individual to leave work for days at a time or forever (Glickman, 1983; Lee, Rom, & Craft, 1983; Marchette & Marchette, 1985).

Needlestick injuries continue to occur in spite of the fact hospitals and nursing schools invest time, money, and personnel in making environmental changes and providing both student and staff education on the topics of universal precautions and safe needle-handling. The

large number of studies available on the topic of needlestick injuries among healthcare provider students (nursing, medical, laboratory, etc.) and other personnel do not identify specific educational programs, equipment modifications, or procedure changes that achieve a sustained decrease in the needlestick injuries. The literature does report that applying individual pieces of recommendations do not produce sustained change in behavior (Sanborn et al., 1988; Kransinski et al., 1987; Edmond et al., 1988; Levin, 1995).

The identification of specific combinations of adult education approaches that result in a decreased incidence of needlestick injuries would enable everyone involved in education and training, both the current and future healthcare worker, to focus effectively their energies in a manner that saves both human and financial resources.

#### Contents of the Dissertation

This dissertation is divided into five chapters. Chapter I contains a statement of the problem, a purpose for the study, limitations, assumptions, definition of terms, and statement of significance. Chapter II contains a review of the literature. The methodology and procedures followed are found in Chapter III, and Chapter IV contains the findings of the study. The conclusions, implications, and recommendations of the researcher are contained in Chapter V.



## CHAPTER II

### REVIEW OF RELEVANT LITERATURE

Though other on-the-job injuries such as sprains and strains exist, the mostly preventable needlestick injuries are much more frequent and no less serious or even fatal. Deaths from these injuries have long been tolerated in the United States. As of 1989, some 200-300 workers died each year from occupationally acquired Hepatitis B virus alone (Ryan, Jones, & Miller, in press; Hadley, 1989). The rate of Hepatitis B virus infection from a contaminated needle is reported to be as great as one in six (Gurevich, 1994). Through June 1990, over 5,425 cases of AIDS alone have been reported by healthcare workers (HCW) in the United States (Chamberland et al., 1991). The some 800,000 annual needlestick injuries bring the risk of HIV transmission to 16,000 (one in 300) HCWs.

#### Bloodborne Diseases

The wide variety of diseases transmitted through blood products extends well beyond the Hepatitis B and C viruses and AIDS, malaria, Rocky Mountain spotted fever, tuberculosis, herpes simplex, Creutzfeld-Jakob disease

(manifested as mid-life pre-senile dementia), tetanus, and syphilis. These diseases may manifest themselves within days of the initial injury or may remain unobserved for months or years. Infected individuals may continue to expose others to their infection while they continue working or studying without being aware they are infected (deCarteret, 1987).

### Educational Programs

Nursing student education programs, that include specific skill performance training and injury prevention, do not decrease the incidence of accidental nurse needlestick injuries. Equipment improvements for needle-handling have also not been effective in decreasing needlestick injuries among nursing personnel (Lim et al., 1990; Schultz et al., 1995).

The problem with needlesticks exists because either no immediate correcting responses are known or because several responses may be required while it is almost a certainty that not all will be able to be carried out (Greeno, 1980). Problem-solving can be explained either in the Gestalt manner (a process of organizing the situation in such a manner that structure is provided for the time when reorganization of previous ideas occurs so that solution or solutions can be reached for the problem) or in behavioral terms (the various aspects of

the situation defines the problem and the reinforcers become the solution to the problem) (Greeno, 1980).

In the problem of needlestick injuries there are often no mechanisms available in the nursing schools or the clinical institutions to assist anyone identify specific students, skills labs, or clinical experience (location of individual patient care units where the students completed their clinical experiences) that are at higher risk for student injury. No evaluations are currently being made of the nursing students' levels of accurate knowledge about diseases and proficiency in handling needles injuries so that deficiencies in knowledge, skills, and/or problem-solving processes could be focused on identifying why injuries are continuing to occur.

In the literature and at Incarnate Word College for the last two years, nursing students in unit clerk (clerical staff on a hospital workcenter) positions and those without previous work experience that exposed them to handling needles have reported needlestick and other "sharps" injuries. These students have reported injuries while handling equipment left laying in patient bed linens, in waste baskets, or on counters and desks, because they also assist in emptying or removing the trash from the workcenters.

These nursing students also report informally that they have fears of the unknown in relation to mystery diseases like HIV. They have difficulty identifying with or creating any emotional involvement with anyone who has become infected with Hepatitis B or C, HIV or AIDS (Meisenhelder, 1994).

#### Key Factors Related to Occupational Injury

An extensive literature review reveals many studies about nursing personnel workcenter injuries. Key factors associated with injuries, including knowledge (educational needs), individual risk behaviors (actions), attitudes (feelings), and substandard equipment or the lack of safety procedure needs are identified. When the separate recommendations or combinations of two or three recommendations were implemented as they were reported in the literature to decrease the frequency of needlestick injuries, they achieved either no change or only temporary change in the incidence of needlestick injuries (Sellick et al., 1991; Whitby, Stead, & Najman, 1991).

Because learning is a subset of change, it refers to the process that results in any change in actions or capabilities that develops as a result of interaction with the environment. It is an adaptive process that is facilitated or hampered by a variety of factors for adults. The change the adult will experience is either

type one, a change from one behavior to another within a given way of behaving, or type two, a change which might occur as a change from one way of behaving to another. This second type of change, the actual occurrence of change, changes the individual (Watzlawick, Weakland & Fisch, 1974; Paprock, 1994; Captain, 1995). Applying this pattern to nurses experiencing preventable needlestick injuries when they experience change, there would be either type one or two conditions depending on what they see their knowledge and skill level to be when they entered into the learning experience. Each nursing student would experience a decrease in their needlesticks and also their risk behavior in handling needles.

In a 1988 hospital needlestick study, Jagger et al., found one third of the 326 reported injuries to staff were from needles. Interviews with the injured employees found that the needlestick injury occurred most when they were attempting to recap their needles. These injuries occurred before and after needle designs were made safer and needle-disposal procedures were improved. Additionally, 35% of all hospital-related injuries to staff are caused by needlestick and sharps injuries despite the traditional employee orientation and educational efforts which focused on educating the staff to avoid these preventable injuries. Two-thirds of all staff injured are nursing personnel (Holloway & Surrey,

1992). Over the last three school years, the nursing students at IWC reported 15 needlestick injuries during 1993-1994 and 24 needlestick injuries during 1994-1995 in spite of the routine safety and infection control classes.

Gaining new knowledge or unflawed knowledge improves the learners' perception of control for risk. Students' perceptions of fears of contracting diseases have been shown to decrease when they gain an increase in their knowledge about HIV and other bloodborne disease transmission. Programs that assist student nurses to gain new or more accurate knowledge also should improve the learners' perception of control over the risk of injury or disease transmission and help them achieve a decrease in their incidence of needlestick injuries (Meisenhelder, 1994)

Knowledge (thinking) does lead to different action. For example, nurses in a number of studies, Holloway and Surrey (1992) and Jagger et al. (1988), reported that they had accurate knowledge of the proper one-handed spearing techniques to recap a needle. When they experienced a needlestick injury, 97.3% of them were from another person whom they had no control over or when they employed another needle-handling method, not the safe one-hand method. Their accurate (unflawed) knowledge resulted in decreasing their risk-taking behavior but did

not keep them from being exposed to others with needles or from employing other methods of needle-handling that carries more risk of injury. The mechanisms' knowledge activates in the individuals that result in a decrease in individuals behaving in a risk-taking manner are: First, they are motivated to improve their compliance with safe needle-handling or problem-solving to avoid unnecessary needle use. Second, knowledge allows them to make changes in procedures or techniques for individual higher risk situations, or less frequently occurring situations. Locating the learning and practice or problem solving at the workcenter in a hospital or a skill lab links together the knowledge (thinking), attitude (feeling) and practice or action (skill) variables. This special linking further decreases or prevents the building of barriers to safe needle-handling practice due to lack of practice or the presence of fear (Jackson & Lynch, 1986; English, 1992; Paprock, 1994).

#### Adult Education

The review of literature found reference to only two preventive education programs for the healthcare providers that briefly mentioned that they were designed using adult education principles. The programs that have achieved at least temporary change in the incidence of needlestick injuries appear, from the descriptions

provided, to incorporate at least some adult education principles (Gerberding, 1991; Holloway & Surrey, 1992; Hadley, 1989; Sellick et al., 1991; deCarteret, 1987; Neuberger et al., 1988; Jackson & Lynch, 1986). Many of the elements suggested by the researchers to be included in a successful prevention program are, in fact, the same elements listed for adult self-planned learning (Jackson & Lynch, 1896; English, 1992).

### Knowledge and Skill

In the two programs found in the literature that sought to decrease performance problems, such as needlestick injuries, those reported that three areas as a minimum needed to be included in adult education (Holloway & Surrey, 1992; Hadley, 1989). The programs' points are summarized below:

1. In order to define and resolve individual lack of knowledge or skill, the goal of the program should be knowing and practicing the following procedures for avoiding needlestick injuries:
  - Believe that gloves you wear during procedures do not protect you or anyone from needlesticks.
  - The first thing you ask yourself is, "Do you absolutely have to use a needle?"



- If you answer that you need to use a needle, be sure to review and visualize the procedure you will do while thinking about ways you can reduce the chance for you or others to be punctured by the needle.
- Above all, slow down and actually think. Think about what you are doing and about the others around you. Be sure you clearly see the spot you will be placing the needle before you do the task.
- Continuously try to expose the actual needle out of its case for the least amount of time possible.
- Your hand must not be placed or moved into a location near the needle point.
- Always try to practice not recapping the needle; but if you absolutely must recap, use only a one-hand method to scoop the cap back onto the needle.
- Do not cut, bend, or attempt to twist the needle.
- Participate in avoiding the need to carry and remove needles from the location of complicated procedures.
- Needle-disposal containers should be close at hand to where the needles are used, and the needles should be immediately disposed.

2. Individual adults should identify and problem solve barricades they view that would or are preventing them from performing the correct skill of needle-handling. They might include equipment or supplies as problems.
3. The adults identify their own performance problems that cannot be directly connected to a lack of knowledge, faulty equipment, or a deficit in their skill performance. They, then, problem solve ways to reduce or do away with those problems. This group of problems are often related to time management or management/faculty relationships. Some examples of these are the few hours available to practice the new skill with a teacher present, tiredness that slows both the thought process and physical coordination efforts.

#### Self-Planned or Self-Directed Learning

Allen Tough's 1982 extensive literature review of adult education designed to help people change found adult self-planned learning developed around Spear and Mocker's (1984) Self-Planned Learning, and organizing circumstances, to be widely recognized and successful when used in adult education programs, including ones for healthcare students. Literature also reports that there

is a growing requirement for health professionals to participate in Self-Directed Learning (SDL) or self-planned learning like activities in order to meet their professional licensure requirements for remaining current about changes in their healthcare specialty.

The self-planned learning programs change the learners. They move the learners toward accepting responsibility for managing their own learning. They achieve this in a self-directed manner. They are also given skills to solve problems that they see as barriers to their learning (Long & Confessore, 1992).

A number of adult educators discuss findings about adult individuals participating in interactive, self-paced, work specific, learning experiences that take place where they work (as employees or students). They report that the adults increase their knowledge (thinking), skills (actions) and their positive attitude (feeling) about what is being taught, e.g., needle safety, more than their peers experiencing traditional education away from their workplace (Woolner, Lowy, & Associates, 1991; Paprock, 1994).

When individuals participate in the adult education program, they self-report that they see themselves as represented in the process. If they initially do not see that they are represented in the learning process, they will over time move to being represented. Additionally,

they will be more likely to comply with the needed behaviors, safe needle-handling, and they will experience less risk-taking behaviors that lead to mistakes in handling needles that can lead to accidental needlestick injuries.

An example of this adult education process would be when the adult is included in identifying the methods and amount of time, they need to achieve broad learning objectives. An orientation is carried out with the adults to prepare them for this method of learning. A problem-solving approach is used so they can discover their own flawed perceptions. Through visual and verbal linking, the words they hear or read and the pictures they see or experience are connected to their own internal world. This gains their attention and shows them the meaningfulness or relevance of the information. They are actively involved and allowed time to alter their perception toward a more accurate one by increasing their accurate knowledge and by allowing them the time and resources to practice the changes during their real work practices in the hospital or in the skill lab.

If the adult identifies barrier(s) that might keep them from achieving their learning, they are allowed to seek out solutions to remove or at least decrease the barrier(s). Because the information is presented in language, the adult understands, and it is seen by the

adult as immediately applicable to their work at the hospital or in the skill lab. The learning may influence their compliance behaviors to employing safer needle-handling behaviors.

Adult education programs that reported success kept their focus and end goals directed on the learners. They monitored what effect the educational process achieved, but it was measured by the learners in relation to changes in themselves and not by the organizers of the programs (Houle, 1978). The SDL experiences reported as being successful with healthcare workers included SDL modules on specific topics. They often had individualized learning contracts, learning resource centers, and educators who acted as facilitators of the individual learning activities (Confessore & Confessore, 1992, p. 104).

#### The Role of Self-Efficacy in Compliance

Many hospitals and schools employ SDL successfully as part of their nurse education programs which attempt to assist the nurse achieve or maintain a competence level to perform certain desired or required skill(s). These places identify two important underlying assumptions about the learners. The first is that these adults (young or older) are capable of self-directed learning. The second is that they are professional or preprofessional individuals.

McKenzie (1993) and Fitzgerald (1991) defined self-efficacy as a specific internal state that individual adults might experience. Specifically, adults achieve this state when they reach a "competence" level to perform certain desired tasks or behaviors. The more that adults, such as nurses or nursing students, believe they are capable of functioning in their role and of performing the necessary activities (thinking and actions), the more likely the role and activity will be performed. Personal evaluations of self-efficacy also play a part in: (a) determining how much effort the individual nurse or student expends, and (b) how long they will persist or continue to perform certain desired safe tasks or behaviors when presented with barriers or adverse experiences. Rapid paced, unpredictable daily routines occur both in hospitals on patient care areas and in nursing school learning labs (McKenzie, 1993; Fitzgerald, 1991).

### Barriers to Change

Even if all the recommendations mentioned above for a successful adult education experience were followed, adults might still set up barriers that would keep them from following safe needle-handling policies and procedures. Willy (1990) and Barnes (1991) reported that adults who do not perceive a skill or procedure as risky,

will behave in a manner that will set up barriers that keep them from following safe procedures. The perception (personal beliefs) of hazard or risk of transmission of disease, whether accurate or flawed, influences compliant behavior. The intervention point to keep the barriers from being built or for the barriers to be broken down was identified in literature by Feldon in 1986 and repeated by Kopfer (1993) and Willy (1990). Adults must believe that they are at actual risk of infection and responsible for their own injury. They must also or otherwise believe that there is a relative importance of their own life's personal and environmental factors to the cause of their own needlestick injury. Finally, they must believe that the injured individual could have avoided the injury (Feldon, 1986). One example of this phenomenon is that if adult nurses or nursing students believe recapping provides protection to their peers, to others, or to themselves, it will contribute to the frequency of their recapping needles and decrease the possibility that they will change their practice to a safe needle-handling policy or procedure (Willy, 1990).

#### Personal Perceptions Related to Compliance Rates

From the literature covered earlier, there are at least five personal beliefs (perceptions) expressed that are linked to whether an adult will consistently and

properly use prevention measures, like not recapping needles, to avoid a threat to their health and life. In the case of needlesticks, the threat is from contaminated needles, carrying the risk of bloodborne transmitted diseases. Summarized from the literature, these personal beliefs include, but are not limited to:

1. They perceive that they are vulnerable/susceptible to a risk of needlestick injury.
2. They perceive there are real benefits from following safe needle-handling policies and procedures.
3. They have a perceived level of seriousness of injury along with consequences such as a negative health outcome.
4. They perceive the costs related to following preventative action recommendations as barriers between them and consistent complying behavior.
5. In their workplace, hospital, or lab, they perceive cues or hints to action which cause the nurses or nursing students to initiate protective behavior.

Finally, studies on professionals show that self-reported data are highly accurate (Blackburn, Pellino, Boberg & O'Connell, 1980).



### Summary of the Review of Literature

The review of literature addresses four areas. First, literature reports the reality that nursing students do experience needlestick injuries. Second, the diseases and infections individuals sustaining needlesticks could sustain are extensively reviewed from the literature. They can occur individually or in combination to bring on fairly immediate or long-delayed illnesses and/or death to the nurse or nursing student. Infected individuals can carry and spread many of the diseases before they know they are infected. Third, the successes of and the positive implications of adult education programs which actively include the student in self-direction learning are covered. These programs recommend openly addressing the fact that the learners' actions are not only linked to their perceptions of the danger or risk related to the activity but that their perceptions can be changed, and the learner can experience changes in their knowledge (thinking), attitudes (feelings) and skills (actions). Fourth, literature is examined that highlights the need for empirically based research specifically related to adult education programs located in the clinical or skills labs settings. Although there is an abundance of research in each individual field of study, i.e., adult education,

nursing student education, and healthcare workers' occupational injuries, there is very little research available that specifically targets the combined fields of adult education, nursing education, and the dangerous injury of occupational preventable needlesticks.

The review of literature, then, supports the need for a baseline study that provides a starting point for measuring the perceived effect workplace (clinical and skill lab) adult learning programs have in achieving a sustained decrease in preventable needlestick injuries. Clinical healthcare students sustain injuries by needlestick at a comparable rate to other personnel in hospitals. Because of this finding in the literature, clinical students are presented with very real risk of exposure to transmissible pathogens, including, but not limited to Hepatitis B and C virus, and HIV (deVries & Cossart, 1994).

Needlestick injuries continue to occur among hospital personnel across the United States at an alarming rate, and nursing personnel make up the largest group of hospital employees. These personnel are both expensive and scarce resources (Jensen, 1987; Wachs & Parker-Conrad, 1989). The results of the needlestick injuries are ranging from serious to fatal and are permanently removing these resources from the healthcare provider workforce (Glickman, 1983; Jagger et al., 1988; Lee et al., 1983; Marchette & Marchette, 1985).

Healthcare providers, including nursing personnel (R.N., L.P.N., N.A.), physicians, interns, and students in clinical practice, experience both body fluid exposures. The fact is well documented that up to 91.8% of the exposures involve blood contact. Interns and students reported the most common exposures were during their participation in intravenous manipulations and venipunctures. R.N.s report that the most common procedures in which they participated that resulted in exposure to blood and body fluids were intravenous manipulations and glucometer fingersticks, while the L.P.N.s and N.A.s experienced more exposures when they were involved in non-procedural patient care (Stotka et al., 1991; Weatherly et al., 1991)

Most needlesticks are, in fact, preventable; but they continue to occur even when hospitals invest time, money, and personnel in making environmental changes and educating the staff. Despite the large number of studies available concerning the topic of needlestick injuries among nursing personnel, none moved from theoretical to practice, from the hospital to the schools preparing the nursing student. The studies usually built in one or a few of the elements that adult education literature targets as being critical if the goal is achieving sustained changes in the learner's thinking and behavior. After many years, the reported staff educational programs

still fall short of achieving their important goal -- having a sustained decrease in needlestick injuries rates among healthcare providers and students in schools who seek to follow in the healthcare providers' footsteps (Sanborn et al., 1988; Kransinski et al., 1987; Edmond et al., 1988). Identification of an adult education program or a specific part or parts of a program that students perceive as directly influencing their sustained decrease in needlestick injuries would allow schools to place a portion of their diminishing finances and programs on more effective prevention efforts, which saves both human and financial resources.

## CHAPTER III

### METHODOLOGY

This chapter consists of a description of the background of the project, and the collection of information.

#### Population

The population of this study were 104 sophomore and junior nursing students in the Bachelor of Science Nursing program, Incarnate Word College, San Antonio, Texas in 1995. Fifty were first-year nursing students (Sophomore) and 54 were second-year nursing students (Junior). There were 17 male students. Of the 104 students, 15 students held a prior degree or have had education/training in another field prior to entering the BSN nursing program, (Licensed Vocational\Practical Nurses, Operating Room Technicians, Nursing Assistants, and clerical staff including Ward Clerks, etc.). Only 100 nursing students worked with patients and patient procedures using needles during their campus lab classes and during their hospital clinical classes. The largest ethnic group was Mexican-American with 55 (50%), 30 (34%) being Anglo-American, and 12 (16%) being African-

American. All the students were full-time and enrolled in medical-surgical nursing skills labs on the college campus and clinical courses that took place on nursing units in local hospitals.

### Procedures

A repeated measure study was done. Participation in the study was voluntary, and there was an informed consent obtained from each student volunteer before they completed the initial baseline Ball State questionnaire (Appendix A) and the demographic information form (Appendix B). No class credit was given for student participation. Both groups did receive credit for the nursing school's annual Universal Precautions and Safety Class attendance when the control group attended the videotapes and the experimental group completed their self-directed educational program (Appendix C).

After the principal investigator explained the study to all the sophomore or junior students at the end of their orientation assembly, she passed out copies of the volunteer consent form (Appendix D) to all interested students. When a student finished reading the consent and turned in their signed consent form, they were handed a randomly ordered plain cover packet. Inside the packet was an information letter and assignment to either the control or the experimental group. The study volunteers

were randomly assigned into these two groups. The study volunteers received a coded number that they could use to help ensure their privacy.

Differences in intervention for the control and experimental group were that the control group attended their regular scheduled classes and labs. The experimental group completed the Self-Directed Learning Program objectives as indicated in Appendix A. All the volunteer students had their human rights protected at all times during the study. An informed consent was obtained from the volunteer participants and they were given a copy to keep themselves. These consents were obtained the first day before any questionnaires were completed or random group assignments made. All results were confidential and coded. All lists were maintained by the principal investigator and destroyed after the data were entered into the computer for analysis. No individual student information was released at any time to anyone.

The student volunteers were asked verbally by the principal investigator to complete the demographic sheet and the Ball State University School of Nursing Bloodborne Pathogens and Universal Precautions questionnaire provided in their packet. The demographic information collected, included, but was not limited to, historical data on the students' number of years in

school, titles or health-related jobs they had held, age, and any prior needlestick injuries.

The Ball State questionnaire includes a 41-question multiple choice and true-false self-report inventory that measures individual knowledge about environmental safety, risk behavior, universal precautions, needlestick injuries, and class attendance for any of these subjects during the last 30 days.

The students in the study were instructed to respond to each question as it related to their role(s) as a student and/or staff member in a clinical hospital setting. If the question did not apply to them, they were instructed to leave the answer blank on the answer sheet. They were told they could write down any questions, concerns, or comments on the last page of their Ball State questionnaire. Their responses were marked on a standardized bubble answer sheet to facilitate analysis.

The questionnaire used is Ball State University School of Nursing Bloodborne Pathogens and Universal Precautions Test. This tool was selected to assess the knowledge and self-reported perceived concerns of healthcare workers regarding bloodborne pathogens and the application of universal precautions, which include needle-handling.



It was developed by L. Jones and M. Ryan in 1992 at Ball State University Indiana (Ryan, Jones, & Miller, 1996). The questionnaire has been previously validated by two internal validity studies by Dr. Ryan in 1994 and 1995 on Bachelor of Science nursing students and other healthcare providers. A construct validity study was completed on it in 1995.

Permission to use the tool (Appendix E) in this study and copies of the demographic and knowledge questionnaires were obtained from the Associate Director of the Graduate Nursing Program and primary research tool developer, Dr. Marilyn E. Ryan, at Ball State University at Muncie, Indiana.

Part one of the questionnaire has 20 multiple-choice questions addressing knowledge about HIV/AIDS, HBV, and Universal Precautions (U.P.). Part two of the questionnaire addresses the application of U.P. and has ten questions. These questions are answered on a four-point Likert scale ranging from "consistently" to "never." Part three of the questionnaire solicits comments, concerns, and suggestions through four open-ended questions.

The Ball State questionnaire was reviewed by a panel of experts located in Indiana when it was constructed. The panel included a medical doctor and experts in the HIV/AIDS arena at the Indiana State Department of Health.

They were directly involved with and knowledgeable about both state and national guidelines and regulations related to bloodborne pathogens and injuries.

Reliability for the questionnaire was established by test and re-test. The correlation for the knowledge test between time one and time two was  $r = .7341$  and for the application of U.P.,  $r = .7378$ . The instrument was considered sufficiently reliable for the purpose of the original study and for this study (Ryan et al., in press).

The population to which the Ball State questionnaire was originally administered in Indiana was practicing healthcare workers including RN, LPN, and other categories. It was used in a second study recently by the lead researcher who administered the questionnaire to Bachelor of Science nursing students. Statistical information was not available from this second study conducted in Indiana.

Dr. M. Ryan recommended this questionnaire's use with the B.S.N. nursing student population at Incarnate Word College, San Antonio, Texas, because it specifically addressed the research questions, and she had used a similar nursing population in her latest study completed in December 1995.

Because so many of the knowledge test questions were answered correctly in the original Indiana study, the

reliability testing completed on the questionnaire was  $r = .4626$  (Ryan et al., in press). A reliability scale was run on the knowledge scale to verify reliability. There was concern raised over the wording on questions 16 and 17 of the Ball State University questionnaire. These were addressed during the study, and it was not necessary to eliminate them from the questionnaire.

Results obtained during the Incarnate Word College Study from using the Ball State questionnaire were first analyzed individually and then as a group to identify trends and other significant information. Each student in the IWC study completed the Ball State questionnaire four times (the first during the week of orientation, the second after 30 days, the third after 60 days, and the fourth after 90 days).

The answers to each of the student's questionnaires were entered into an automated statistical package (SPSS for Windows) by the primary investigator, and the open-ended questions were content analyzed. The coded student numbers allowed statistical calculations and descriptive analysis for trending to be completed for individual students and/or for groups either by month or cumulative for the length of the research study (three months). The statistical analysis was reviewed by statisticians at Incarnate Word College and by doctoral prepared adult education and nursing education researchers.

The research proposal was submitted to the Human Subjects Research Committee at Texas A&M University and Incarnate Word College. Permission for the research study was granted by both schools before it was done (Appendix F).

### Summary

This chapter on methodology has described the background of the study, the research design, and the information collection, information analysis, and verification process of this research study. Data obtained from the questionnaires were analyzed through both a process of content analysis and use of the Statistical Package for the Social Sciences (SPSS-x).

## CHAPTER IV

### FINDINGS

The objective of this research was to test if there was a difference in the incidence of preventable needlestick injuries between the nursing students who participated in a self-directed/self-paced adult education needle-handling program and those who received only their scheduled semester classes and skills labs. This chapter reports, analyzes, and discusses the tabulated data from this research.

More specifically, answers to the following research questions are reported in regard to the incidence of needlestick injuries among the nursing students at Incarnate Word College. First, what was the perceived effect that the workplace adult education needle-handling program had on helping subjects achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College? Second, what was the perceived effect that the knowledge portion of the workplace adult education needle-handling program had on helping subjects achieve a sustained decrease of prevent needlestick injuries among nursing students at Incarnate Word College?

Third, what was the perceived effect that the specific problem or task-solving portion of the workplace adult education needle-handling program had on helping subjects achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College? Fourth, what was the perceived effect that the skill portion of the workplace adult education needle-handling program had on helping subjects achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College? Fifth, what was the perceived effect that the individual's attitude had on helping the subjects achieve a sustained decrease of preventable needlestick injuries among students at Incarnate Word College?

### Design

The research used a randomized control group interrupted time-series design that is appropriate to evaluate the effects of the adult education program intervention across time (Popham, 1993). It looked at the longitudinal effects of an adult education program designed after Spear and Mocker's Self-Planned, Self-Directed Adult Education program. The multiple post test design helps to see if contemporary affects affected the results. It also addresses the short-term influences that should disappear over time in the two groups. The

rest of the chapter discusses the findings from this research. The analysis of differences in attitude will be reported before the run of analysis of variance. Only correlations significant at the .05 level or better will be reported.

#### Attrition Rate

The Ball State questionnaire was distributed to the 40 Sophomore and Junior year BSN students who had volunteered for the study and had completed their consent forms during their Fall semester orientation at Incarnate Word College in August 1995. The students were asked to complete the questionnaire and return it to the primary investigator.

Because the requirement to see the infection control, Universal Precautions (U.P.), safe needle-handling videotapes was dropped for the sophomore students by their clinical faculty member during the first week of the study, 16 students chose not to continue with completing the questionnaires. A total of 24 baseline questionnaires were completed and returned during orientation week.

There were 20 students who stayed in the study for the entire three months. The findings discussed in this section are based on analysis of the data obtained from these 20 questionnaires. The discussion of findings will

consider the restriction of range as described by Edwards (1976) that any correlation coefficients would have been higher if all the original students were included in the study.

### Demographics

The demographics of the sample population were examined and are discussed in this section. Table 1 presents the demographic profile of the students returning the questionnaire.

Table 1

#### Demographic Description

Variable	Experimental	Control
<u>Number of years you have been employed as a healthcare worker</u>		
Less than 1	7	6
1 - 5	2	3
6 - 10	1	1
11 - 19	0	0
20 or More	0	0
No Answer	0	0
<u>Have you received Hep B injections (or are in the process of receiving it)</u>		
Yes	10	10
No	0	0



Table 1 (continued)

Variable	Experimental	Control
<u>Are you familiar with state an/or federal laws that require healthcare workers to use universal precautions</u>		
Yes	9	8
No	1	2
<u>Gender</u>		
Male	2	5
Female	8	5
<u>Age</u>		
10 - 20	0	0
21 - 30	8	8
31 - 40	1	1
41 - 50	1	1
51	0	0
<u>Class</u>		
Sophomore	4	4
Junior	6	6
<u>Basic education preparation</u>		
High School/GED	4	5
Associate Degree	3	3
L.V.N./N.A.	1	0
Diploma Technician	2	1
Diploma R.N.	0	0
Not Answered	0	1
<u>Role as a healthcare worker</u>		
R.N.	0	0
L.V.N.	2	1
N.A./R.T.	2	3
M.D./Intern/Resident	0	0
Other	6	6
n=20		

## Hypothesis

The first research question focused on the two different educational experiences. The hypothesis more specifically addressed the incidence of needlestick injuries between the two groups of students in the study. The findings indicated that the students going through the adult education program had fewer needlestick injuries during the study period. There was one needlestick injury in the control group and no needlestick injuries in the experimental group. The single needlestick injury occurred in the second month of the study. A junior nursing student sustained the injury in the learning skills lab while she was using a syringe to administer a medication to an existing I.V. line. The student was withdrawing the needle from the I.V. port when the needlestick occurred. The needle stuck the inside tip pad of her left ring finger. There was a small amount of bleeding from the puncture site.

The student perceived the needlestick injury to be preventable. She stated that the cause of the injury was that she did not have enough skill yet to perform the tasks and behaviors related to handling the needle in the skills lab. The student reported her injury and completed the accident report that day. She had not experienced a needlestick before this date. She had

completed her series of Hepatitis B vaccine injections and her tetanus shot was current.

#### Research Question One

This section will discuss the findings derived from the analysis of the data covering the second research question, which was: What is the perceived effect of the adult education needle-handling program on helping to achieve a sustained decrease of preventable needlestick injuries?

Learning is viewed in this research as a concept related to change(s) in individuals; it is a process that leads to change in one or more of three areas: knowledge (thinking), attitude (feeling), and skill (actions).

The perceptions of the program's effectiveness were analyzed first from the open-ended questions in the Ball State questionnaire. Next, changes in the completed questionnaires at Time 1 (T1), Time 2 (T2), Time 3 (T3), and Time 4 (T4) were reviewed. The Ball State questionnaire was analyzed for correlations between sections related to the elements of the program: knowledge, including problem solving; attitudes; and skills, including their actions and the actions of those around them.

Analysis of the content of the questionnaires reflected several interesting findings that mirrored the

findings in the literature. This self-directed education program included skill training and provided an opportunity for the learner to gain new or correct flawed knowledge at their own pace.

The ten experimental group students were allowed to check out selected audiotapes, videotapes, first-person articles, self-paced study guides, problem-solving needle-handling situations, or other activities to meet their self-determined learning objectives. This approach allowed them to improve their perception of control over their risk for preventable needlestick injury because the program allowed integration of more than one area (skill, knowledge, and attitude). Individual students' perception/fears of infection from one of the diseases carried in blood and body fluids were decreased with an increase in their knowledge about HIV and Hepatitis B transmission.

Analysis of the four open-ended questions addressing present and future program evaluation revealed two unique categories of comments: program evaluation comments were uniformly positive. The members of the control group requested opportunities to check out videos and tapes, have guest lecturers, add first-person literature to the annual classes, and get new videotapes. The experimental group felt the first-person literature, the newer videos, audiotapes, and self-study guides were valuable in giving

them accurate information. The hands-on experience was the most desired method for skill learning, and both groups wanted more time. Both groups wanted the faculty and hospital staff to do procedures correctly all the time.

There were nine recommendations for changes in the program: five were focused on adding guest speakers with first-hand stories of injury and illness; four stressed providing inservice education to nursing staff in the hospitals and real hands-on experience with infected patients.

The most frequent evaluation comment revealed satisfaction with the many options available to the learner: when, how, and where they wanted them. The students identified a variety of learning resource preferences to check out. The videos to view at home in the evening or night and the audiotapes to listen to in the car were the most popular items on their resource list. They felt the "newness" and "honesty" of the videos and handouts made the learning more interesting and pertinent to them. Their excitement as a group was evident when they came either to check out items, return items, or review completed objectives.

Program changes for next semester were recommended by seven of the ten students. They recommended that in the future, their peers needed to be more critical of

each other and have unannounced situations in the clinical setting or lab when their skills in needle-handling could be evaluated. The actual number of needlestick injuries and the number of patients infected with bloodborne diseases in their hospitals needed to be reported to them. Faculty were identified to receive inservice training so that all the faculty would consistently perform the needle-handling skills using appropriate techniques. One student wanted quiz points to be deducted when a student failed to carry out safe needle-handling or Universal Precautions.

Analysis of control group and experimental group members' perceptions of the program are reported at interval one (T1), interval two (T2), interval three (T3), interval four (T4), and as an average for both the control and experimental groups. The program consisted of five separate but related portions (knowledge, problem solving, application of universal precautions including safe needle-handling, efficacy concerning the universal precaution procedures including needle-handling, and attitudes about individual risk of injury and control over the environment).

A bivariate intercorrelated matrix (Table 2) found significance at the moderate to very strong levels for relationships between seven variables. Moderate relationships existed between -- washing hands :

sufficient time; sufficient time : doing procedures correctly themselves; sufficient time : others around did correct procedures; complying with policies : correct recap procedure; wash hands after gloves : correct recapping; correct recapping : self-follow policy; others follow policy : correct recap; degree believe self-susceptible : others follow U.P., comply with policy, wash hands after gloves, recap needles correctly, self-doing procedures correctly.

Strong positive correlations were found between sufficient time to do procedures : complying with policies; complying with policies : washing hands after gloves; washing hands : self-correct procedures; others complying with procedures : complying with the policy; others following policies : washing hands after gloves.

The only very strong positive correlation was between others following correct procedures : self-following correct procedures. The correlations were also run for the control or experimental groups at time one, two, three, and four. They did not reveal strong differences from the combined group analysis.

Table 2

Perception Bivariate Intercorrelated Matrix

Variable	Sufficient Time	Comply with Policies	Wash Hands	Recap Needle	Self Follow Procedure	Others Follow Procedure
Comply with policy	.7488 P = .000					
Wash hands	.5460 P = .010	.8548 P = .000				
Recap needles		.6308 P = .003	.6540 P = .002			
Self-follow procedure	.6119 P = .004	.9131 P = .000	.8284 P = .000	.6603 P = .002		
Other follow procedure	.6067 P = .005	.8269 P = .000	.8123 P = .000	.5932 P = .006	.9039 P = .000	
Degree believe self susceptible		.5062 P = .019	.5297 P = .014	.4995 P = .025	.5423 P = .013	.6667 P = .001

Key:

Sufficient time for carrying out universal precautions

Comply with the hospital/school policies on universal precautions

Wash their hands after removing gloves or gown

Recap needles or removal of needles using correct procedure

Self follow the correct policies and procedures in safe needle-handling

Others they work with follow safe policies and procedures in safe needle-handling

Degree believe susceptible to needlestick injury

The knowledge portion of the questionnaire focused on the student's knowledge about universal precautions and bloodborne pathogens. A high level of knowledge about U.P. and bloodborne pathogens, especially Hepatitis



B and human immunodeficiency virus, is important because it allows the students to give safe care to patients and prevents them from acquiring an infection from a preventable accident. Because correct/unflawed knowledge has been shown to lead to different action, the findings of this section played an important part in understanding the other findings of the study. The knowledge can decrease the actual risk-taking behavior of the nursing students by motivating them to increase their compliance with safe needle-handling or increase the times they will problem solve a situation in such a way to avoid using unnecessary needles (Jackson & Lynch, 1986; English, 1992).

Patterns emerged over the three months, both within the groups and between the groups. Both groups improved in their average correct answers as reflected in Table 3. The control group began with an 80% average and the experimental group 79%. At the end of the three months, the control group average was 88% and the control group was 87%. Both groups began the study with 100% correct scores on the first four general public questions about HIV tests, disease spread, and who is most at risk for contracting the disease. The next five questions covered diagnostic laboratory studies, incubation periods for the disease, and the purpose of universal precautions. These were more technical in nature for a healthcare provider.

Regardless of the sophomore or junior year status, both groups experienced difficulty identifying the correct answers at T1, T2, T3, and T4.

Table 3

Knowledge Portion of the Questionnaire: Group Averages at Each Time Interval and Percentile of Correct Scores for the Control and Experimental Groups

Percent	Time 1		Time 2		Time 3		Time 4		Summary	
	C	E	C	E	C	E	C	E	C	E
100%										
90%										
			87%	83%						
					84%	84%	88%	87%	85%	83%
80%										
70%	80%	79%								
60%										
50%										
40%										
30%										
20%										
10%										

Key:

C=Control Group

E=Experimental Group

The specific problem-solving questions and skill questions were analyzed to see if there was a corresponding increased percentage correct in these scores over time. The results showed the control group had no consistent improvement over time in the problem-solving questions or skill questions. The experimental group did maintain a consistent score of correct answers in both areas over time.

#### Research Question Two

In this section, research question two is discussed and the findings reported. The second research question asked what was the perceived effect that the knowledge portion of the workplace adult education needle-handling program had on helping subjects achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College?

The knowledge portion of the Ball State University questionnaire focused on the student's knowledge about Universal Precautions and bloodborne pathogens. The findings from the knowledge questions did look U.P. and bloodborne pathogens, especially Hepatitis B and HIV which is reported in the literature as most important because it allows the students to give safe care to patients and prevents them from acquiring an infection themselves from a preventable accident. Since correct/

unflawed knowledge has been shown to lead to different action, the findings of this section played an important part in understanding the other research questions and findings of the study. The presence of unflawed knowledge is expected to decrease the actual risk-taking behavior of the nursing student by one or both of the following ways: It can motivate them to increase their compliance with safe needle-handling or increase the times they will problem solve a situation in such a way to avoid using unnecessary needles in patient care situations. A trend did emerge over the three months both within the groups and between the groups. Both groups improved in their average correct answers to the knowledge portion of the test. The control group began with a 80% average and the experimental group 79%. At the end of the three months, the control group average was 88% and the control group was 87%.

Both groups began the study by answering the first four questions on their test correctly all four times they were tested. These 100% correct scores on the first four questions were on topics the general public receives education and information about: HIV tests, disease spread, and who is most at risk for contracting the disease. The next five questions covered information that might not be readily available to the students. They received the information in classes that were

specific to their specialty, and the information was more complex in nature. It includes diagnostic laboratory studies, incubation periods for the disease, and the purpose of universal precautions. The correct answer scores dropped lower for these were more technical in nature for a healthcare provider. Regardless of the sophomore or junior year status, both groups experienced difficulty identifying the correct answers at the start of the study, at one month, at two months, at three months, and at four months.

Review of the knowledge portion of the Ball State University questionnaire revealed that the overall mean score for the complete 20-question knowledge test was 84%. Participants demonstrated a higher level of knowledge about the eight questions related to correct infection control procedures (87%) than the two questions covering the principles of U.P. (84%). Scores were reported at about the 81% for the ten items concerning protocols to follow after occupational exposure, basic facts about HIV and HBV, and the means of acquiring or transmitting the HIV. Specifically, the average correct scores for the three questions covering basic facts about HIV was 83%, the four questions about the means of acquiring or transmitting the HIV was 83%, and the three questions about the correct protocols was 77%.

The number of correct answers for the entire 20-question knowledge portion of the Ball State University Questionnaire was then reviewed for both groups in the study at each test time. The control group members scored: 80% first time, 87% second time, 84% the third time, 88% the fourth time, and averaged a score of 85% for all four times. The experimental group scored a 79% the first time, 83% the second time, 84% the third time, an 87% the fourth time, and an 83% average for all four times.

In the research study, learning is viewed as a concept related to change(s) in individuals; it is a process that leads to change in one or more of three areas: knowledge (thinking), attitude (feeling), and skill (actions). This research question looked specifically at knowledge and not at the other two areas, attitude or skill. The perceived change or changes individuals reported in relation to their knowledge about the topics were reviewed and analyzed in two ways: a) for changes in the amounts of correct knowledge at each data collection time, the start of the study, one month, two months, and at three months, and b) by their group membership in the control or the experimental group and their class membership as a sophomore or a junior nursing student.

The findings from the knowledge portion of the questionnaire indicated both the control and the experimental group members experienced a slight overall increase in the amount of correct knowledge questions on the Ball State University Questionnaire. The two different educational opportunities to gain new or unflawed knowledge was looked at next.

Three correlations of significance for correct knowledge and the student's perception of control for risk of acquiring a bloodborne pathogen infection were identified: a) the degree students believed themselves susceptible for infection with the HIV correlated at  $P = .019$  (.5062) with having sufficient time to complete procedures, b) their perception of control for risk of acquiring a bloodborne pathogen infection correlated at  $P = .019$  (9.5297) with their complying with the organization's policies related to U.P. and infection control, and c) the student's perception of control for risk of acquiring a bloodborne pathogen infection correlated at  $P = .013$  (.5423) for carrying out the correct procedures themselves. The improvement in the experimental group's perception of control for risk of acquiring a bloodborne pathogen infection occurred almost identically to the control group's. Analysis did not find that the individual experimental group members'

perceptions/fears of contagion did not decrease with an increase in knowledge about HIV transmission.

The students who were in their junior year of nursing school had experienced at least four months of additional didactic instruction when they were sophomores. Some of the subjects they covered included the same facts and procedures present in this program. Analysis of the experimental and control group members by their class year membership found that there was almost no difference between classes overall. The sophomores averaged 6.5 incorrect questions on their knowledge test while the juniors average 6.4 incorrect answers on their knowledge test questions. At the beginning of the study, the sophomores averaged 9.8 incorrect answers while the juniors averaged 8.9 incorrect answers. At the end of one month, the sophomores averaged 7.2 incorrect answers and the juniors scored an average 5.8 incorrect. After two months, the sophomores averaged 6.5 answers incorrect and the juniors averaged 4.3 answers incorrect. Finally, after three months, the sophomores averaged 6.2 incorrect answers to the juniors with an average 5.6 incorrect answers.



Table 4

Correct Responses by Group Membership at Test Time 1, 2, 3, and 4 for the Healthcare Workers: Knowledge about Universal Precautions and Bloodborne Pathogens

Content	No. of Items	Correct % Response by Experimental or Control Group Membership			
		Time 1	Time 2	Time 3	Time 4
<u>Basic Facts HIV Disease</u>					
Control	3	80%	93%	87%	87%
Experimental	3	70%	73%	87%	90%
<u>Means of Acquiring or Transmitting the HIV</u>					
Control	4	85%	88%	80%	85%
Experimental	4	83%	80%	83%	83%
<u>Principles of Universal Precautions</u>					
Control	2	75%	85%	80%	85%
Experimental	2	80%	90%	85%	90%
<u>Correct Infection Control Procedures</u>					
Control	8	81%	89%	88%	94%
Experimental	8	86%	88%	88%	79%
<u>Protocol following Occupational Exposure to the HBV or HIV</u>					
Control	3	70%	77%	80%	77%
Experimental	3	93%	73%	73%	73%
<u>Total</u>					
Control	20	80%	87%	84%	88%
Experimental	20	84%	82%	84%	82%

Key:

Time 1 is day 1, Time 2 is at 30 days, Time 3 is at 60 days, Time 4 is at 90 days  
n=20, Control=10, Experimental=10

### Research Question Three

This section addresses the third research question, namely: What perceived effect did the specific problem-solving or task solving portion of the workplace adult education needle-handling program have on helping achieve a sustained decrease of preventable needlestick injuries among nursing students?

The Ball State questionnaire addressed problem-solving and task-solving in four areas. First, it assessed the knowledge level of the student and, second, provided five problem-solving situations for the student to process and answer. Third, it identified if they or others around them correctly implemented safety procedures consistently, frequently, occasionally, or never. Fourth, it assessed the attitude of the students in relation to belief that there was a danger to them from bloodborne diseases and if universal precautions were relevant/meaningful to them at this time.

The students in both groups scored well on the basic knowledge questions. The more specific technical knowledge questions showed less accurate answers in the knowledge portion of the questionnaire at T1 and a gradual increase in this area over T2, T3, T4. The increases are shown in Table 5.

The overall average for the knowledge test was 84% correct for the 20 knowledge questions. Participants demonstrated a higher level of knowledge about correct infection control procedures (94th percentile) than the principles of U.P. (73rd percentile). Scores were reported at about the 79th percentile for items concerning protocols to follow after occupational exposure, basic facts about HIV and HBV, and the means of acquiring or transmitting the HIV.

The second part of problem-solving is to see if the needed equipment and supplies are present where the student would need them to do the procedure. In this section, the students stated whether or not they perceived that certain supplies and equipment needed to implement universal precautions (U.P.) were readily available. As seen in Tables 5-8, this response did change slightly over the four times of data collection. The sophomore students were not in clinical or lab at T1 and many were not in the clinical or lab areas at T4 because the classes had ended and the students were taking exams in classrooms.

Finally, the students needed to be able to identify correct procedures and supplies along with the actions they would use to resolve problems facing them with missing equipment, lack of time, substandard equipment, and/or lack of knowledge about a disease. As their knowledge increased in its accuracy and their problem-

solving abilities changed, the students in the experimental group reported consistent solutions to the patient situations and a correlation between the dangers from bloodborne diseases and the need for them to use correct universal precautions.

Table 5

Perceived Availability of Equipment and Supplies at Time 1 for Both Control and Experimental Groups

Question	Consistently	Frequently	Occasionally	Never
Gloves	16 (80%)	1 (5%)		
Protective face ware	8 (40%)	5 (25%)	4 (20%)	
Gowns/aprons	6 (30%)	6 (30%)	5 (25%)	
Sharps disposal containers	13 (65%)	2 (10%)	2 (10%)	

Table 6

Perceived Availability of Equipment and Supplies at Time 2 for Both Control and Experimental Groups

Question	Consistently	Frequently	Occasionally	Never
Gloves	16 (80%)	2 (105%)	2 (10%)	
Protective face ware	7 (35%)	7 (35%)	4 (20%)	
Gowns/aprons	7 (35%)	6 (30%)	5 (25%)	
Sharps disposal containers	17 (85%)	0 (0%)	1 (5%)	

Table 7

Perceived Availability of Equipment and Supplies at Time 3 for Both Control and Experimental Groups

Question	Consistently	Frequently	Occasionally	Never
Gloves	17 (85%)	3 (15%)		
Protective face ware	7 (35%)	8 (40%)	5 (25%)	
Gowns/aprons	8 (40%)	7 (35%)	5 (25%)	
Sharps disposal containers	18 (90%)	1 (5%)	1 (5%)	

Table 8

Perceived Availability of Equipment and Supplies at Time 4 for Both Control and Experimental Groups

Question	Consistently	Frequently	Occasionally	Never
Gloves	17 (85%)	3 (15%)		
Protective face ware	8 (40%)	8 (40%)	4 (20%)	
Gowns/aprons	8 (40%)	6 (30%)	6 (30%)	
Sharps disposal containers	19 (95%)		1 (5%)	

### Findings on Efficacy

The students entered this study with varying barriers at various levels, including various perceptions critical to their beliefs and what would or would not be their actions. Because these external forces cannot control what the students bring with them, the findings revealed that the students showed little difference in reported scores on the questions of efficacy over T1, T2, T3, and T4.

This section asked the student to state their perception of their efficacy: judgment about enough time, capability to perform the skill, knowledge to carry out the skill, and/or understanding of the procedures related to doing U.P. activities. Self-efficacy is the single most important prerequisite for the students to have a behavioral change. These are all elements reported by McKenzie and Jurs (1993) and Bandura (1977) pertaining to the internal state (confidence) the nursing student experiences as his or her ability to carry out correctly the desired tasks and/or behaviors. Self-efficacy is the amount of conviction that the person can successfully carry out the behavior required (capable) to produce the outcome, safe behavior. One example of this type of barrier would be the student bringing into a learning situation the perception that they could not use

gloves which are physically present without verbal permission from their teacher (authority figure).

The more the nursing students believed they were capable or were in the role of student performing the skills necessary to handle needles safely, and in the appropriate situations, the more likely they will fulfill the actual student role and needle-handling skills competently.

The other reason self-efficacy was reported is that studies have shown a correlation between the amount of effort individuals put into and the length of time they continue to implement specific desired safe tasks and/or behaviors in the face of a barrier or unpleasant experience, such as the unpredictable supply levels or the multiple procedures involving needles at one time in a hectic lab or patient-care area. Table 9 demonstrates how individuals can look in both directions for relationships among the variables located in any situation involving adults performing procedures or skills related to personal danger and some level of technical or medical knowledge. The parts are interrelated and efforts to decrease or improve only one area have shown little ability to produce a change in the learners.

Table 9

Bi-directional Relations of the Four Key Separate Parts  
Adult Nursing Students Perceive to Be Involved in Their  
Decision to Carry Out Safe Needle-handling Procedures

Score	Knowledge	Perceived Threat	Self- Efficacy	Prior NSI
4				4
3				
2	2		2	
1		1		

Key:

Knowledge

Low number means the student's knowledge is flawed or deficient. High number means the knowledge is not flawed and is sufficient in amount.

Perceived Threat

Low number means that the student perceives little fear of needlesticks, perceived threat/risk of contracting disease, perceived severity of the disease, and perceived susceptibility to contracting one of the diseases including HIV.

High score means the student perceives great fear of needlesticks, perceived threat/risk of contracting disease, perceived severity of the disease, and perceived susceptibility of contracting one of the diseases including HIV.

Self-Efficacy

Low score means that the student perceives that they are not able to problem-solve and perform the task or skill with the correct skill, speed, and knowledge.

High score means that the student perceives that they are able to problem-solve and perform the task or skill with the correct skill, speed, and knowledge.

Prior Needlestick Injury (NSI)

Low score means the student has had no or a few needlestick injuries. High score means the student has experienced numerous needlestick injuries.



#### Research Question Four

In this section, the following research question is discussed: What perceived effect did the skill portion of the workplace adult education needle-handling program have on helping achieve a sustained decrease of preventable needlestick injuries? The experimental group members' answers were analyzed to answer this question.

The majority of the 10 experimental group members reported at T1, T2, T3, and T4 what they believed to be the most important reason as to why they did not have a needlestick injury as reported in Table 10. Their answers revealed that the main reason was taking the required time and effort to do the skills correctly and safely, while being skilled enough to perform the required needle-handling. The four sophomores, at least once in the four periods, identified seeing videos in class or skills lab that gave them accurate knowledge as their most important reason for not sustaining a needlestick injury.

Table 10

The Students' Perceived Most Important Reasons  
for No Needlestick Injuries

Skills	Start		30 days		60 days		90 days		Totals	
	SO	JR	SO	JR	SO	JR	SO	JR	SO	JR
Efficacy expends time and effort	0	4	4	5	3	4	3	3	10	16
Skilled	0	0	0	1	0	1	0	1	0	3
Knowledge	4	1	0	0	1	1	1	2	6	4
Not handled needles	0	1	0	0	0	0	0	0	0	1
Total	4	6	4	6	4	6	4	6	16	24

Other Staff Compliance

One barrier to the students performing safe procedures and skills is their perception of the staff's compliance with correct procedures for U.P. at their lab, hospital, or nursing home. This factor influences to varying degrees the value and accuracy of the correct procedures and applications for U.P. in their skills training. The findings at T1, T2, T3, T4 and cumulative scores between groups are shown in Table 11. These totals may be less than the sample size because individuals selected not to answer specific questions.

Table 11

Healthcare Workers' Perceptions about the Application of Universal Precautions (U.P.) by Experimental and Control Group at the Start of the Study and 30, 60, and 90 days

Question	Consistently	Frequently		Occasionally	Never
<hr/>					
I have sufficient time to implement U.P.					
<u>Start</u>					
Control	4	1	2	0	3
Experimental	6	2	1	0	1
<u>30 days</u>					
Control	6	2	0	0	2
Experimental	6	4	0	0	0
<u>60 days</u>					
Control	7	1	2	0	0
Experimental	7	3	0	0	0
<u>90 days</u>					
Control	6	2	1	0	1
Experimental	7	3	0	0	0
I use personal protective equipment such as gloves, and protective facewear according to school/clinical policy.					
<u>Start</u>					
Control	6	1	0	0	3
Experimental	6	3	0	0	1
<u>30 days</u>					
Control	6	2	0	0	2
Experimental	8	2	0	0	0
<u>60 days</u>					
Control	9	1	0	0	0
Experimental	8	1	0	0	1
<u>90 days</u>					
Control	9	1	0	0	0
Experimental	6	1	0	0	3

Table 11 (continued)

Question	Consistently	Frequently		Occasionally	Never
<hr/>					
I wash my hands after the removal of gloves (or other protective equipment).					
<u>Start</u>					
Control	6	2	0	0	2
Experimental	8	2	0	0	0
<u>30 days</u>					
Control	6	2	0	0	2
Experimental	7	2	0	0	1
<u>60 days</u>					
Control	8	2	0	0	0
Experimental	9	1	0	0	0
<u>90 days</u>					
Control	8	2	0	0	0
Experimental	8	2	0	0	0
If recapping or needle removal is required, I use a mechanical device or a one-handed technique.					
<u>Start</u>					
Control	6	0	0	0	4
Experimental	9	0	0	1	0
<u>30 days</u>					
Control	7	0	0	1	2
Experimental	9	1	0	0	0
<u>60 days</u>					
Control	7	2	1	0	0
Experimental	8	1	0	0	1
<u>90 days</u>					
Control	9	1	0	0	0
Experimental	9	1	0	0	0

Table 11 (continued)

Question	Consistently	Frequently		Occasionally	Never
<hr/>					
I follow the correct procedures for U.P.					
<u>Start</u>					
Control	6	1	0	0	3
Experimental	7	3	0	0	0
<u>30 days</u>					
Control	7	1	0	0	2
Experimental	8	2	0	0	0
<u>60 days</u>					
Control	6	4	0	0	0
Experimental	7	3	0	0	0
<u>90 days</u>					
Control	7	3	0	0	0
Experimental	6	4	0	0	0
Other staff follow correct procedures for U.P.					
<u>Start</u>					
Control	4	3	0	0	3
Experimental	6	4	0	0	0
<u>30 days</u>					
Control	3	4	1	0	2
Experimental	6	3	1	0	0
<u>60 days</u>					
Control	2	7	1	0	0
Experimental	5	5	0	0	0
<u>90 days</u>					
Control	2	6	1	0	1
Experimental	5	5	0	0	0

### Research Question Five

In this section, the following research question is discussed: What perceived effect did the individual's attitude have on helping achieve a sustained decrease of preventable needlestick injuries? The answers provided by both the control and experimental groups were analyzed to answer this question.

The answers to the four open-ended questions were analyzed and the findings are reported in this section. Analysis of the differences in attitudes are reported at T1, T2, T3, T4, and as an average for both the control and experimental groups. There were twelve questions that addressed the attitudes of the students related to their risk-taking behavior, severity of the needlestick injury, and their control over the occurrence of the needlestick injury.

#### Belief Attitude

The initial data gathered from the nursing students related to their attitudes included feelings and fears related to bloodborne diseases, risk-taking behaviors, ability to identify with or relating on an emotional level to individuals with one of the bloodborne diseases, the level of skill or procedure knowledge that might set up barriers to their learning and performing needle-handling safely. The data were analyzed in total and in

the separate study groups before the learning programs began and over time at each data collection point.

Over time, the elements being measured shifted slightly. The correlations did not vary after the initial data collection time. The attitudes between the control and the experimental group did not differ significantly.

A bivariate intercorrelated matrix (Table 12) found significant relationships between seven variables: moderate relationships existed between -- washing hands : sufficient time; sufficient time : doing procedures correctly themselves; sufficient time : others around did correct procedures; complying with policies : correct recap procedure; wash hands after gloves : correct recapping; recap correctly : self-follow policy; others follow policy : correct recap; degree believe self-susceptible : others follow up, comply with policy, wash hands after gloves, recap needles correctly, and self-doing procedures correctly. Strong positive correlations were found between sufficient time to do procedures : complying with policies; complying with policies : washing hands after gloves; washing hands : self-correct procedures; others complying with procedures : complying with the policy; others following policies : washing hands after gloves. The only very strong positive correlation was between others following correct

procedures : self-following correct procedures. The correlations were also run for the control or experimental groups at time one. They did not reveal strong differences from the combined group analysis.

Table 12

Correlations Addressing Beliefs and Actions:  
Belief Attitude Bivariate Intercorrelated Matrix

Variable	Sufficient Time	Comply with Policies	Wash Hands	Recap Needle	Self Follow Procedure	Others Follow Procedure
Comply with policy	.7488 P = .000					
Wash hands	.5460 P = .010	.8548 P = .000				
Recap needles		.6308 P = .003	.6540 P = .002			
Self-follow procedure	.6119 P = .004	.9131 P = .000	.8284 P = .000	.6603 P = .002		
Other follow procedure	.6067 P = .005	.8269 P = .000	.8123 P = .000	.5932 P = .006	.9039 P = .000	
Degree believe self susceptible		.5062 P = .019	.5297 P = .014	.4995 P = .025	.5423 P = .013	.6667 P = .001

Key:

Sufficient time for carrying out universal precautions

Comply with the hospital/school policies on universal precautions

Wash their hands after removing gloves or gown

Recap needles or removal of needles using correct procedure

Self follow the correct policies and procedures in safe needle-handling

Others they work with follow safe policies and procedures in safe needle-handling

Degree believe susceptible to needlestick injury



Because the students were assigned randomly in the study, no effort was made to provide separate faculty to one or the other group. The students rotated among faculty and clinical or lab settings during the semester. The influence of seeing others around them comply with the safety procedures for U.P. and needle-handling became evident in individual comments and in the very strong correlations related to this factor. The fact that the experimental group reported more often that they believed they were at risk for infection and that they were responsible for their own injuries if they occurred was significant and mirrored the literature for elements that would lead an individual to change a behavior, persist longer in attempting to complete a correct behavior, and more often be compliant in implementing hospital or lab policies. There was not a correlation found at any time between either group and a belief that they could avoid all injuries.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### Summary

The nursing students in this study were, for the most part, knowledgeable about bloodborne pathogens and the procedures that they need to follow to protect themselves, their patients, and others from a wide variety of bloodborne infections. Working against the student was their fear of the unknown, and the fact that they often did not perceive they had enough supplies or time to do the needed parts of the procedures involving needles. They also perceived that individuals around them in the clinical setting did not consistently follow the correct procedures. Additionally, they perceived that they could not avoid what other healthcare providers or students might do to expose them to needlestick injuries.

Needlestick injuries are continuing to occur among nursing students and healthcare providers across the United States at a frightening rate. The diseases an individual can acquire from exposure to bloodborne pathogens range from serious to fatal and include Hepatitis B or C, AIDS, and Jacob Crutchfields disease

(premature senility). These diseases can take months to years to fully manifest themselves during which time the individual is exposing others to infection. At some point, most workers are removed by the illness or its complications from their occupation for a temporary or permanent period. The largest portion of hospital staff are nursing staff. They are both an expensive and highly trained group. The numerous medical, scientific, and mechanical advances made annually in the medical field require the nurses to be experienced and highly educated. The nursing personnel and student nurses being trained to join them need to be trained and educated in such a manner that they enter the profession capable of solving problems in a wide variety of situations. They need to see themselves as life-long adult learners in control of their learning, capable of identifying and acting to correct knowledge/skill/problem-solving/ attitude deficits.

Most needlestick injuries have been found, in fact, to be preventable. Schools and hospitals invest hundreds of hours and millions of dollars a year in improving the environmental safety factors and providing students and staff with education on the diseases, U.P., and safe needle-handling procedures. Despite their efforts and the large number of research studies completed on the topic of needlestick injuries, equipment modifications,

procedural changes, and educational efforts, no schools, programs, or hospitals have achieved the ultimate goal of a sustained decrease in the incidence of needlestick injuries among their students or staff.

Identifying and implementing an adult education approach modeled after the one reported in this research could result in a sustained decrease in the number of needlestick injuries. Learners must be allowed to actively participate in the educational process. This approach saves time of educators and money being spent on remedial education resources and medical follow-up for the injured workers. Programs that educate and train healthcare workers, including nursing programs and hospitals, must address in the program more than one piece (knowledge, skill, problem-solving, attitude) to be successful in achieving any long-term type of change in learners and their behavior. As these inter-related pieces are addressed, the learner gains new knowledge or corrects flawed knowledge on the desired subject. They need to set their own goals from broad objectives and be allowed to problem-solve solutions to any personal barriers they see. The barriers may not be visible to the instructor, but these barriers keep students from acting on their new or unflawed knowledge. The staff, students, and facility or school save time and money as the shrinking resources are more efficiently and effectively used.

This study investigated whether or not there would be a difference in the incidence of preventable needlestick injuries between nursing students in the randomly assigned control group and the experimental group of nursing students who participate in the workplace adult education needle-handling program. The findings were clinically significant in the fact that even though one needlestick injury did occur to a member of the control group, no needlestick injuries occurred in the experimental group.

This study also investigated what perceived effect the workplace adult education needle-handling program had on helping achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College. The overlapping approach of using a self-directed adult learning experience with students also involved in formal classes and clinical experiences was well received by both the students and the faculty. The students in the control group who had to see the four old videos and then attended their normal classes and clinical reported more negative comments on the open-ended questions in the questionnaire. This group made numerous requests for new films, real speakers who were infected with one of the diseases, and a need to be allowed to take the films home, or to have alternative material to read at home. This group and the control

group both requested a need for more opportunities to solve problems and to handle needles in the lab and in their clinical areas.

The investigation of the perceived effect of the knowledge portion of the workplace adult education needle-handling program on helping achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College revealed an increase in correct answers by both groups over time. The increases were not large, but the patterns between the two groups were similar. Most interesting was that the number of individuals in the experimental group who answered eight or more of the 15 questions incorrectly the first time dramatically dropped by the second data collection time. This same pattern was not seen in the control group. A couple of the experimental group members expressed verbally to the primary investigator that they were relieved to be allowed to take home the video, or the audio-tape, or new articles written about or by nurses who had experienced a needle injury and acquired one of the bloodborne diseases to read. They felt that they could select when they had time to fit in this additional requirement and the type of resources from which they enjoyed to learn. As they completed the objectives, they had an opportunity to identify any additional deficits in knowledge or skill and work on correcting them.

Investigating the perceived effect the specific problem-solving or task-solving portion of the workplace adult education needle-handling program had on helping to achieve a sustained decrease of preventable needlestick injuries among nursing students at Incarnate Word College, a different pattern was revealed between the control and experimental group members and among the sophomores and juniors in each group. The control group responded to the five problem-solving questions at T1, T2, T3, and T4 in no set way. One time they answered the problem correctly and the next time their answers were wrong. In comparison, the experimental group selected answers, and over the four times, they consistently selected certain answers for their questions.

Closer inspection of the individual questionnaires found more first-person comments being made by the experimental group that reflected that these students were connecting the situations and dangers to their own lives. They not only saw the information as relevant to their own lives, they read the questions as real patient-care situations they were carrying out as nursing students.

In the investigation of the perceived effect of the skill portion of the workplace adult education needle-handling program on helping achieve a sustained decrease of preventable needlestick injuries among nursing

students at Incarnate Word College, the largest difference between the two groups and the sophomores and juniors appeared. The efficacy elements, including their judgment of enough time, capability to perform the skill, knowledge to carry out the skill, and their understanding of U.P. procedures were influenced by whether their faculty or the nursing staff at the hospital followed safety and U.P. procedures. The fact that there were more juniors in the study who were spending more time in the hospitals and they were involved in caring for more patients with either HIV, AIDS, or hepatitis may explain some of the differences. Both groups scored an overall high average score for the knowledge test (85%), the correct infection control procedures (90%), and the principles of U.P. and the procedures to follow after exposure to a bloodborne pathogen (76%). Their knowledge base is still flawed and will continue to influence their time and effort spent in learning their skills related to needle-handling.

Finally, the perceived effect that the individual's attitude had on helping achieve a sustained decrease of preventable needlestick injuries among students at Incarnate Word College was investigated. The students who saw the skill or procedure as risky to themselves and placing them at risk for infection from a bloodborne pathogen more often reported following safe policies and



procedures. There was a definite correlation between what the individual did and what they saw others around them do related to U.P. and procedures involving needles. The less frequently the student saw others perform the U.P. procedures, the less often they reported that they carried out the U.P. procedures.

The attitudes of the control group were more negative ("throw out the old films," "classes are a waste of our time") and their recommendations in the open-ended questions were even punitive in nature toward their peers. They wanted individuals to be tested on their needle-handling skills and grade points removed when someone was not doing the U.P. procedures correctly. The experimental group was at the other end of the spectrum requesting more practice and positive learning opportunities to be set up in the lab areas in the form of posters and first-person short stories from which they could learn when they had time.

### Conclusions

A nursing school that developed a program or revised an existing U.P. and safe needle-handling program to include more than one element of the program used in this study would benefit. Their program would include essential features frequently referenced in the literature for successful adult education programs

seeking to bring about change in the learner. The essential features are:

1. Placing the learning (for faculty and students) at the worksite (clinical or skills lab) allows the learner the opportunity to problem solve, and apply and practice the new or corrected skill or procedure as they are learning it.
2. Problem solving with available resources breaks down or prevents barriers from being built for safe needle-handling.
3. The unflawed knowledge leads the students to different actions as it motivates them to improve their compliance to procedures and allows problem-solving to safer procedures when the original procedure will not work.

The overlapping approach to learning which uses a self-directed experience along with the learner attending formal classes and clinical experiences is both beneficial to the learner and the faculty. The learner gains additional opportunities to learn new knowledge/skill or correct flawed knowledge/skill. The faculty are allowed to focus more time and energy on the rest of the class. The student also trades a negative attitude for a positive one when they are allowed to gain control over both what they need to learn, which methods they employ to facilitate the learning, and when they attend to the learning tasks.

The efficacy elements including their judgment of enough time, capability to perform the skill, knowledge to carry out the skill, and the learners' understanding of U.P. procedures are definitely influenced by whether their faculty or the nursing staff at the hospital followed safety and U.P. procedures. This fact is too often overlooked in hospitals and nursing schools. The influence the healthcare providers have on students and each other is one that needs to be made a priority in everyday practice and in all safety or needle-handling class.

The self-directed learning approach to the problem-solving on who to carry out patient-care procedures does, in fact, allow the learner to see the situation as a real one. These students are able to connect the situations to dangers and health risks for themselves and their other patients. They see the situation that needs to be problem-solved now with a real patient and they emotionally connect the fact that the patient needs their care, but they need to be careful.

When students have a knowledge base that is either flawed or deficient in some way, they will continue to perform skills or procedures incorrectly. This places them and their peers or patients at risk for injury or illness when an accident occurs, such as a needlestick.

Learners with positive attitudes increase both the number of times they implement correct procedures or skills and the length of time they actually invest in problem-solving real-life situations that are not allowing a procedure or skill to be performed. This is important because the hectic patient-care areas require nurses to be able to think through situations and find solutions so care can be safely provided to the patients while not bringing harm to themselves or others.

#### Recommendations

1. Because there was a small sample size, the study should be repeated with a larger base of students and/or with nurses in practice to show that what was found in this study is normal variation and not special cause variation.
2. The profile of the nursing students may be biased because of the nature of the private Catholic Bachelor of Nursing Science program from which the sample was drawn. Additional research with other nursing students and registered professional nurses working in clinical settings would provide data that could be used to validate or dispute the findings of this study.

3. Generalization of the findings outside the group studied is difficult because the sample size was so small. Construct validity of tool needs to be established for the purposes of generalizing the findings outside the group studied.
4. The researcher recommends replication of this study using the same adult education self-directed needle-handling program with a larger sample size of nursing students or registered nurses.
5. Replication of the study is recommended for an extended period beyond 90 days to see if the intervention continues effective or if more interventions would be required to maintain the sustained decrease in incidence of needlestick injury.
6. A study that addresses cost differences between the traditional universal precautions, safe needle-handling classes, and this self-directed adult education workplace needle-handling program should be completed.
7. Because it is not known if the needlestick injury that occurred in the control group was statistically significant, a follow-up study of the student population each semester for the entire two years is recommended.

8. Even if there is really not a difference between the two groups, there is still a cost savings in personnel, time, equipment, and supplies when the individual adult self-paced learning program is used. A study should be done that compares the traditional infection control and the needle-handling program's expenses over time (the tests, commercial video(s), speakers, and other materials) with the costs and time to set up and manage individual learning packets, such as those used in this study.
9. The researcher also recommends a study be done that addresses the changes today in the healthcare environments and the changing roles of the healthcare providers that is increasing the numbers of semi-skilled workers and untrained adults involved in needle-handling procedures. Because of new federal and state laws, this trend will continue to increase in the United States for at least the near future. Is the increase in these numbers going to present problems not covered in the research because of the different skill and knowledge levels, attitudes, and ages of these new caregivers? Would they need more or different education and/or reinforcement to achieve the decrease in incidence of needlesticks?

10. Future study is needed that focuses on the outpatient and home setting. More healthcare providers and healthcare procedures are moving out of the hospitals and into the outpatient home health settings. With the shift in the location where the needle-handling procedures are being carried out (outpatient clinics, and managed-care programs), the availability of necessary protective supplies becomes a question. The contents of existing needle-handling and Universal Precaution programs may need to be modified to be successful.
11. The researcher also recommends close review of existing education programs for families and other care providers for needed revision as more family and other helpers are now involved with carrying out procedures involving needles. Should a program using the adult education self-directed design, which includes knowledge, attitudes, skills, and problem-solving, be used to help safeguard family members and other associated personnel from the needlestick injuries?
12. The researcher recommends the first five questions in the knowledge portion of the Ball State questionnaire used in this study be revised. These questions are very basic and

have been correctly answered by all students every time. The lack of variety in the answers is drawing down the reliability scores being run on the tool. Modifying these questions to a more difficult level should help correct the deficit in the tool.



## REFERENCES

- Agerton, T. B., Mahoney, F. J., Polish, L. B., & Sharpiro, C. N. (1995). Impact of the bloodborne pathogens standard on vaccination of healthcare workers with hepatitis B vaccine. Infection Control and Hospital Epidemiology, 16(5), 287-291.
- Anglim, A. M., Collmer, J. E., Loving, T. J., Beltran, K. A., Coyner, B. J., Adal, K., Jagger, J., Sojka, N. J., & Farr, B. M. (1995). An outbreak of needlestick injuries in hospital employees due to needle-piercing infectious waste containers. Infection Control and Hospital Epidemiology, 16(10), 570-576.
- Barnes, L. (1991, November/December). Needle recapping: Do we practice what we preach? MCH, 16, 331.
- Berbiglia, V. (1991). A case study: Perspectives on a self-care deficit nursing theory-based curriculum. Journal of Advanced Nursing, 16(10), 1158-1163.
- Billings, D. (1994). Effects of BSN student preferences for studying alone or in groups on performance and attitudes when using interactive instruction. Journal of Nursing, 33(17), 322-324.
- Blackburn, R. T., Pellino, G., Boberg, A., & O'Connell, C. (1980). Faculty development programs, the improvement of instruction and faculty goals: An evaluation. In R. Edgerton (ed.) Current issues in

- higher education (pp. 32-48). Washington DC: American Association for Higher Education.
- Borg, W., & Gall, M. (1989). Educational research (5th ed.). New York, NY: Longman.
- Bower, D., Webb, A., & Stevens, D. (1994). Nursing student's knowledge and anxiety about Aids: An experimental workshop. Journal of Nursing, 33(6), 272-276.
- Captain, C. (1995). Needlestick prevention for nurses: Impact on risk and injury. San Antonio, TX: San Antonio VA Hospital.
- Chamberland, M. E., Conely, L. J., Ciesielski, C. A., Hammett, T. A., & Jaffe, H. J. (1991). Healthcare workers with AIDS. National surveillance update. JAMA, 266(24), 3459-3462.
- Cholowski, K., & Chan, L. (1995). Knowledge-driven problem-solving models in nursing education. Journal of Nursing Education, 34(4), 148-153.
- Confessore, G. J., & Confessore, S. J. (Eds.). (1992). Guideposts to self-directed learning. King of Prussia, PA: Organizational Design and Development.
- Centers for Disease Control. (1993). Seroconversion following occupational exposure. Washington, DC: Author.
- deCarteret, J. C. (1987). Needlestick injuries: An occupational hazard for nurses. AAOHN Journal, 35(3), 119-123.

- deVries, B., & Cossart, Y. E. (1994). Needlestick injuries in medical students. Medical Journal of Australia, 160(7), 398-400.
- DiBenedetto, D. V. (1995). Occupational hazards of the healthcare industry. American Association of Occupational Health Nurses, 43(3), 131-137.
- Dunn, S., Stockhausen, L., Thornton, R., & Barnard, A. (1995). The relationship between clinical education format and selected student learning outcomes. Journal of Nursing Education, 34(1), 16-24.
- Edmond, M., Khakoo, R., McTaggart, B., & Solomon, R. (1988). Effect of bedside needle-disposal units on needle-recapping frequency and needlestick injury. Infection Control and Hospital Epidemiology, 9(3), 114-116.
- Edwards, A. L. (1976). An introduction to linear regression and correlation. San Francisco, CA: W. H. Freeman.
- English, J. F. (1992). Reported needlestick injuries related to knowledge/skill, design, and management problems. Infection Control and Hospital Epidemiology, 13(5), 259-264.
- Feldman, R. (1986, September). Needle injuries. Occupational Health & Safety, 12-15.
- Fitzgerald, S. (1991). Self-efficacy theory: Implications for the occupational health nurse. AAOHN Journal, 39(12), 552-557.

- Fothergill-Bourbonnais, F., & Higuchi, K. (1995).  
Selecting clinical learning experiences: An analysis  
of the factors involved. Journal of Nursing Education,  
34(1), 37-41.
- Gerberding, J. L. (1991). Does knowledge of Human  
Immunodeficiency Virus infection decrease the  
frequency of occupational exposure to blood? American  
Journal of Medicine, 91(Suppl. 3B), 308s-311s.
- Glickman, F. R. (1983). Workplace safety: A hazard  
recognition approach. Family and Community Health,  
6(1), 71-79.
- Goetz, A., & Yu, V. (1990). Hepatitis B virus and (HBV)  
Hepatitis B vaccine requirements in schools of nursing  
in the United States. American Journal of Infection  
Control, 18(4), 240-249.
- Greeno, J. (1980). Psychology of learning, 1960-1980.  
American Psychologist, 35(8), 713-728.
- Gurevich, I. (1994). Preventing needlesticks. RN, 11, 44-  
49.
- Hadley, W. K. (1989). Infection of healthcare worker by  
HIV and other bloodborne viruses: Risks, protection,  
and education. American Journal of Hospital Pharmacy,  
12(46), 4-7.
- Haiduven, D. J., Phillips, E. S., Clemons, K. V., &  
Stevens, D. A. (1995). Percutaneous injury analysis:  
Consistent categorization, effective reduction

- methods, and future strategies. Infection Control and Hospital Epidemiology, 16(10), 582-589.
- Holloway, J., & Surrey, R. (1992). Safety from sharps. British Journal of Nursing, 1(8), 389-390.
- Houle, C. O. (1978). The design of education. San Francisco, CA: Jossey-Bass.
- Isaac, S., & Michael, W. B. (1990). Handbook in research and evaluation (2nd ed.). San Diego, CA: EdITS.
- Jackson, M. M., & Lynch, P. (1986). Education of the adult learner: A practical approach for the infection control practitioner. American Journal of Infection Control, 14, 257-271.
- Jagger, J., Hunt, E. H., Elnaggar, J. B., & Pearson, R. D. (1988). Rates of needlestick injury caused by various devices in the university hospital. The New England Journal of Medicine, 319(5), 284-288.
- Jensen, R. C. (1987). Disabling back injuries among nursing personnel: Research needs and justification. Research in Nursing and Health, 10(1), 29-38.
- Krasinski, K., LaCouture, R., & Holzman, R. S. (1987). Effect of changing needle-disposal systems on needle-puncture injuries. Infection Control, 8(2), 59-62.
- Lee, J. S., Rom, W. N., & Craft, B. P. (1983). Preventing disease and injury in the workplace: Issues and solutions. Family and Community Health, 6(1), 1-15.

- Levin, P. F. (1995). Improving compliance with universal precautions: Effectiveness of interventions. AAOHN Journal, 43(7), 362-370.
- Lim, K. S., Chou, M. Y., Hsu, G. J., & Chen, I. W. (1990). Investigation on the relation between hepatitis B virus knowledge and needlestick injury of hospital personnel. Chinese Medical Journal, 46(2), 104-108.
- Long, H. B., & Confessore, G. J. (1992). Abstracts of literature in self-directed learning 1966-1982. Norman, OK: Oklahoma Research Center for Continuing Professional and Higher Education of the University of Oklahoma.
- Long, H. B., & Redding, T. R. (1991). Self-directed learning dissertation abstracts 1966-1991. Norman, OK: Oklahoma Research Center for Continuing Professional and Higher Education of the University of Oklahoma.
- Marchette, L., & Marchette, B. (1985). Back injury: A preventable occupational hazard. Orthopedic Nursing, 4(6), 25-29.
- McConnell, E. (1995). How and what staff nurses learn about the medical devices they use in direct practice. Research in Nursing and Health, 18 165-172.
- McKenzie, J. F., & Jurs, J. L. (1993). Planning, implementing and evaluating health promotion programs-a primer. New York, NY: Macmillan.

- Meisenhelder, J. B. (1994). Contributing factors to fear of HIV contagion in registered nurses. Image: Journal of Nursing Scholarship, 26, 65-69.
- Nadine, N. (1995). Narrative pedagogy: Rethinking nursing education. Journal of Nursing Education, 34(5), 204-210.
- Nettle, C., Beltz, C., Benchot, R., Brown, K., Freund, B., Gosnell, D., Jones, S., Shaffer, J., Stopper, C., & Wood, S. (1995). Evaluation of a curriculum for adequacy of AIDS content. Journal of Nursing Education, 34(1), 45-47.
- Neuberger, J. S., Kammerdiener, A. M., & Wood, C. (1988). Traumatic injuries among medical center employees. AAOHN Journal, 36(8), 318-325.
- Paprock, K. (1993, November). Learning for survival: A systems approach to learning, change, and adaptation. Unpublished article, Texas A&M University, College Station, Texas.
- Popham, W. J. (1993). Educational Evaluation (3rd ed.). Needham Heights, MA: Allyn & Bacon.
- Ryan, M. E., Jones, L., Irvine, P., & Hodson, K. E. (1991). Integrating HIV/AIDS policies and curricular content into baccalaureate nursing programs. Journal of Nursing Education, 30(8), 347-351.
- Ryan, M. E., Jones, L., & Miller, D. (in press). Healthcare workers and bloodborne pathogens:

Knowledge, concerns, and practices. Journal of Nursing Staff Development.

Sanborn, C., Luttrell, N., & Hoffmann, K. (1988).

Creating the safer environment for healthcare workers: Implementing a point-of-use sharps disposal system. Nursing Administration Quarterly, 12(2), 24-31.

Sass, J., Bertolone, K., Denton, D., & Logsdon, M. C.

(1995). Exposure to blood and body fluid. American Association of Occupation Health Nurses, 43(10), 507-513.

Schultz, C. M., Harris, J., & Shultz, S. L. (1994).

Accidental needlestick injuries in the academic setting. Nurse Educator, 19(4), 23-31.

Sellick, J. A. Jr., Hazamy, P. A., & Mylotte, J. M.

(1991). Influence of an educational program and mechanical opening needle-disposal boxes on occupational needlestick injuries. Infection Control Hospital Epidemiology, 12(12), 725-731.

Spear, G. E., & Mocker, D. W. (1984). The organizing

circumstance: Environmental determinants in self-directed learning. Adult Education Quarterly, 35(1), 1-10.

Stotka, J. L., Wong, E. S., Williams, D. S., & Markowitz,

S. M. (1991). An analysis of blood and body fluid exposure sustained by house officers, medical students, and nursing personnel on acute-care general



- medical wards: A prospective study. Infection Control and Hospital Epidemiology, 12(10), 583-590.
- Thede, L. S., Taft, S., & Coeling, H. (1994). Computer-assisted instruction: A learner's viewpoint. Journal of Nursing Education, 33(7), 299-305.
- Tough, A. (1982). Intentional changes: A fresh approach to helping people change. Chicago, IL: Follett.
- Turner, C. J. (1995). Health risk appraisal. AAOHN Journal, 43(7), 357-360.
- U.S. Department of Labor Occupational Safety and Health Administration. (1994). Bloodborne facts: Reporting exposure incidents. Washington DC: OSHA Publications.
- Wachs, J. E., & Parker-Conrad, J. E. (1989). Predictors of Registered Nurses' lifting behavior. AAOHN Journal, 37(4), 131-140.
- Watzlawick, P., Weakland, J., & Fisch, R. (1974). Change principles of problem formation and problem resolution. New York, NY: W. W. Norton.
- Weatherly, K. S., Young, S., & Andresky, J. (1991). Needlestick injury in pediatric hospitals. Pediatric Nursing, 17(1), 95-99.
- Weltman, A., Short, L., Mendelson, M., Lilienfeld, D., & Rodriguez, M. (1995). Disposal-related sharps injuries at a New York city teaching hospital. Infection Control and Hospital Epidemiology, 16(5), 268-274.

Whitby, M., Stead, P., & Najman, J. M. (1991).

Needlestick injury: Impact of a recapping devise and an associated educational program. Infection Control Hospital Epidemiology, 12(4), 220-225.

Willy, M. (1990). Adverse exposure and universal precautions practices among a group of highly exposed health professionals. Infection Control and Hospital Epidemiology, 11(7), 351-356.

Woolner, P., Lowy, & Associates. (1991, October).

Integrating work and learning: A developmental model of the learning organization. Presented to the Commission of Professors of Adult Education, 1991 Annual Conference, Montreal, Quebec.

**APPENDIX A**  
**BALL STATE UNIVERSITY QUESTIONNAIRE**

## **PLEASE NOTE**

**Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.**

**Pages 106-111**

**University Microfilms International**

**APPENDIX B**  
**DEMOGRAPHIC INFORMATION FORM**

Supplemental Student Nurse Demographic, Program  
Evaluation, Self-Perception Report for  
Incarnate Word College Nursing  
School Educational Study

Part I: Supplemental Student Demographic Information

1. Student nurse age in years:
  - a. 10-20 years
  - b. 21-30 years
  - c. 31-40 years
  - d. 41-50 years
  - e. 51-60 years
2. Basic educational preparation before entering this B.S.N. program:
  - a. High School or GED
  - b. Associate Degree [general studies or A.D.N.
  - c. Diploma from Nursing Assistant, or LVN program
  - d. Diploma from specialty course OR Tech, Dialysis Tech or other
  - e. Diploma in Nursing R.N.
3. Which area or areas have you had patient care experience as a student or employee:
  - a. Medical/Surgical
  - b. Emergency Room/Out-Patient
  - c. Critical Care/Operating Room/Post Anesthesia/ Same day Surgery
  - d. Obstetrics/Gyn/Pediatrics
  - e. None

4. Have you ever experienced a needlestick injury before this date?
  - a. No
  - b. Yes
5. If you answered NO to question #4 identify, as close as possible, the One MOST IMPORTANT reason you believe you have not had a needlestick injury.
  - a. Carefulness, expend needed amount of effort and time necessary to perform safe needle-handling task in lab or unpredictable patient care clinical setting
  - b. Knowledge of safe needle-handling or disposal procedure(s) gained from completing required Universal Precautions, safety, and Injury Prevention videos.
  - c. Knowledge of proper needle-handling or disposal procedures gained while completing individual learning objectives for needle-handling, Universal Precautions, Safety and injury prevention.
  - d. Skilled enough to perform tasks and behaviors related to handling needles in a skills lab or clinical setting (intravenous line start or removal, hanging or removing piggyback, etc.)
  - e. Did not handle needles or work around needles in lab or patient care area
6. If you answered YES in question #4, how many needlestick injuries have you experienced?
  - a. One
  - b. Two
  - c. Three
  - d. Four
  - e. Five or More

7. If you answered YES in question #4 Identify, as close as possible, the top reason you believe your needlestick injury or injuries occurred (e.g. lack of knowledge, skill, problematic equipment or supplies).
- a. Carelessness, did not expend needed amount of effort and time necessary to perform safe needle-handling task in lab or unpredictable patient care clinical setting
  - b. Not enough knowledge of safe needle-handling or disposal procedure(s) gained from completing required Universal Precautions, safety, and Injury Prevention videos.
  - c. Not enough knowledge of proper needle-handling or disposal procedures gained while completing individual learning objectives for needle-handling, Universal Precautions, Safety and injury prevention.
  - d. Not skilled enough to perform tasks and behaviors related to handling needles in a skills lab or clinical setting (injection, intravenous line start or removal, hanging or removing piggyback, etc.)
  - e. Unpreventable injury, due to unanticipated patient movement or needle out of sight (in bed linen, in trash etc.) left by another healthcare provider
8. If you have had a needlestick injury, did you report your needlestick injury?
- a. Yes, immediately
  - b. Yes, later when I had time
  - c. No, the injury was not serious
  - d. No, it was too much hassle, there was not enough time
  - e. No, did not know the procedure to do a report



9. Identify, as close as possible, how you currently rate the severity of a needlestick injury you would receive from a needle that had been used in a patient procedure.
  - a. No concern about that needlestick and I do not share the event with anyone else.
  - b. Small amount of concern, but no need to report event and complete injury reports.
  - c. Some concern, enough to talk to a peer about the stick but not enough to take the time to report the event and complete the paperwork for injury.
  - d. Concerned, report the event, go to get the bloodwork drawn and complete the paperwork for injury.
  - e. Extremely concerned, report the event immediately, complete all the paperwork, get blood tests completed, follow up with occupational health immediately.
10. Do you believe needlesticks are an acceptable occupational hazard?
  - a. No
  - b. Yes
11. Do you personally know someone who had experienced a needlestick injury?
  - a. No
  - b. Yes, they never had any complications from the needlestick.
  - c. Yes, at least one had slight complications but never lost time from school or working.
  - d. Yes, at least one had serious complications and lost time from work or school
  - e. Yes, at least one who contracted HIV or Hepatitis, or other virus and is terminally ill.

II. Learning experiences over the last 30 days

12. Have you attended a class or viewed the required video tapes about Universal Precautions, needle-handling procedures, or on-the-job injury prevention in the last 30 days?
- a. Yes
  - b. No
13. Have you read any information about Universal Precautions, needle-handling procedures or on-the-job injury prevention in the past 30 days?
- a. Yes
  - b. No
14. Have you practiced Universal Precautions, or correct needle-handling skills, on your own, with another student, with nursing faculty or nursing personnel in your clinical rotation or at work during the last 30 days?
- a. Yes
  - b. No
15. Have you listened to any audiotape(s) about Universal Precautions, needle-handling and/or needlestick injuries prevention during the last 30 days?
- a. Yes
  - b. No
16. Have you watched videotape(s) from an independent learning packet about Universal Precautions, needle-handling procedures and/or needlestick injury prevention during the last 30 days?
- a. Yes
  - b. No

17. Have you discussed, with another student, nursing faculty, nursing staff at your clinical rotation or work, ways you and they can perform safe needle-handling activities when you and they are in the rapid paced unpredictable patient care area?
- a. Yes
  - b. No
18. Have you participated in any patient care or procedure problem-solving exercises related to Universal precautions, needle-handling behaviors, or needlestick injuries, with another student, nursing faculty, nurse at your clinical site or at work during the last thirty days?
- a. Yes
  - b. No

Part III: Program Evaluation

19. How helpful do you think the information/classes/labs etc. you were provided or selected was for your personal prevention of needlesticks?
- a. None at all or I am not interested in making changes to my needle-handling skills
  - b. Minimal amount of help, did not have the time to integrate what I learned into what I had to do with the needles or it did not reduce my fears enough for me to perform needle-related skills correctly
  - c. Some what helpful as a review, gave me no new knowledge or experience but did not improve my skill in handling needles or creatively handle needle-related patient care situations
  - d. Large amount of help gave me enough knowledge and experience to somewhat reduce my fears about needle-handling and begin performing my needle-related lab or clinical skills without help

- e. Most helpful because it was relevant, practical, and provided enough knowledge and practice to make me capable of performing needle-handling skills competently

Part IV: Perception of Self

For the next 5 questions identify which statement says where you see yourself in relation to the following statements about prevention measures used to avoid needlestick threats to your health:

- 20.
  - a. I am susceptible to needlestick injury
  - b. I am neutral or undecided if I am susceptible to needlestick injury
  - c. I am not susceptible to needlestick injury
- 21.
  - a. I see the seriousness of needlestick injuries and their negative health outcomes
  - b. I am neutral, undecided, or ambivalent about the seriousness of needlestick injuries and their negative health outcomes
  - c. I do not see the seriousness of needlestick injuries and any negative health outcomes
- 22.
  - a. I see the benefits of needle safety procedures
  - b. I am neutral, undecided, or ambivalent about the benefits of needle safety procedures
  - c. I do not see the benefits of needle safety procedures
- 23.
  - a. I see the costs of following safe needle-handling procedures as a barrier to my following the procedures
  - b. I am neutral, undecided, or ambivalent about the costs of following safe needle-handling procedures and if that is a barrier or not to my following the procedures

- c. I do not see the costs of following safe needle-handling procedures as a barrier to my following the procedures
- 24. a. I know clues to action that are specific environmental stimuli which stimulates me to engage self protection behavior related to needle-handling.
- b. I am neutral, undecided, or ambivalent about clues to action that are specific environmental stimuli which cause me to engage self protection behavior related to needle-handling
- c. I do not know clues to action that are specific environmental stimuli which stimulate me to engage self protection behaviors related to needle-handling

**APPENDIX C**  
**SELF-DIRECTED EDUCATION PROGRAM**

*Nursing Adult Education Program Goal and Objectives*

**Goal:** The goal of this program is to insure that our BSN nursing students have a basic knowledge about Universal Precautions and bloodborne pathogens, especially HIV (Human Immunodeficiency Virus) and Hepatitis B so that they can avoid acquiring an infection and can provide safe nursing care to all their patients.

**Instructions:**

*Before you begin this portion of the program please complete the questionnaire given to you in your packet. Answer the multiple choice questions on the bubble sheet provided. Leave any questions blank that do not apply to you at this time. For example- if you are not working in a hospital now leave the questions about hospital staff blank. Return the completed questionnaire to Mrs. Covington or the return box in the NLRC or in the Nursing office.*

*Now that your questionnaire is completed you are ready to complete the educational project.*

First - review the following broad educational objectives listed on the third page.

Second - select references you need to complete the objectives from the variety of resources now available to you. [Some of the resources are being provided and you are free to seek out additional resources from our college, your peers, your work, or other clinical faculty.] It is your decision how you will complete the objectives.

Third - complete your objectives.

Fourth - The completed objectives must be signed by you and returned to Mrs. Covington in the NLRC for you to receive credit for completing your OSHA/JCAHO annual training requirements for Universal Precautions. You must complete the requirement by the date decided by your clinical instructor.

[Additional note: There is a separate requirement for each nursing student to view the designated video-tape on fires in hospitals or read available references on the topic annually. This video and reading material are available in the NLRC if you do not see it in one of your nursing classes. ]

- Reference type one: There are *articles included in your packet* that cover each objective.
- Reference type two: There are *video-tapes available for viewing* either in the NLRC or at a place of your choice. *These video-tapes may be checked out from the NLRC over-night or for the weekend.* Each volunteer in Group B will be allowed to check out the listed video-tapes as desired over the next two weeks from Mrs. Covington or the NLRC staff. You will need to identify yourself as a member of the study Group B will you request the specially marked video-tapes. Please return the tapes when you are finished reviewing them so that others in your group may check them out.
- Reference type three: *The NLRC, college library, Internet, previous class lectures, and clinical continuing education offerings* all offer articles, books, films, and videos specific to your objectives.
- Reference type four: *Nursing faculty, Infection Control nurses, Nursing Education and Staff Development personnel, Nursing students and Professional Registered Nurses* who have experienced needle-stick injuries with or without acquiring a bloodborne disease all can provide valuable information for completing your objectives.
- Reference type five: *Other sources you identify.* You may read, watch, call, write, or visit your resource/reference.

The objectives are listed on page 3 & 4. Space is provided for you to make notes and identify how you selected to complete each objective.



## BROAD EDUCATIONAL OBJECTIVES WORKPLACE NEEDLESTICK PREVENTION

1. The learner's knowledge will increase about the causes and consequences of needlestick injuries. (Example: Define accidental and preventable needlestick injuries listing the common causes and resulting diseases a health care worker might become infected with from a needlestick.)
2. The learner's knowledge will increase about safe needle-handling policies, procedures, and behaviors specific to this hospital and their workplace. ( Example: Describe in writing or verbally the proper methods of needle handling and disposal at your workplace)
3. The learner will be able to recognize at least 5 high risk needlestick environments in this hospital and on their workplace. (Example: Point out to the in-service coordinator or another peer a part of a procedure/common area practice that leave the individual exposed to needles or some missing or broken equipment that increases the chance for the person to be stuck by a needle)
4. The learner will be able to express in writing or discussion their own personal beliefs about needlestick risks and factors in their workplace that facilitate or interfere with their own safe needle-handling behavior. (Example: Explain that they believe they will never be stuck or become infected by hepatitis or HIV because the workplace uses needless access devices and needle disposal boxes everywhere the needles have to be used)
5. The learner will be able to write about, discuss with their in-service coordinator, or demonstrate three critical thinking and problem solving situations:
  - (1) Identify potential needlestick situations in their daily work routine.
  - (2) During the process of complex patient care activities involving needles at their workplace the learner will maintain safe needle-handling behavior
  - (3) While engaging in needle-handling activities at their workplace the learner will cope effectively with competing demands for their attention.

### **Broad Objectives**

Read each broad objective and then narrow down each objective to your own needs and interests. It may be helpful to think of any previous needle handling experience or back to your questionnaire and content areas you did not know or were confused about.

**1. The nursing student's knowledge will increase in relation to the causes and consequences of needlestick injuries.** (Example: Define in writing, or verbally to a peer or faculty what accidental and preventable needlestick injuries are. List the most common causes of needlestick injuries to nursing students and Professional Registered Nurses. Identify four diseases a nursing student or Professional Registered Nurse might become infected with from a needlestick).

**2. The nursing student's knowledge will increase about Universal Precautions and specifically safe needle handling policies and procedures, and behaviors specific to this nursing school and clinical hospital.** (Example: Describe in writing, demonstrate, or verbalize proper safe methods of needle handling and needle disposal in your learning lab and clinical hospital).

**3. The nursing student will be able to recognize at least 5 high risk needlestick situations in their learning lab or clinical hospital.** (Example: List in writing or verbalize to a peer or faculty member portions of nursing skill procedures, equipment placement, or room construction that places the nursing student or other healthcare worker with an increased chance for needlestick injury).

4. The nursing student will be able to express in writing or verbalize in discussion with a peer or nursing faculty 3 of their own personal beliefs or knowledge that have been altered after studying the available reference material about needlestick risks and factors in their learning lab or clinical setting which facilitate or interfere with their own personal safe needle handling behaviors. (Example: Flawed knowledge- Explain that they believed they would never get stuck or become infected by Hepatitis B or HIV because the hospital uses needleless access devices and disposal boxes. New corrected knowledge- Now after studying the material and talking to a nursing student from this city who had a room-mate die last year from hepatitis following a needlestick realize needles still are being used in emergency procedures and to start IVs and draw blood so the risk is still there for me).

5. The nursing student will be able to write down, discuss with a peer or with a faculty member, or demonstrate three problem-solving situations involving patient care which includes needle handling in their lab or clinical setting. The student will use creative solutions to improve safety for themselves, their peers, and the patients.

Examples:

A. Identify potential personal unanticipated contact between to healthcare providers or the student and a patient during injections, starting IVs, or collecting blood samples when a person jerks or reaches to help hold a patient. Solution offered-to anticipate the patient's reaction to the invasive procedure and warn them of the dangers, make ample clear visible space to work in when handling needles.

B. During the process of complex patient care activities involving needles in the lab or at the hospital the student maintains safe needle-handling behavior. When straightening or changing a set of bed linen the nursing student uses care as they check for needles or other sharps left by other students or staff in or near the patient's bed. Solution offered- the nursing student places needle disposal containers on the dressing change cart and IV cart to insure a container is always at the location when needles or sharps are used on patients.

C. While engaging in needle-handling activities at their learning lab or clinical experience the student safely and effectively managed competing demands for their attention when handling needles. How- the student reviewed each procedure to be sure needles were actually necessary and found two times needles did not have to be used because a needleless system could be attached to existing tubing for specimen collection.

Sign \_\_\_\_\_ Date \_\_\_\_\_

# EDUCATION RESOURCE PACKET

Items to be included in the information packet for individuals in the experimental group:

1. List of available video tapes which can be used to complete learning objectives related to knowledge. These videos are available for viewing in the NLRC or for check-out from NLRC over night for viewing at home and each as handouts the students will be allowed to keep.

Video tape: Universal Precautions AIDS and Hepatitis B Prevention For Healthcare Workers

Video length 33:21 minutes. Produced by MEDCOM, INC. Video tapes (two copies) located in the NLRC. Video contains Universal Precautions principles and procedures to be used in any clinical setting. The video covers all areas of a hospital including wards, surgery, CMS, laundry, lab, food preparation, linen service, and housekeeping.

Video tape: Tuberculosis Prevention and Practices for Healthcare Workers.

Video length: 20 minutes. Produced by Medcom Inc. Video tapes (two copies) are located in the NLRC. Video contains principles and prevention practices for healthcare workers related to Tuberculosis. The video covers all clinical areas in a hospital.

Video tape: HIV and the Health Care Worker.

Video length: 20 minutes. Produced by Glaxo. Video tape (two copies) are located in the NLRC. Video contains principles and prevention practices for healthcare workers related to HIV and the health care worker. The video covers all clinical areas in a hospital.

2.. One Handed Needle Recapping Technique information sheet.

National Safety Council's manual Bloodborne Pathogens published by Jones and Bartlett Publishers. One Exeter Plaza, Boston, MA 02116. 1-800-832-0034.

3. First person article :

Desperately Seeking Primary Prevention , 1991, Rodnick JE & Mcphee, SJ.  
West J Med Sep: 155:310-311.

4. Fact articles covering diseases- frequency rates, risks, and steps, both environmental that health care providers can take toward reducing needle-stick exposures

Needle-stick injuries An Occupational Health Hazard for Nurses. 1987.  
deCarteret. J.C. AAOHN Journal March, Vol. 35, No. 3 PP 119-123.

Does knowledge of human immunodeficiency virus infection decrease frequency of occupational exposure to blood? 1991, Gerberding, JL. The American Journal of Medicine, Volume 91 (suppl 3B), pp 3B 308S- 311S.

Postexposure requirements and counseling issues resulting from the bloodborne pathogens standard. 1994, Lesniak, LP & Parpart, CF. AAOHN Journal. August, Vol. 42, No. 8, pp. 130- 134, 135-137.

Transmission of HIV via Needlestick injury. Practice Recommendations and research implications. 1993, Kopfer, Am & Mc Govern, PM, AAOHN Journal. August, Vol. 41, No. 8, pp 374-379. Article includes background on subject, risk factors, work practice controls, and clear 10 item list of strategies applied to the prevention and control of HIV Exposure via a needle stick injury.

Infection of the health-care worker by HIV and other blood born viruses: risks, protection, & education, 1989, Hadley, W.K., American Journal of Hospital Pharmacy Vol 46 Dec 1989 Suppl 3, pp S4-S7.

APPENDIX D  
VOLUNTEER CONSENT FORM

INCARNATE WORD COLLEGE  
 DIVISION OF NURSING AND THE SCIENCES  
 CONSENT TO PARTICIPATE IN THE  
 " AN EDUCATION PROGRAM'S PERCEIVED EFFECT ON REDUCING NEEDLE-STICK  
 INJURIES AMONG NURSING STUDENTS IN A BACHELOR OF NURSING PROGRAM AT  
 INCARNATE WORD COLLEGE, SAN ANTONIO, TEXAS"

You are being asked to be part of a research project on educational programs impact on needle handling. We want to learn by student self-report what effects two different types of learning situations have on nursing student's attitudes and clinical performance related to handling needles. You are being asked to participate because you are a nursing student in the B.S.N. program at Incarnate Word College and you are scheduled for clinical and/or lab classes which require you to handle needles in relation to patient care. We hope this research will help us understand more about different educational approaches to teaching nursing skills and procedures. However, this research may not help you directly. There are minimal risks to you from this research.

If you take part in this study, you will be asked to complete two questionnaires containing information about yourself, what educational resources you use to learn about Universal Precautions and new clinical skills. You will be asked to describe your Universal Precaution and needle-handling experiences each month. The questionnaires will be completed in class during orientation week and every thirty days for three months. The Universal Precautions and Safety requirements are already required annually for all nursing students. You may need an additional one hour, at a place and time you choose, to complete listening to, watching or reading information specific to the educational program for your study group. You will receive credit for completing your annual educational requirement for Universal Precautions and Hospital Safety after you complete your assigned learning objectives in the research study. The principal researcher for the study will provide written notice to the Incarnate Word Nursing School when your objectives are completed.

Your participation in this study is voluntary and you will not be paid to participate in this study. Each student in the study will be assigned a code number to insure their confidentiality. The same code number will be used throughout the study to help with computer database entry and analyze of the data collected from the questionnaires over the three months. At the end of the study any list that contains names and code numbers will be destroyed by the principle researcher to prevent individual information from being discovered.

You may choose not to take part in this study at all or to stop taking part even after you sign this form. If you decide not to take part, it will not affect your treatment at Incarnate Word College, at your school or at your clinical setting.

If we publish anything about this research study in a scientific magazine, you will not be mentioned by name or code number. No personal information about you or your responses will be released to anyone.

If you have any questions about this research, please call Mrs. Barbara Covington, R.N., M.S. N. (210) 829-6029 or 493-3442. The Incarnate Word College committee that reviews research on human subjects (Institutional Review Board) will answer any questions about your rights as a research subject. You may contact Dr. Robert Connelly, who is the chairman of that committee at (210) 829-6000.

YOUR SIGNATURE INDICATES THAT YOU WANT TO TAKE PART IN THE STUDY AND THAT YOU HAVE READ AND UNDERSTAND THE INFORMATION GIVEN ABOVE AND EXPLAINED TO YOU. YOU WILL BE GIVEN A COPY OF THIS FORM TO KEEP.

\_\_\_\_\_  
 Volunteer's Signature      Date

\_\_\_\_\_  
 Witness Signature      Date

\_\_\_\_\_  
 Investigator      Date

APPENDIX E  
PERMISSION LETTER TO USE TOOL



## Ball State University

College of Applied Sciences and Technology  
School of Nursing

July 31, 1995

Ms. Barbara G. Covington, RN, MSN

Dear Barbara:

This is a follow-up to our conversation regarding the use of the "Bloodborne Pathogens and Universal Precautions Test" to conduct a study for your dissertation. You have permission to use the enclosed instrument developed by L. Jones and M. Ryan in 1992. The manuscript is enclosed so that you can review results from the study conducted by Ryan, Jones and Miller.

Regarding reliability testing, a Cronbach Alpha coefficient for the knowledge scale was  $r=.4626$ . After discussing this with a statistician we learned the problem was that so many answered the knowledge test correctly -- and many missed a few items -- which led to a low reliability. Perhaps you could run a scale reliability on the knowledge scale.

Thank you for your interest in our research. I look forward to seeing an abstract for your study.

Sincerely,

Marilyn Ryan, Ed.D, RN  
Associate Director Graduate Program

MR/dp

Enclosures



## VITA

BARBARA GLENN COVINGTON  
4402 Shavano Woods  
San Antonio, Texas 78249

## EDUCATION

- 1996            Doctor of Philosophy in Educational  
                 Human Resource Development  
                 Texas A&M University  
                 College Station, Texas
- 1977            Master of Science in Nursing  
                 University of Pennsylvania  
                 Philadelphia, Pennsylvania
- 1970            Bachelor of Science in Nursing  
                 University of Florida  
                 Gainesville, Florida

## PROFESSIONAL EXPERIENCE

- 1995-Present   Nursing Instructor and Coordinator  
                 Nursing Learning Resource Center  
                 University of the Incarnate Word  
                 San Antonio, Texas
- 1987-1995      Brooke Army Medical Center  
                 Fort Sam Houston, Texas  
                 Colonel, U.S. Army Nurse Corps  
                 Director Nursing Resource Management and  
                 Information Systems  
                 Director, Nursing Workload and Research
- 1983-1987      Fifth General Hospital  
                 Stuttgart West Germany  
                 Director of Nursing, Ambulatory Services  
                 Ambulatory Nursing Consultant
- 1983-1984      Eisenhower Medical Center  
                 Fort Gordon, Georgia  
                 Director of Nursing  
                 Psychiatric Nursing Services
- 1981-1983      Brooke Army Medical Center  
                 Fort Sam Houston, Texas  
                 Assistant Director of Nursing  
                 Education and Staff Development  
                 Psychiatric Clinical Nurse Specialist

This dissertation was typed by Marilyn M. Oliva at  
Action Ink, Inc.