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A Comparison of Two Teaching Methods in Basic Cardiac Life Support Training and Education

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A COMPARISON OF TWO TEACHING METHODS IN BASIC CARDIAC LIFE SUPPORT TRAINING AND EDUCATION

By

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ABSTRACT

A COMPARISON OF SELF-STUDY AND LECTURE DEMONSTRATION TRAINING METHODS IN BASIC CARDIAC LIFE SUPPORT

BY

Patricia A. Merrill

The purpose of this study was to compare the effect of two teaching methods on knowledge and skill acquisition in basic cardiac life support. A quasi-experimental, nonequivalent control group, pretest-posttest design was used to compare 37 nursing personnel recertifying in basic cardiac life support. The experimental group received a self-study module. The control group received a lecture and demonstration. Sample selection was one of convenience.

An analysis of covariance was performed to test the hypothesis. There was not a significant difference in acquisition of knowledge in the experimental or control group ($p > .05$). Subjects in the control group scored significantly higher ($p < .05$) in skill performance than the experimental group.

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CHAPTER ONE

INTRODUCTION

Cardiovascular disease is recognized as the leading health problem in the United States. The American Heart Association (1992) stated that there are nearly one million victims of myocardial infarction in the United States annually resulting in 500,000 deaths from cardiac arrest. Two major syndromes that result in sudden cardiac death from heart disease are sudden arrhythmic death resulting from cardiac arrest and death due to cardiac failure (Albarran-Sotelo, 1987). Survival of sudden cardiac death has been made possible by the development of basic cardiac life support (BCLS) knowledge and skills that include preventive and restorative aspects of emergency cardiac care.

Since 1960, techniques in cardiopulmonary resuscitation and emergency cardiac care have resulted in a growing body of knowledge. Kouwenhoven, Ing, Jude, and Knickerbocker (1960) first described the technique of closed chest massage as an effective method to restore circulation until defibrillation and other measures could be applied. As a result of their report, cardiopulmonary techniques and standards were developed to provide hope that sudden cardiac death could be reduced.

The evolution of emergency cardiac care has focused on prehospital emergency care systems and early interventions to stricken victims by lay bystanders. This is illustrated by community wide basic cardiac life support programs and the upgrading of Emergency Care Systems. Yet, thirty to forty percent of all sudden deaths caused by cardiac arrest occur in the hospital setting (American Heart Association, 1992). Nursing staff are often the first to identify the cardiac arrest victim (Bernhard, Turndorf, Cottrell, Vea, & Basak, 1979; Gass & Curry, 1983; Yakel, 1989). Therefore, it is essential for the survival of the person that nurses have basic cardiac life support knowledge and skills.

Various organizations have recognized the role of the nurse in basic cardiac life support interventions and have addressed this issue. The Joint Commission on Accreditation of Healthcare Organizations states that each individual in an organization is competent as appropriate to his or her responsibilities in cardiopulmonary resuscitation (Joint Commission for Accreditation of Healthcare Organizations, 1994). The American Heart Association Standards (1992) recommend that all hospitals require competence in cardiopulmonary resuscitation as a prerequisite for employment.

Besides providing emergency cardiac care, nurses are key persons in evaluating resuscitative efforts as well as

training prehospital providers and lay bystanders. These facts emphasize the importance of maintaining basic cardiac life support skills after the initial training in order to provide care immediately when the need arises. Immediate expert provision of basic cardiac life support is necessary when a cardiac emergency or sudden cardiac death occurs. Recognizing the high risk patient, familiarity with the signs of potential cardiovascular collapse, and prompt intervention in a cardiac emergency are all components of basic cardiac life support care.

The efficacy of early initiation of BCLS and emergency cardiac care has been associated with reduced death rates from sudden cardiac death. BCLS training of physicians in a hospital setting was found to impact survival rates in sudden cardiac death (Lowenstein, Sabyan, Lassen, & Kern, 1986). A necessary part of emergency cardiac care is the education and training of providers of this care. Therefore, in order to optimize outcomes in cardiac emergency care and resuscitation, knowledge and skills should be at the same American Heart Assosciation standard level achieved at initial training. However, a problem exists with the retention of BCLS training. A consistent finding is that retention of cardiopulmonary resuscitation related skills and knowledge is poor whenever this matter has been investigated (Fossel, Kisdaddon, & Steinbach; 1983;

Gass & Curry, 1983; Kaye & Mancini, 1986; Moser, Dracup, Guzy, Taylor, & Breu, 1989; Gombeski, Effron, Ramirez, & Moore, 1982; Nelson & Brown, 1984; Friesen & Stotts, 1984; Wilson, Brooks, & Tweed, 1983; Seraj & Naguib, 1990; Martin, Loomis, & Lloyd, 1983).

Therefore, health care professionals, including nurses, need to periodically review BCLS knowledge and skills. This becomes particularly important when the opportunities to utilize knowledge and skills are limited. Experience and prior basic cardiac life support training may not be sufficient for knowledge and skills retention. A 1989 study by Yakel found that nurses in critical care units, who had the potential to do the most cardiopulmonary resuscitation, did not perform any better than those who rarely had the opportunity.

Health care professionals, including nurses, receive initial certification of basic cardiac life support knowledge and performance of skills from the American Heart Association or the American Red Cross during initial schooling and again when hired into a health care facility. Periods of certification vary from one to two years with one year being the norm. The common teaching strategy used in recertification programs has been lecture and discussion method. In the case of experienced nurses, however,

recertification should be individualized in order to consider previous knowledge and specific areas of weakness.

Purpose

Since hospital nurses have previous knowledge and experience with BCLS training, instruction should provide information and skill review in the most efficient manner. Modular self-paced instruction can meet the needs of experienced nursing personnel who are adult learners. This type of instruction is compatible with the adult learning principles of self-direction, the opportunity to self diagnose, and builds on previous learning (Knowles, 1980). The purpose of this study was to determine if a self-paced modular instruction improves acquisition of basic cardiac life support knowledge and skills compared to the traditional lecture and demonstration method of teaching.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptual Framework

Robert Gagne's model of instruction is an appropriate conceptual framework to use for developing self-study modules and understanding knowledge acquisition in adult learners. Learning is defined in this framework as a change in human disposition or capability that persists over a period of time and is not simply ascribable to processes of growth (Gagne', 1985). A learning occurrence is assumed to take place when a stimulus situation together with the contents of memory and previously learned capabilities affect the learner in such a way that his or her performance changes from before the event to after the event.

Gagne' (1985) further identifies four elements of a learning event: The learner (individual), the stimulus or stimulus situation, memory, and the response. The stimulus includes all the external conditions which can influence learning. Memory consists of previous learning events acquired and stored in the brain that mediate with the new learning event through complex mental processes. The response in this framework is the final task that the learner is expected to know or perform. When responses are

described in terms of their effects they are called performances.

Instruction, the focus of this study, consists of the ways in which external events are arranged to activate, support, and maintain the internal processing that constitutes each learning situation (Gagne', 1985). Instructing includes arranging the required conditions of learning that are external to the learner. Since the learners were adults in this study, the process of knowledge acquisition suggested the ability for increased capacity for self-learning. The older, more experienced learner is assumed to bring to his or her instruction a wider variety of knowledge, intellectual skills, cognitive strategies, and a different set of attitudes than less experienced learners (Gagne', 1971). As the learner gains experience and continues to pursue learning activities, the learner acquires more capabilities of a self-directed learner. The experienced learner has developed the skills and mental processes necessary to acquire knowledge independently so that less assistance is needed in learning.

In any type of instruction, the internal and external conditions of learning are a consideration. Internal conditions are the learner's residue of previous knowledge, such as past experience with basic cardiac life support education. Other internal conditions found in adult

learners are intellectual skills, learning strategies, and attitudes toward learning job-related skills. External events are the conditions that support the internal processes of learning. These instructional events have the purpose of stimulating, activating, supporting, and facilitating the internal process of learning (Gagne' & Driscoll, 1988).

The instructional events that are initiated by the teacher begin with gaining the attention of learners and informing the learner of the objectives which are the learning outcomes. The stimulus material or instructional strategies are the resources that facilitate learning BCLS knowledge and skills. Stimulus material can include a basic cardiac life support training manual, computer assisted instruction, videos, and practicing mannikins. Memory, which includes recall of previous knowledge, is also stimulated by instructional strategies. The events of learning operate upon the learner in ways that constitute conditions of learning depending on the specific learning outcome or capability desired (Gagne, 1985).

Designing instruction facilitates this process and considers these events. Providing learning guidance and eliciting performance are events that are arranged so the learner is given hints or exercises that direct him or her to the desired outcomes. Practice on mannikins with

feedback on performance are events easily arranged with use of recording mannikins and practice tests of knowledge.

Assessment of the performance is carried out by the certification process of testing learners on cognitive and psychomotor skills. Retention and transfer of knowledge, the final learning events according to Gagne's framework, suggest the need for teaching cues to stimulate the memory and periodic reviews. Reviews should be scheduled in different contexts and settings to enhance transfer of learning. The literature and current practice indicate that reviews of resuscitation training are generally infrequent and usually represent a one or two year period before the recertification process. Results of this information may suggest time frames necessary for periodic reviews.

Literature Review

Acquisition of basic cardiac life support (BCLS) knowledge and skills is important in terms of emergent cardiac care. Basic cardiac life support training should address the issues of retraining in the most efficient and resource effective manner. Adult learners often have many demands and commitments in their lives which should be considered in designing a teaching method. Self-study modules represent a teaching method which addresses these issues of learning BCLS knowledge and skills. Literature was reviewed in the areas of teaching methods in BCLS

training, self-study modular teaching strategies in basic cardiac life support training courses, and self-study modules in nursing education.

Teaching Methods in Basic Cardiac Life Support Training

Studies in BCLS training have examined the effects of types of courses on acquisition and retention of knowledge and skills. Addressing the issue of practice in the retention of motor skills, several studies have focused on longer courses providing more practice and time to acquire these skills. Subjects trained in comprehensive courses which included more skill components such as infant and child basic life support and two man basic life support (Yakel, 1989; Gombeski, Effron, Ramirez, & Moore, 1982), or a BCLS instructor course (Tweed, Wilson, & Isfeld, 1980) were found to have improved retention of BCLS knowledge and skills on written and performance tests compared to groups taught the shorter basic one-person BCLS course.

The effects of increased practice and opportunity to develop skills suggest the advantages of comprehensive training for skill acquisition and retention, but it is difficult to determine the effect of competing variables as additional explanations in these studies. Subject characteristics, motivation, instructor quality, and testing effects were possible threats to internal validity in these studies.

Several studies have attempted to examine teaching aids and strategies that enhance the acquisition of skills and knowledge prior to taking a course or between courses. Kaye et al. (1985) and Kaye, Mancini, and Rallis (1987) identified the necessity of refresher training in basic cardiac life and advanced cardiac life support after reviewing the literature. Difficulties of maintaining knowledge and skill performance were particularly evident when practitioners have infrequent opportunities to utilize these skills and information.

A small study by Moser, Dracup, Guzy, Taylor, and Breu (1989) of family members of cardiac patients utilized a CPR retention packet as a method to reinforce learning and improve retention. Although CPR retention was poor in all subjects tested at seven months and twelve months, there were significant differences in retention of six subjects who practiced with the packet compared with twenty-five subjects who did not ($p = .007$).

Other studies indicated that the use of teaching aids might influence the effectiveness of BCLS training. Mandel and Cobb (1987) found increased effectiveness of performance after the use of a videotape or a written review while Bachman (1990) found that the use of mental imagery did not alter performance of one-rescuer cardiopulmonary resuscitation compared to a control group. Although the

small number of subjects and subject characteristics limits the generalizability of findings to other populations, a method of providing practice or a review before training is suggested to assist in the acquisition of skills and knowledge. In addition, reviews may be indicated when training or the actual use of the knowledge and skills is infrequent.

Mannikins simulating sudden death victims are used to teach the performance skills necessary in BCLS training. Technology has resulted in the development of mannikins that can provide feedback on correct techniques as well as simulate the arrest victim.

Riley (1989) was interested in the use of mannikins with computer capabilities which provide highly visible corrective feedback and their effect on skill acquisition and retention. In this inquiry the computerized mannikin was compared to a mannikin with tape recording capabilities and a version of mannikin without feedback capabilities. The sample in this study were 205 college students taking a BCLS course who were randomly assigned to either one of the three mannikins. Results of this study showed that students who used mannikins providing feedback such as the computer assisted mannikin or the mannikins providing a recording strip of performance showed no significant decreases in retention of cardiopulmonary resuscitation skills at one

month and two months. Students who were assigned the mannikin without feedback capabilities had significant decreases in retention of CPR skills throughout the study ($p < .05$).

The importance of immediate feedback in acquiring psychomotor skills was suggested from this study and had additionally been recommended for accuracy in performance as well as evaluation of correct performance (Mancini & Kaye, 1990). A difficulty of using sophisticated mannikins is related to the high costs of initial investment which may be a barrier to widespread use. Another problem is the applicability of study results to other populations. For example, college students may be more receptive to computer assisted mannikin than other populations.

Self-Study Modular Teaching Strategies in Basic Cardiac Life Support Training Courses

The demand for BCLS courses, economic issues, and the need for periodic refresher training has resulted in studies that examine the value of various teaching strategies including self learning modules. Nelson and Brown (1980) compared a modular and traditional lecture method in a group of 104 medical students, hospital personnel and lay people. There was no significant difference ($p > .05$) between the modular and lecture courses for both the performance and written examinations at one year.

Other studies comparing these methods found similar results. Friesen and Stotts (1984) compared lecture-demonstration and self-paced methods on 63 baccalaureate nursing students. Initial mastery and retention were tested at eight weeks. The authors found no difference in cognitive knowledge acquisition or performance of skills based on teaching methods. Coleman, Dracup, and Moser (1991) found that 49 college students had no differences in knowledge and skill performance regardless of method used at three months. Modular self-study instruction was at least as effective as traditional methods according to these studies.

Self-directed learning modules have also been compared with traditional methods in studies using registered nurses as subjects. Mueller and Glaser (1990) studied 60 nurses who used either a self-study or a lecture and demonstration method of instruction for BCLS training. There was a significant difference in acquisition of knowledge and skill performance which favored learners using the self-directed approach ($p < .05$). In their study the BCLS course was a recertification course, which indicated that the nurses taking the course had previous experience with BCLS training. Since study results were different from other BCLS studies comparing instruction methods, the authors speculated on the use of self-study methods for review.

They suggested that self-directed instruction may be more useful to review knowledge and skills rather than for initial training.

Plank and Steinke (1989) were interested in retention of BCLS knowledge and skills in a group of 37 registered nurses. Contrary to the other studies, cognitive knowledge retention at 6 to 8 weeks was greater in the control group receiving a lecture-demonstration than the self-study group ($p < .05$). There was no significant difference in skill retention during the same period between groups ($p > .05$). The literature review of educational methods in BCLS training indicates that self-study modules provide a reasonable alternative to traditional lecture demonstration teacher directed methods.

Self-Study Modules

Self-paced learning, self-directed learning, and learning modules are all concepts used to describe an individualized type of instruction with varying degrees of learner control, multimedia strategies, and teacher involvement. De Tornyay and Thompson (1987, p. 208) define the learning module as a self contained instructional unit that focuses on a single concept or topic and has a few well defined objectives. Independent study is central to the use of learning objectives, strategies, and evaluation.

There are many reports in the nursing literature that describe experiences with the use of modules and other instructional programs, but studies that investigate the effectiveness of the module as a teaching and learning method are limited. Learning modules in nursing education programs have been described as a way to allow nursing students to acquire and practice psychomotor procedures before actual clinical use of these skills.

Teacher designed multimedia learning modules have become popular ways of teaching core skills and concepts to nursing students in the past two decades (Mast & Van Atta, 1986). Learning modules have provided methods to address the problems of clinical safety, (Brigham, Foster, & Hodson, 1991), transfer of learning (Spickerman, Temple, Lee, & Eason, 1986), and clinical opportunities that frequently impede nursing student's role development (Hodson, Brigham, Hanson, & Armstrong, 1988).

In addition, self-learning modules have been compared to other teaching techniques in nursing education. Huckabay (1981) compared modularized instruction with the lecture-discussion method. Subjects were 97 graduate nursing students enrolled in a nursing education course. Results indicated that irrespective of teaching strategy, all groups had learned significantly. The modular group learned significantly more than the lecture-discussion group but

students enrolled in the class with a combined lecture-discussion and modular course had the greatest knowledge gains ($p < .001$). A finding from this study was that all of the teaching strategies were sufficient to meet course objectives. However, internal validity may have been threatened since subjects were not matched for level of motivation, cognitive style, and the interaction effect between student characteristics and teaching strategy.

Designing self-study modules involves efforts to include a variety of instructional strategies in order to assist learners in acquiring information as well as actively involve learners in the learning process. Knowledge acquisition may be improved when various strategies are used to present the material. Studies have examined various types of instructional strategies used in self-study modules such as autotutorials and computer assisted instruction. Koniak (1985) investigated autotutorial methods as an alternative approach to a lecture and demonstration presentation on developmental assessment skills to nursing students. Learning outcomes were positively associated with the autotutorial approach. The autotutorial method used in this study demonstrated a useful and efficient alternative to a lecture and demonstration presentation in this group of students.

Computer assisted instruction (CAI), a teaching strategy utilized in self-study modules, has been compared and used as an adjunct to other methods in regard to acquisition of learning objectives in various areas of nursing instruction. Huckabay, Anderson, Holm, and Lee (1979) were interested in the effects of computer assisted instruction versus lecture-discussion on cognitive learning, transfer of learning and affective behavior of nurse practitioner students. Results showed no significant differences between the groups in learning, transfer of learning, or affective behaviors. The authors suggested that CAI facilitates learning by meeting individual learning needs and helps learners practice from feedback areas needing further improvement. A weakness of the study was that level of motivation, cognitive style, and the interaction effect between student characteristics and teaching strategy were not controlled. It could be also argued that the CAI group did better because the experimental treatment provided an additional learning aid.

Bratt and Vockel (1986), found similar results when computer assisted instruction was used as an adjunct to a traditional course. Other studies compared computer assisted instruction to lecture methods. Content about health assessment (Day & Payne, 1987), nursing functions (Neil, 1985), and nursing research (Warner & Tenney, 1985;

Gaston, 1988) have been studied and have indicated that computer assisted instruction was at least as effective as the traditional lecture method. These studies imply that CAI may be an effective teaching methodology for nursing students knowledge acquisition and retention in at least some nursing education content. Computer assisted instruction can provide an instructional strategy in a self-study module.

Nursing education in the area of staff development has investigated the use of self-study modules as a means to promote the competency of nursing staff practice in the most cost-effective manner. Not only do self-study modules efficiently use instructor time, but have been found to be more cost-effective than traditional lecture methods (Messmer, Arnold, & Kurtyka, 1990; Mueller & Glaser, 1990; Coleman, Dracup, & Moser, 1991). Hospital orientation programs and mandatory reviews especially lend themselves to self-study because of the repetitive nature of this information and the varied levels of experience and knowledge among learners participating in these programs. For example, Procuik (1990) found that the use of self-directed learning in an orientation program was a preferred method of learning compared to learning directed by educators. Questionnaires were returned by 66 nurses from a population of 150. According to this study most of the

nurses preferred self-directed learning to meet their educational needs but needed some direction in learning objectives and reference material.

The use of self-learning packets has been associated with increased theoretical and assessment skills. Hamilton and Gregor (1986) described the use of a self-directed learning packet on respiratory assessment by critical care nurses while Pritchett (1986) reported the use of an independent study on care of the stroke patient. In both of these descriptive reports, participants and supervisors reported that learners had acquired a gain in knowledge from use of the independent study unit.

While use of self-learning packages in nursing staff development programs is suggested as a cost-effective and time efficient method to provide mandatory continuing education, limited research has been done to determine the effectiveness of self-study, particularly in comparison to traditional methods. The few nursing studies in the area of self-learning and staff development suggested that self-learning modules were at least as effective as traditional inservice education presentations and in some topics superior. All the studies reviewed cited the lower costs of self-study compared to traditional inservice programs (Rufo, 1985; Cunningham, 1988; Nikolajski, 1992; Messmer, Arnold, & Kurtyka, 1990).

Rufo (1985) compared learning outcomes of a hospital orientation program with use of instructional packages or the lecture and demonstration method. In this study, 38 new employees were assigned to an experimental or control group using the stratified randomization method. Of the ten instructional packages developed, half proved to be significantly effective in meeting learning objectives ($p < .001$). In addition to providing a cost-effective method of presenting required learning material, Rufo noted the additional benefits of motivating adult learning and alleviation of "burn-out" from the instructor's viewpoint of frequently presenting repetitious material.

Cunningham (1988) found that 24 nurse orientees to a critical care unit were able to obtain the same knowledge by using a self-study module as by a lecture method. A paired t test revealed a difference in pretest and posttest knowledge in all participants ($t(23) = 6.6$, $p < .001$) but there were no differences between groups in knowledge and performance. Although limited by the small sample size, this study suggested that critical care nurses were able to obtain the same knowledge by using two different types of teaching methods.

A third study investigating the use of self-learning packages in staff development was concerned with a self-learning package based on a inservice program to staff

comparable learning outcomes when compared to traditional methods in providing basic cardiac life support training. Other factors supporting the self-study module in basic cardiac life support training are economic issues. Since periodic reviews are necessary to maintain knowledge and skills, teaching methods that utilize nursing time efficiently for both staff nurses and educators show promise for decreasing costs. In addition, the self-study module approach in BCLS training can provide the same level of learning as more traditional methods. Therefore, the following hypothesis will be tested in this study.

Research Hypothesis

There will be a significant difference ($p < .05$) in basic cardiac life support knowledge and psychomotor skills of nursing personnel who receive self-study modular instruction compared to nursing personnel who receive the lecture-demonstration method.

Definition of Terms

Self-study module is an instructional unit which describe performance objectives, contains a set of materials and learning activities which are either self-contained in the module or external to the module, and a method of self-evaluation of mastery of the objectives.

Lecture-demonstration method is a teaching strategy which includes a lecture describing the signs and risk

factors of cardiac emergencies and demonstrations which illustrate the various rescue techniques for sudden cardiac death and cardiac emergencies.

Basic Cardiac Life Support (BCLS) is a basic lifesaving technique focusing on airway, breathing, and circulation to assure an open airway and to support respiration and circulation with rescue breaths and external chest compressions when necessary (Sotelo, 1987).

Retention of cardiopulmonary resuscitation skills and knowledge are stored from initial learning. This stored material can be recovered on a posttest and demonstrated as performances to an external observer after a time interval from initial training.

Nursing personnel are health care employees who give direct patient care in the hospital or clinic setting. This includes registered nurses, licensed practical nurses, surgical technicians, and patient care technicians.

Performance indicates a behavior change measured from entry behavior at the onset of the basic cardiac life support course to terminal behavior at the end of the course as measured by a psychomotor skill demonstration and a cognitive knowledge test of didactic content of the course.

CHAPTER THREE

METHODOLOGY

Study Design

A quasi-experimental, nonequivalent control group, pretest-posttest design was used to test the hypotheses that the use of a self-learning module in basic cardiac life training will result in a significant increase in knowledge and skill acquisition compared to attendance at the lecture and demonstration basic cardiac life support course (Figure 1). Before receiving instruction all subjects took a pretest consisting of the American Heart Association (AHA) knowledge test (Appendix A) and performed cardiopulmonary resuscitation (CPR) for one minute on a mannikin. The control group attended a lecture and demonstration BCLS while the experimental group completed a self-learning module. After completing a lecture and demonstration or the self-learning module, all subjects took the AHA knowledge test and performed CPR for one minute. The dependent variables were knowledge and skills of BCLS. The independent variable was the teaching method.

Figure 1. A pretest-posttest quasi-experimental, nonequivalent control group research design.

GROUP	BEFORE TRAINING	INSTRUCTION METHOD	POST TRAINING
Control	O_1 (pretest)	Lecture Demonstration	O_2 (posttest)
Experimental	O_1 (pretest)	Self-study Module	O_2 (posttest)

Setting and Sample

This study was conducted in a 425 bed midwestern acute care teaching hospital which serves as a referral center for the surrounding area. A monthly BCLS course is offered to nursing personnel in order to meet the hospital requirement for certification in BCLS at least every two years. This course is geared to nurses who work in medical surgical clinical areas. A convenience sample was used. The criteria used for subjects were: nursing personnel who worked in medical and surgical clinical areas, had previous certification in BCLS, and were willing to participate in this study. Subjects selected were registered to take course A which includes risk factors of cardiac disease, emergency cardiac care, the basic one person cardiopulmonary resuscitation, and adult airway management.

The sample size consisted of nineteen subjects in the experimental group and eighteen subjects in the control group. Subjects were assigned to the experimental or

control group according to the BCLS course they registered for. The control group was composed of learners registered in the September, October, January, February, and March courses and the experimental group was recruited from registrants of the November, December, and April courses. The source of subjects was derived from the monthly BCLS list of nursing personnel who registered for a course within an eight month period of time. This block of time was chosen because of the availability of subjects willing to participate in the study.

Instruments

In order to measure knowledge acquisition and psychomotor skills of BCLS two instruments were utilized for this study. The same two instruments were used as the pretest and post test. A knowledge test was used for testing cognitive knowledge before and after instruction. A psychomotor skill evaluation instrument was used for testing BCLS skills before and after instruction.

Basic Life Support Course A Written Examination

Acquisition of knowledge was measured by using the 25 multiple choice question examination developed by the American Heart Association (1992) and used for testing information following any American Heart Association BCLS course (Appendix A). Course A questions included information regarding basic emergency cardiac care, risk

factors, and performance of one-person BCLS. The order of questions was reversed so that alternative forms of the same test were available for the pretest and posttest.

Other studies examining basic cardiac life support knowledge and retention have used this examination (Yakel, 1989; Friesen & Stotts, 1984; Coleman, Dracup, & Moser, 1991; Mueller & Glaser, 1990). Since reliability and validity of this examination has not been established by the AHA, content validity was evaluated by a nurse educator, a professional cardiac nurse, and three BCLS instructors. An attempt was made to examine reliability for internal consistency by using data from the present study. However, it was not possible to use the Kuder-Richardson (KR-20) formula for measuring reliability because of the lack of variability.

One-person Adult Cardiopulmonary Resuscitation Evaluation Instrument

The instrument used to measure BCLS psychomotor skill was the one-person adult cardiopulmonary resuscitation evaluation instrument (OPA-CPREI) developed by Riley (1989) (see Appendix B). This instrument contains a detailed list of all the tasks involved in performance of BCLS according to the standards and guidelines for cardiopulmonary resuscitation and emergency cardiac care established by the

American Heart Association, (1992). Permission was received to Riley's instrument in this study (Appendix C).

Riley (1989) developed this instrument and established interrater reliability by having five BCLS instructors simultaneously rate one person in the performance of one-person adult BCLS using this instrument. A percent agreement on each item was calculated, and then averaged to find a 93 percent agreement between raters. Content validity was established by review of the OPA-CPREI by three persons with expertise in the area of cardiopulmonary resuscitation, and two persons whose expertise was in the area of testing and measurement.

In addition, Riley (1989) pilot tested this instrument on three occasions. The first pilot test was accomplished by having three BCLS instructors use the instrument to evaluate 16 students testing cardiopulmonary resuscitation skills. In this situation the instrument was tested for content validity and ease of use. Necessary revisions were made and the instrument was tested on two subsequent occasions with 15 students in each test and three different BCLS instructors. Results yielded that content was sufficient.

For the purposes of this study, a pilot test was conducted to determine the reliability of the OPA-CPREI instrument. Pilot testing was accomplished in a BCLS course

prior to the study by the four BCLS instructors who tested subjects. After pilot testing, revisions were made to increase ease of use and to reflect 1992 AHA BCLS course standards. In order to establish interrater reliability among the BCLS instructors who would test learners in the study, the researcher was evaluated while doing one-person BCLS by the four instructors who used the instrument. A percent agreement on each item was calculated, and than averaged to find a 92 percent agreement among raters. Content validity was established by a review of the revised OPA-CPREI by four BCLS instructors and two persons whose expertise were in the are of instruction.

Internal consistency of the OPA-CPREI was measured by using data from the present study. The Kuder-Richardson formula 20 reliability coefficient was computed which yielded a coefficient of .71 using 63 skills items. A reliability coefficient value in the vicinity of .70 is considered sufficient in making group-level comparisons (Polit & Hungler, 1991).

Additional data were obtained from a demographic data sheet which was included with the answer sheets for the cognitive tests (see Appendix D). The following items were on the demographic data sheet:

1. Age of subject
2. Clinical area of employment

3. Job position
4. Number of times certified in BCLS
5. Date of last BCLS certification
6. Years of experience in nursing
7. Previous experience in advanced life support
8. Previous experience in providing resuscitation to sudden death victims
9. Learning preferences

Two questions were included on the demographic sheet which requested subjects to evaluate the learning method in regards to meeting individual learning needs.

This study utilized two teaching methods which were based on the basic cardiac life support standards developed by the American Heart Association. The content of both methods was identical. A self-study module was used as the experimental method and a lecture-demonstration method was used for the control treatment.

Teaching Methods

Self-Study Module

The self-study module that was used in this study was developed by the department of education at Lutheran Hospital, La Crosse, Wisconsin (1987). This self-paced, self-learning program includes a student manual based on the American Heart Association standards and an audio-video tape demonstrating skills.

The self-learning system for CPR mastery is a manual divided into modules. Since the manual covers all types of BCLS courses, instructions are included to direct the learner on how to use the program depending on the course the learner is taking. The manual includes objectives, an introduction to basic life support, heart facts, and the psychomotor skill modules. After each of the above sections there are study questions on the previous material with an answer sheet and references. In this study, the learner completed module 1 which is the adult with a blocked airway and one-person cardiopulmonary resuscitation. Permission was obtained from the hospital to used the self-study module program (Appendix E). Included with the self-study program was a video demonstrating BCLS skills.

Learners were encouraged to practice on a mannikin after viewing the video. A mannikin was available the week before testing so subjects could plan and practice as desired. Instructions on using the mannikins and written tapes showing correct techniques were also included in the self-learning module.

Learners scheduled their own time to utilize the module and practice on mannikins. Instead of teacher control of the material presented, the learners managed the learning resources and determined his or her mastery. This self-learning program has been used by Lutheran Hospital since

1987 for annual recertification of nurses in BCLS. Use of this program has been found to be at least as effective in BCLS certification as traditional methods in two studies which used this module (Coleman, Dracup, & Moser, 1991; Miley, 1987). Furthermore, the hospital evaluated the program on 71 nursing personnel for ease of use and clarity prior to implementing the program. The material was found to be helpful by 62% of participants. Another 32% of participants felt the video was very helpful (Perry & Winey, 1987).

Lecture-Demonstration Method

In contrast to the self-study module, the lecture-demonstration method used a traditional classroom approach. Content of basic cardiac life support was presented and controlled by the teacher or in this study by BCLS instructors. A video tape was used which presented a demonstration of sudden cardiac death and one-person BCLS. A brief lecture was given to learners on airway management, heart facts, and the sequence of steps for BCLS. Demonstrations were provided to learners by instructors on airway management and one-person cardiopulmonary. Unlike the self-study module where the learner evaluated his or her own performance during practice, in the lecture-demonstration method learners received corrective feedback from instructors during practice. Learners practiced on

mannikins until they were able to achieve accuracy in performance. The instructor and student ratio was approximately one to four.

Procedure

This study was conducted over an eight month period from September, 1993 to April, 1994. Data collection was at the beginning and completion of instruction for each subject. Prior to conducting the study, permission was obtained from Grand Valley State University's Human Subject Review Committee and the hospital's Human Rights Committee. After approval to conduct the study was received, the staff and patient education department were informed of the intent to recruit course participants for this study, the purpose of the study, and anticipated time frames for collection of data and the method of data collection. A registration list of participants for selected courses was obtained from the staff and patient education secretary. In order to prevent contamination between teaching methods, the intent was to utilize the first courses for the control group and subjects from later courses would use the self-study module. However, because some subjects in the first groups did not complete the study it became necessary to alternate instruction each month in order to obtain an equivalent number of subjects in each group.

Since course registration was at least one week before the course, experimental subjects received a letter or phone request (Appendix F) to enter the study one week before the BCLS course. If subjects agreed to enter the study, they received the self-study module one week before the study. Initial contact by this investigator with the experimental group occurred at this time. A brief explanation of the purpose of the study, methodology, and the individual's rights as far as confidentiality, risks, potential benefits, voluntary participation, and the right to withdraw from the study at any time was given. The subjects were asked to sign the informed consent (Appendix G).

After signing consents, subjects were pretested on psychomotor skills and knowledge and given the self-learning module. When the experimental subjects received the self-learning module, verbal and written instructions were given on how to use the learning module and how to arrange for psychomotor skill practice (Appendix H). A resource area was available to learners which included a mannikin, the videotape, and a video cassette recorder. Instructions for operation were placed on top on the video cassette recorder. Instructions and a demonstration were provided to the subjects on how to use the mannikin recorder so that learners could evaluate their practice. A phone number was made available to the subjects in the event they had

questions or problems with the self-study module. Subjects received a face shield with verbal instructions for use at the time they started their pretest, and were instructed to keep the shield for practice as well as for the posttest. The posttest was completed on the original course date, but at a different time than the control group.

The control group received the lecture and demonstration BCLS course. Subjects were tested before and immediately after receiving instruction. After receiving instruction, course participants were divided into two groups. One group took the written test while the second group practiced on mannikins until accuracy was achieved according to AHA standards. Groups alternated after completing their initial assignment. Three hours were allotted for learners to complete pretests, instruction, practice and posttests.

Initial contact with the control group by this investigator was at the beginning of the BCLS course when permission was requested to participate in the study. At this time, the investigator explained the purpose of the study, methodology, and the subject's rights as far as confidentiality, risks, potential benefits, voluntary participation, and the right to withdraw from the study at any time was given (Appendix I). The subjects were asked to sign the informed consent (Appendix G). This investigator

had no contact with either the experimental or control subjects during the posttests. Four BCLS instructors who were also AHA BCLS instructor trainers tested all the subjects on psychomotor skills and administered the knowledge tests. Prior to conducting the study, these instructors pilot tested the instrument and contributed their input to changes that revised the instrument for this study.

For both groups, the importance and appreciation for their participation in the study was emphasized, as well as the researchers willingness to share the findings of the study. Because of the particular risk factors of infection and physical exertion present in all BCLS courses the liability statement developed by the American Heart Association was also included (Appendix J).

CHAPTER FOUR

RESULTS

Data were collected during an eight month period from September 15, 1993 to April 7, 1994. During this period, there were 51 nursing personnel that met the criteria and were approached regarding study participation. Ten subjects in the control group did not complete post-testing and four subjects in the experimental study did not complete the self-study module or decided not to participate in the study after initial consent. Thirty-seven subjects (73%) gave consent to participate and completed the study. All analysis was computed using the Statistical Package for the Social Sciences (SPSSX) software.

Characteristics of Subjects

Age, Position, and Clinical Area

Ages of the subjects ranged from 22 to 64 years with a mean age of 40.36 years. The largest number of subjects were in the 40-49 year old category (Table 1). Distribution of subjects in the two groups by age groups was similar.

Table 1

Subject Distribution by Age

Age	Group: Experimental[a] (n = 19) n	Group: Control (n = 18) n	Total (N = 37) n	Total (N = 37) %
20-29	1	3	4	12
30-39	7	4	11	34
40-49	5	8	13	39
50-59	1	2	3	9
60-69	1	1	2	6

[a]Four subjects from the experimental group did not respond.

Distribution of subjects by position is shown in Table 2. The majority of the subjects were registered nurses (n = 22). Of the remaining subjects four were licensed practical nurses, three were patient care technicians, and four experimental subjects did not list their position. In order to compare groups according to position, the positions were collapsed into two categories; registered nurses and non-registered nurses. The two groups were not significantly different from each other with respect to the professional position, X^2 (1, N = 37) = .00, p > .05.

Table 2

Sample Distribution by Nursing Position and Clinical Practice Area

	Group		
	Experimental[a] (n = 19) n	Control (n = 18) n	X^2
Position			
Registered nurse	10	12	0.00[b]
Non-registered nurse	5	6	
Clinical Area			
Category 1	6	13	3.47[c]
Cardiology, Neurology, Oncology			
Category 2	9	5	
Nephrology, Dialysis Medical surgical, Outpatient surgery, Other			

[a]Four subjects from experimental group did not respond.
[b]p = 1, df = 1. [c]p = .062, df = 1

The study was limited to medical surgical nursing personnel. The clinical practice areas listed by subjects included the inpatient areas of cardiology, neurology, oncology, nephrology, and general medical-surgical. Outpatient clinical practice areas listed included outpatient surgery, outpatient clinics, and out-patient

dialysis. Subjects also had the option of listing other as a practice area. Data were not available for four experimental subjects who did not complete the demographic data sheet. Due to the small number of subjects in practice areas, groups were collapsed into two categories (Table 2). Since the inpatient clinical areas of cardiology, neurology, oncology had more acute patients, these areas comprised one group. The second group consisted of the outpatient areas and less acutely ill patients. These areas were nephrology, general medical surgical, outpatient dialysis, outpatient surgery and other.

Chi-square analysis of distribution between groups was computed. The difference in distribution for clinical practice area was not significant at a .05 level.

Years of Nursing Experience, Number of Previous Basic Cardiac Life Support Courses, and Previous Certification

Years of nursing experience were measured as the number of years an individual was in the professional position listed. The number of years of experience ranged from 2 years to 33 years. The experimental group had mean experience years of 14.53 and the control group had mean experience years of 15.25 (Table 3).

Table 3

Sample Distribution by Years of Nursing Experience, Previous BCLS Number, and Last BCLS Course

	Group						
	Experimental (n = 19)		Control (n = 18)				
Characteristic	M	SD	M	SD	df	t	p
Years of Experience[a]	14.53	7.93	15.25	8.38	31	0.25	.80
No. of BCLS courses[b]	6.90	3.36	10.64	6.52	20.3	1.85	.08
Years since Last BCLS[c]	2.41	.67	2.46	.99	25	0.15	.88

[a]Four subjects from the experimental group did not respond. [b]Five subjects from the experimental group and four control group subjects did not respond. [c]Seven experimental subjects and three control subjects did not respond.

Data were not available for four experimental subjects who did not complete the demographic data form. Experimental and control groups were not significantly different from each other with respect to the number of years of experience ($t(31) = 0.25$, $p > .05$).

All the subjects were registered for a recertification BCLS course. Subjects had taken at least one BCLS course and 18 subjects had taken six or more courses. The mean number of courses was 7 for the experimental group and 10

for the control group. Data were not available for five experimental subjects and four control subjects who did not answer the question on number of BCLS courses. The results of the t-test showed that the two groups did not differ significantly from each other on previous number of BCLS courses (t (20), = 1.85, p > .05).

Data on last certification date were not available for seven experimental subjects and three control subjects. T-tests were computed to compare differences in the means of the experimental and control groups. Levene test for equality of variances was performed before t-tests. The results of t-test showed that the two groups did not differ significantly from each other on number of years since the last BCLS course (t (25) = 0.15, p > .05).

Previous Experience with Advance Cardias Life Support and Sudden Death

Sample distribution based on previous experience with advanced cardiac life support (ACLS) training and sudden death is shown in Table 4. Data were not available for five experimental subjects who did not respond to the questions. The Fisher's exact test was performed to compare the groups on these variables since three of the expected frequencies were less than five. The differences in distribution for both characteristics were not significant at a .05 level.

Table 4

Previous Experience With Advance Cardiac Life Support (ACLS) and Sudden Death

	Group		
	Experimental[a] (n = 19)	Control (n = 18)	
Previous Experiences	n	n	p[b]
Previous ACLS			
Yes	3	4	1.00
No	11	14	
Sudden Death			
Yes	4	6	1.00
No	10	12	

[a]Five subjects from experimental group did not respond.
[b]Fisher's exact test was used for data analysis.

Learning Preference and Type of Instruction Received

Sample distribution based on learning preference is shown in Table 5. Data were not available for four experimental subjects who did not complete the demographic data sheet. Chi-square analysis of distribution between groups was computed. The difference in distribution for learning preference was not significant for lecture, simulation, demonstration, and self-study ($p > .05$). Although statistically not significant, a larger number (n = 11, 68%) of subjects in the control group selected

simulation as a learning preference than the experimental group (n = 5, 31%).

Table 5

Learning Preference

	Group			
	Experimental[a] (n = 19)	Control (n = 18)		
Learning preference	n	n	x^2	p
Lecture				
Yes	4	8	1.11	.290
No	11	10		
Demonstration[b]				
Yes	10	14		.696
No	5	4		
Simulation				
Yes	5	11	2.52	.111
No	10	7		
Self-Study				
Yes	10	6	3.63	.056
No	5	12		

[a]Four subjects from the experimental group did not respond.
[b]Fisher's exact test was performed.

A larger number of experimental subjects (n = 10, 67%) selected self study as a learning preference than the

control group (n = 6, 33%). A majority of subjects (72.7%) selected demonstration as a learning preference while lectures were the least preferred by subjects (36.4%).

In the absence of randomization, the experimental and control groups were compared with respect to major extraneous variables to examine equality of two groups. The experimental and control groups were not different from each other with respect to all the demographic characteristics examined. Subjects in both groups were similar in age, years of nursing experience, number of BCLS courses, and previous experiences with cardiac emergencies. There was also no difference in either group in learning preferences.

Hypothesis Testing

Prior to data analysis of the hypothesis, the two groups were compared with respect to knowledge and skills. Pretest and posttest basic cardiac life support knowledge test scores are shown in Table 6. Each question had equal weight in scoring with a possible range from 0-25. The range of scores of subjects was 18 to 25 in the pretest and 20-25 in the posttest. Both the experimental and control groups showed a slight gain in knowledge. The Levene test for equality of mean variances was performed before paired t-test. Paired t-test was computed to compare differences in the pretest means of the experimental and control groups. The result showed that the two groups did not differ

significantly from each other on mean pretest scores ($p > .05$).

Table 6

Basic Cardiac Life Support Knowledge

	Group				
	Experimental (n = 19)		Control (n = 18)		
Test	M	SD	M	SD	t
Pretest	23.11	1.33	22.83	2.36	-.43[a]
Posttest					
Obtained	24.21	5.32	23.89	1.41	
Adjusted	24.17		23.92		

[a]$p = .67$, $df = 26.51$.

Pretest and posttest BCLS skill test scores are shown in Table 7. Scores for the psychomotor skills were based on the number of errors out of a possible 64 skill tasks. Each of the 64 items was equally weighted. Variability in skill tests of subjects ($N = 37$) is reflected in the range of pretest skill errors (0-57), and posttest skill errors (3-47). Before t-tests were performed on pre-errors test means, the Levene test for equality of variances was done ($F = 4.68$, $p = .037$). The results of the paired t-test

showed the groups did not differ significantly from each other on pretest psychomotor means ($p > .05$).

Table 7

Basic Cardiac Life Support Skill

	Group				
	Experimental (n= 19)		Control (n = 18)		
Test Result	M	SD	M	SD	t[a]
Pretest errors	21.78	10.68	27.27	19.19	1.07
Posttest errors					
Obtained	11.00	10.41	5.44	7.62	
Adjusted	11.52		4.92		

[a]$p = .296$, $df = 26.30$.

Analysis of covariance (ANCOVA) was used to analyze the hypothesis: There will be a significant difference in BCLS knowledge and psychomotor skills of nursing personnel who receive self-study modular instruction compared to nursing personnel who receive the lecture-demonstration method. ANCOVA was used to compare the experimental and control groups' posttest knowledge score and skill errors. The pretests measure of knowledge and skill acquisition were used as the covariates. The hypothesis related to BCLS knowledge was not supported (Table 8). There was no significant difference in posttest knowledge scores in

either group after controlling the effect of pretest scores $F (1, 34) = 0.55, p > .05$.

On the other hand, learners who attended the lecture and demonstration instruction had less errors on the post skill test than the experimental group, $F (1, 34) = 5.03, p < .05$ (Table 9). Some subjects had difficulty meeting the American Heart Assosciation standards during initial testing and had to retake the skill test to be recertified. These subjects included three experimental subject and one control subject. It should be noted that the data used for hypothesis testing was from the initial testing. Any additional testing was not included in the hypothesis.

Table 8

Analysis of Covariance for Posttest Knowledge

Source of Variation	df	MS	F	p
Between groups	1	.60	0.55	.465
Covariate	1	7.24	6.53	.015
Within groups	34	1.11		

Table 9

Analysis of Covariance for Posttest Skill

Source of Variation	df	MS	F	p
Between groups	1	389.70	5.03	.032
Covariate	1	301.67	3.89	.057
Within groups	34	77.55		

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

Discussion

The purpose of this study was to compare a self-study method of instruction with the traditional lecture demonstration method of instruction in reviewing the knowledge and skills of basic cardiac life support. Experienced nursing personnel taking a BCLS recertification course were able to review BCLS knowledge with either a self-study module or a lecture demonstration method. Some experimental subjects had more difficulty reviewing BCLS skills with a self-study module.

Basic Cardiac Life Support Knowledge

The mean difference in posttest knowledge scores between the experimental and control group was not statistically significant ($p > .05$). The experimental group had an adjusted posttest mean of 24.17 while the control group had an adjusted posttest mean of 23.9. Generally, subjects had only one more correct answer on the posttest than on the pretest. These results suggest that two teaching methods made no difference in a basic cardiac life support knowledge posttest in experienced nursing personnel.

Friesen and Stotts (1984) also reported no difference in acquiring cognitive knowledge between nursing students in a self-learning group or lecture-demonstration group. On the other hand, Mueller and Glaser (1992) found a significant difference in knowledge when these instruction methods were compared. In their study the difference favored the self-study group. Subjects were experienced nurses who were recertifying in BCLS which was similar to the subjects in this study. The researchers speculated that self-directed methods may be particularly useful when learners already have a baseline of knowledge. Since subjects had experience with BCLS knowledge the self-directed instruction may have been more effective as a review than a method of learning new knowledge. The experience of the subjects with the learning material is an important consideration in explaining the results of this study.

In this study most subjects scored high on both tests (Pretest mean = 23, Posttest mean = 24). A possible reason for high scores on the AHA knowledge test is the content. The test consisted of basic knowledge about cardiac disease and risk factors. This test has been designed so that all learners including lay persons can take the same test. Most health care providers have basic cardiac knowledge from job and education experiences. In addition, these subjects had

previous BCLS courses (Mean number of BCLS courses was 10 for the control group and 7 for the experimental group). Since subjects in both groups already scored high on the pretest (23 out of a total possible score of 25), there was not much room to improve knowledge on the posttest. Similar results on both tests for subjects is an explanation for no significant difference between groups on the knowledge posttest. In the case of individuals experienced with the BCLS content, either method of instruction was effective in the acquisition of BCLS knowledge.

Basic Cardiac Life Support Performance

The second part of the hypothesis compared BCLS psychomotor skill acquisition. Findings revealed a significant difference in performance of BCLS skills between groups ($p > .05$). The control group showed the least amount of errors on the posttest with an adjusted mean of 4.92 compared to the experimental group's adjusted mean of 11.52 ($F (1, 34) = 5.03$, $p < .05$). The control group also showed the greater gains in skill acquisition from pretest to posttest. Subjects in the experimental group had more difficulty meeting American Heart Association standards initially after instruction. Of the four subjects who did not meet AHA performance standards at the initial posttest, three subjects were in the self-study group.

The study results showed that psychomotor skills were more difficult to relearn than knowledge in BCLS recertification instruction. Despite several BCLS courses, for many subjects, psychomotor skills were subject to significant degradation. Friesen and Stotts (1984) found among nursing students at eight weeks post course neither a lecture or self-directed group could perform BCLS skills at mastery level. Practice is necessary to develop psychomotor skills. In the present study, most of the subjects had not performed BCLS on a mannikin or real person in two years. BCLS psychomotor skills are difficult to maintain if skills are not used. Other BCLS studies found that health care providers scored better on the knowledge test of BCLS training compared to performance on a psychomotor skill test (O'Connor, 1990; Friesen & Stotts, 1984; Seraj & Nagrib, 1990; Latman & Wooley, 1980; Mueller & Glaser, 1990).

The issue of the type and amount of practice necessary to bring skills up to standard was a consideration in looking at skill test results. Some subjects in the experimental group admitted that they did not have enough time to practice on the mannikin. Subjects in the control group had the opportunity to practice until they met course standards. The practice of psychomotor skills is part of the instruction in the lecture demonstration course. The control group practiced during the course until they

performed adequately on the mannikin. On the other hand, experimental subjects self determined the amount of practice they needed. Since experimental subjects practiced independently, it is possible that not all subjects practiced enough to perform according to AHA standards. Some experimental subjects were inadequately prepared to perform on the BCLS skill test. It seems self-directed learning was not feasible for some subjects in the experimental group.

Another factor that possibly favored the control group was the feedback they received from instructors on correct technique and correction of errors. Even though experimental subjects viewed a video demonstrating correct BCLS skills, some learners may have needed guidance from a teacher when they were practicing on mannikins. Subjects lacking instructor guidance and feedback as was the case in the experimental group could practice on mannikins using incorrect techniques. Learning psychomotor skills may be difficult for some learners without instructor guidance.

A third observation that could explain the disparity of performance between groups was the perceptions of ability to perform. Although the subjects in the self-study group believed they could review BCLS skills with a self-study module, this method of instruction proved difficult for some experimental subjects. Often the individuals ran out of

time before testing to practice adequately on mannikins. In other cases, subjects did not plan time to practice on mannikins. Subjects also complained about lack of assistance despite the instructions and visual aids available on how to use the mannikins and evaluate their performance. More guidance and instructor feedback may be necessary in reviewing skills, particularly for nurses who do not have the opportunity to use BCLS skills in their practice. Medical surgical nursing personnel who do not take care of emergency cardiac patients routinely may require more assistance in reviewing these critical skills.

Adult learning theory suggests that adults prefer self-directed study and are capable of directing their learning (Knowles, 1985). Self-study modular instruction was apparently difficult for some subjects in reviewing and relearning BCLS psychomotor skills. Adults who have years of experience in learning in teacher-directed scenarios may not have had the opportunity to develop self-learning skills. Studies by Coleman, Dracup and Moser (1991) and Friesen and Stotts (1984) found no difference in BCLS knowledge or skill acquisition in students who used a self-study module or lecture demonstration method. Subjects in the former studies were demographically different in age and occupation. Subjects were younger with an age range of 21 to 25. In this study the average age was 40. In addition,

the younger subjects were nursing school or college students not working nurses. Younger college students may perform better than working nurses with any type of instruction because of their student status which puts them in a learning environment where study and learning is usually a main activity.

It is interesting to note that one of the arguments for using a self-study module was to provide a learning method compatible with the time and scheduling demands of busy nurses. Unfortunately, these same time constraints proved to be a problem in using the self-study module. Busy nurses who had many demands and responsibilities found limited time to complete a self-study program. Although subjects were initially enthusiastic about using a self-study module, they often found it was difficult to schedule time to complete the self-study module. The results of this study as well as the experimental group's ability to participate in the self-study module was influenced by the issue of time off from work hours to accomplish BCLS training. Unlike the control group who were able to take time from work hours to complete BCLS training; the experimental subjects had to complete instruction on their own time. Time constraints were also a factor in recruiting subjects. Most of the persons who met the criteria for the self-study group but refused to

participate in the study cited time constraints or busy schedules as a reason for not participating in the study.

Instruction Preference and Study Group

There was not a significant relationship between learning preferences and type of instruction subjects received. However, other findings were of interest in looking at learning preference. Although statistically not significant, a trend showed that self-study subjects were more likely to select self-study methods as a learning preference compared to the control group. A greater number of lecture and demonstration subjects preferred simulation methods of instruction. This finding suggested a subject's learning preference influenced choice to be in a particular learning group.

Subjects who participated in the study may have differed on certain characteristics from those who did not participate. For example, self-study participants required more self-motivation than the control group. The lecture demonstration course was a mandatory program so employees who attended were provided paid time off. A dilemma existed for self-study subjects since the lecture demonstration course was an option and if they decided to be in the self-study group it was at their own time and expense.

Subjects also tended to prefer learning methods appropriate to the type of learning material they were

receiving. A majority of subjects selected demonstrations as a learning preference which is a logical choice when psychomotor skills are a significant component of the instruction. BCLS has a large skill component so learners need to see skills demonstrated. The importance of demonstration in skill learning may have been a problem for self-study subjects. Although a video demonstrating BCLS skills was available, this may not have been as effective as a live demonstration with an instructor. In designing instruction, learning preference is an important component as well as selecting appropriate methods for the content. This factor was particularly evident in the acquisition of psychomotor skills.

Application to Practice

In this study the notion that a self-study module would increase knowledge and skills of BCLS was not supported. Since not all individuals can easily use a self-study module for learning psychomotor skills, different instruction methods may be more appropriate for particular domains of learning. This may be more applicable to individuals who do not use BCLS skills often. If self-study methods are used to provide instruction in psychomotor skills, a facilitator may make the instruction more effective. Learners would then have assistance if needed with skill development.

Any type of instruction used in hospital training programs requires system support. Adequate resources need to be in place to enable the instruction to occur. Dedicated resources provided by the organization that enable learners to participate in self-study has potential for greater flexibility of training and education. For example, nursing personnel could be paid time off to spend on self-study that would individualize instruction and enhance study and practice. Instructors available as resources instead of intensive individual instructors would help eliminate the boredom of repetitive programs. Some adults may need to learn self-study methods. This becomes important as health care resources continue to decrease. Self-learning skills can provide a means of acquiring information economically and remain current in nursing practice.

Limitations

Several threats to internal and external validity existed in this study. Factors such as instrumentation, testing, sample size, selection, research design, missing data, and mortality posed threats to internal validity. The sample selection, experimental effects, and construct validity may decrease the external validity of this study.

Testing and instrumentation are internal threats to validity related to the researcher's measurements (Polit & Hungler, 1991). Instrumentation may have influenced the

performance of subjects. Mannikins were checked between performances and internal parts were changed after each class. However, some mannikins were newer models and less complaint. Parts within the mannikins sometimes twist or get compressed. Depending on the mannikins or if this problem occurred, some subjects worked harder to compress and ventilate the mannikin.

Interaction between the knowledge pretest and posttest was a potential threat to internal validity. An attempt was made to minimize this interaction by using alternate forms of the same test. Form A was the pretest and form B was the posttest. Scores from pretest to posttest in both groups showed little difference between scores. This may be partly due to very high scores on the knowledge pretest leaving little room for subjects to improve. Subject's characteristics of nursing background and previous experience with BCLS knowledge also could account for the test's results.

Subject selection presented threats to internal validity. The study design was quasi experimental, which has the potential for competing explanations because of lack of randomization. When the initial equivalency of the comparison groups are questionable because of nonrandom assignment, statistical control can adjust for differences (Polit & Hungler, 1990). In this study an analysis of

covariance was used to control for preexisting differences between the experimental and comparison group's tests and skill abilities. In addition, demographic characteristics of the two groups were compared to examine equality of the groups. There was no difference in groups in age, clinical position, clinical area, nursing experience, experience with BCLS, and experience with sudden death or ACLS. The two groups were also not different in learning preference and pretest scores of BCLS knowledge and skills. However, not all the subjects completed the demographic data sheet which resulted in missing data on demographic characteristics and experience. Thus, the results of the comparison of the two groups has a limited interpretation.

Mortality of subjects was a problem in this study. In the experimental group three subjects did not complete the study. Among experimental subjects was a perception that greater effort was required for participation in the self-learning module and that time was not available to complete the self-study module. Subjects who agreed to participate in the self-study module did at their own time and expense. They had the option of attending the hospital course that provided paid time off. Other individuals who refused to participate in the study selected the hospital program because a paid hospital program meeting the same requirements was more feasible than a self-study research

project. Equal economic and time support to the self-study group would have reduced this unanticipated variable. The control group included ten subjects who did not complete the posttest or dropped out of the study. Some individuals found duplicate testing time-consuming. Other individuals stated that since they had taken the pretest with acceptable results, a second test was inconvenient.

Missing data on subject characteristics and learning preferences was a limitation in interpreting data. All the subjects did not answer all the questions on the demographic data sheet and four subjects in the experimental group did not fill out the demographic data sheet. There were no trends found regarding specific questions not being answered. Data were not available on the ages of four subjects, years of experience of 5 subjects, and learning preference of 4 subjects. The clinical area and position of four subjects was missing but it was known that all subjects worked in medical surgical areas and occupied a nursing personnel position since this was a study criteria. Other variables that had missing data included clinical area nursing position and experience with death and advanced cardiac life support. Since missing data existed, results reflect the available data and must be interpreted accordingly.

The sample size was small (N = 37) which limits the power to detect the effect of the independent variable upon the dependent variable. Smaller samples tend to produce a larger sampling error than larger samples (Polit & Hungler, 1990). Since this study had a small sample size, the possibility of a markedly deviant sample must be considered. The extent of the relationship among key variables is another concern when interpreting results of studies with small samples. Due to the size of the sample, the results were not generalizable to another group.

Although the intent was for other instructors to collect data, because of scheduling problems the researcher collected most of the pretest data. Most of the posttest data was collected by a BCLS instructor who was experienced as a BCLS instructor trainer. She taught three to four BCLS classes a month. While this factor was a potential threat to internal validity, it strengthened the external validity of this study. The use of a second data collector for the final tests reduced the effect of experimenter expectancy on the subjects. Recording strips were collected from the mannikin during all testing to verify results and decrease instructor bias. These strips showed compressions, breathing, and sequencing.

Recommendations

Maintaining proficiency in BCLS is essential for nursing personnel whose occupation exposes them to situations where these skills might be required. The results of this study showed that even nurses with previous exposure to BCLS had difficulty relearning psychomotor skills in a self-study instruction. The assumption that alternate methods for providing instruction that appeal to adults preference for self direction and flexibility may not always be feasible. In some situations particularly when appealing programs are already in place that allow the time in an inflexible schedule, self-study is not a reasonable alternative. Perhaps similar financial and time resources for experimental and control subjects would provide different results. This study should be replicated using a larger group in a setting where the same resources are provided for both comparison groups.

Subject motivation was a question that occurred when interpreting this data and investigating some of the difficulties subjects had with maintaining BCLS skills despite years of experience. The subjects and potential subjects were satisfied in attending the hospital lecture demonstration program every two years. BCLS was a mandatory employment requirement for all nursing personnel. Despite the fact that nurses in this study rarely or never performed

BCLS skills, nurses did not certify or review skills any more frequently than the mandatory requirement. A perception could develop that these skills were not needed or important. More information is needed on the influence of mandatory programs versus programs that are perceived as a necessary job related skill or a skill they may need. Nurses working in more acute areas such as intensive care or family members of cardiac patients may have different perceptions of the importance of BCLS. A study should be done comparing mandatory BCLS education with a group of learners who have a different motivation toward BCLS training.

The results on learning preference and instruction group suggest that instruction should match learning style preference and type of learning outcome. Clearly, in this study most learners preferred demonstration for BCLS instruction. This is a logical choice that learners made when2the large psychomotor component of BCLS training is considered. Also, learners were more likely to choose self-study method if they were in the self-study group or simulation method if they were control subjects. Given these results more study needs to be done in the area of learning preference and learning outcomes.

A finding that has been repeatedly reported in the literature is the rapid degradation of psychomotor skills.

Pretest information established that most of the subjects were far below standard on performance before instruction. These subjects had their last BCLS class an average of two years. The question occurs about the length of time appropriate between reviewing these critical skills. Subjects were medical surgical nurses with little experience or opportunity to provide basic cardiac life support to patients. If a patient needed lifesaving care at the end of a certification period, chances are that performance by the nurse would be lacking. BCLS instruction is resource driven and costly to hospitals. Self-study modules may provide assistance in areas of more frequent review. A self-study module after one year would be easier to use for review.

Self-directed learning is a skill that is assumed to be well developed in adult learners. Similar to findings by Hamilton and Gregor (1986) learners in this study found difficulty with self-directed learning methods. The usual format for hospital inservices is highly structured and teacher directed. Although learners may prefer self-directed learning, they may be unfamiliar with self-study methods and intimidated by an independent learning format. Further investigation needs to be done in theoretical versus skill information acquisition and the role of participant interest in content areas.

This was a small sample size at one hospital. To make this study more generalizable the study should be conducted in several sites containing a more diverse group. A larger sample size with a true experimental design would also add strength to the study.

Summary

The purpose of this study was to compare the effect of two teaching methods on knowledge and skill acquisition of basic cardiac life support (BCLS). Study findings did not support the hypothesis stating there would be a significant difference in basic cardiac life support knowledge and psychomotor skills of nurses who received self-study modular instruction compared to nurses who received the lecture and demonstration method. There was no significant difference in knowledge acquisition between the lecture demonstration group or the self-study module group ($p > .05$). Nurses receiving the lecture and demonstration method of instruction were found to have a greater proficiency in psychomotor skills compared to nurses receiving the self-study module ($p < .05$). Self-learning modular instruction was a reasonable alternative to the lecture and demonstration method in providing a review of BCLS knowledge. This allowed the advantage of reviewing individual areas more thoroughly and skimming other areas according to need. Psychomotor skill performance of BCLS

skills was more difficult to accomplish in a self-study format. A facilitator or more individual instruction of BCLS psychomotor skills was indicated as necessary for some learners. Since individuals learn in different ways, alternative methods of providing instruction should be explored. Nursing education must continue to look at other ways of instruction and investigate the most effective learning methods for each type of instruction.

APPENDIX A

Written Examination-Basic Life Support Course A-Heartsaver

American Heart Association

Questions

Please do not mark on this test. Record your answers on the separate answer sheet

---

1. If you find someone who looks unconscious, what should you do first?

   a. call 911
   b. tap and gently shake the person
   c. get your CPR book and look up what to do
   d. wait until the police come

2. To open the airway of a person who is unconscious, you should:

   a. put a pillow under the person's head
   b. tilt the head and lift the chin
   c. push on the person's stomach
   d. raise the person's legs

3. An adult is <u>not</u> breathing. You should do mouth-to-mouth breathing. You must breathe:

   a. every 5 seconds
   b. every 12 seconds
   c. every 20 seconds
   d. every 28 seconds

4. A person is not awake. To check for breathing you should:

   a. take the blood pressure
   b. find the pulse
   c. look at the color of the skin
   d. look, listen, and feel for breathing

5. You must do chest compressions. You put one hand on top of your other hand:

   a. near the nipples
   b. on the ribs
   c. on the lower half of the sternum
   d. over the right side

6. **You should do chest compressions:**

a. 50--60 times a minute
b. 60--70 times a minute
c. 80--100 times a minute
d. 120--140 times a minute

7. **The first thing to do if you cannot get your initial two breaths to go in is:**

a. open the airway and try again
b. clean out the airway and try again
c. give 6--10 stomach thrusts
d. check the pulse

8. **A person is having a hard time breathing. The person is coughing and making noise. You should:**

a. give 6--10 abdominal thrusts
b. clean out the mouth
c. let the person cough, but stay with the person
d. give the person something to drink

9. **When should you give abdominal thrusts to a person who is choking but is awake?**

a. when the person is coughing hard
b. when the person cannot speak or cough
c. when the person tells you to
d. never

10. **You can stop CPR:**

a. when you think the person will die
b. when the person has a broken neck
c. when another person says the person is dead
d. when the pulse and breathing start again

11. **If the person's stomach looks filled with air when you're doing CPR:**

a. stop giving breaths
b. give more breaths
c. cut down on the air you're giving with breaths
d. just do compressions but no breaths

12. You can reduce the chance that you will have a heart attack:

a. true
b. false

13. If you eat a lot of beef, eggs, and cheese, you increase the chances that you will:

a. live longer
b. get diabetes
c. not have a heart attack
d. clog your arteries with fat

14. You should be careful about how much cholesterol you eat. Foods that are high in cholesterol are:

a. fruits and vegetables
b. eggs, meat, and cheese
c. bread and cereals
d. potatoes and cake

15. If you have high blood pressure, you should:

a. sleep more
b. not exercise
c. stress yourself
d. see a doctor

16. Smoking cigarettes:

a. causes cancer
b. makes heart disease worse
c. can give you breathing problems
d. does all of these things

17. The best way to lose weight is to:

a. not eat for 3 days
b. diet and exercise with your doctor's advice
c. eat only meat and dairy foods
d. eat only fruits and vegetables

18. **You should know about the risk factors for heart disease because:**

a. you know what things might cause a heart attack
b. you will stop smoking cigarettes if you know
c. you will know when you're going to have a heart attack
d. you can recover from a heart attack much faster

19. **You can change some risk factors. Choose the risk factor you can change:**

a. sex
b. family history
c. being too fat
d. age

20. **High blood pressure is a risk factor for:**

a. alcoholism
b. cancer
c. a heart attack or stroke
d. diabetes

21. **The biggest risk factor for stroke is:**

a. drinking too much
b. eating a lot of fatty foods
c. never exercising
d. high blood pressure

22. **The most common sign of a heart attack is:**

a. shortness of breath
b. pain in your chest
c. feeling sick to your stomach
d. dizziness

23. **If you were having a heart attack, it might feel like:**

a. terrible pain in your chest
b. mild pressure on your chest
c. a belt being pulled around your chest
d. any of these things

24. **If someone tells you she has chest pain, you should:**

a. drive the person to your doctor's office
b. start CPR
c. call Emergency Medical Services and keep the person calm
d. call the person's doctor

25. **A person who is having a stroke might say that he:**

a. is dizzy
b. has a chest pain
c. can't hear
d. has back pain

APPENDIX B

One-Person Adult CPR Evaluation Instrument

The One-Person Adult CPR Evaluation Instrument (OPA-CPREI) was designed as an instrument which would serve as a checklist for evaluating one-person adult CPR. Consequently, use of the instrument involves insuring all items on the checklist are either completed or otherwise noted. Each numbered item on the check list is scored as one point, for a total number of 64 points. Score each item Pass (P) or Fail (F) in the appropriate space. Items that are missed or skipped by an individual are score F.

Instructions for Test Administrator

1. Place the learner's section numbers on all pages of the OPA- CPREI in the blanks provided.
2. Tell learners, "You are to perform one-person CPR until you are told to stop."
3. Tell learners, "Do not stop for any reason. Continue even if you make a mistake."
4. Place a mark in the blank next to any skill which is not correctly performed. Note: Skills which are omitted are considered skills which are not correctly performed.
5. When the learner begins the second cycle (after the one minute pulse check) tell them to stop.
6. Thank learner for their participation.

I.D. #: _____

Total Score: _____

ONE-PERSON ADULT CPR EVALUATION INSTRUMENT

Item	P	F
<u>Check for unresponsiveness</u>		
1.Taps or gently shakes shoulders	[]	[]
<u>Call for help</u>		
1.Activates the EMS	[]	[]
<u>Looks, listens, and feels</u>		
1. Establishes correct head tilt chin lift	[]	[]
2. Puts ear over mouth	[]	[]
3. Watches chest for movement	[]	[]
<u>Shield</u>		
1. Applies Shield	[]	[]
<u>Breaths</u>		
1. Maintains open airway	[]	[]
2. Pinches off nostrils	[]	[]
3. Forms seal over mouth	[]	[]
4. Gives two breaths	[]	[]
a. Correct speed (1-2.0 seconds per breath)		
b. Correct volume		
c. Turns or lifts own head between breaths		
<u>Looks, listens, and checks for pulse</u>		
1. Puts ear over mouth	[]	[]
2. Watches chest for movement	[]	[]
3. Checks carotid pulse	[]	[]
a. Above items take 5-10 seconds		

One-Person Adult CPR Evaluation Instrument

	P	F
Compression (1st set)		
1. Correct hand position	[]	[]
2. Locks elbows	[]	[]
3. Gives 15 compressions	[]	[]
4. Correct angle	[]	[]
5. Correct depth (1.5-2 inches)	[]	[]
6. Correct rate (80-100 per minute)	[]	[]
7. Correct rhythm (steady)	[]	[]
8. Correct releases (complete releases without hands leaving chest)	[]	[]
Breaths (1st set)		
1. Establishes correct head tilt chin lift	[]	[]
2. Pinches off nostrils	[]	[]
3. Forms seal over mouth	[]	[]
4. Gives two breaths	[]	[]
a. Correct speed (1-2.0 seconds per breath)		
b. Correct volume		
c. Turns or lifts head between breaths		
Compressions (2nd set)		
1. Correct hand position	[]	[]
2. Locks elbows	[]	[]
3. Gives 15 compressions	[]	[]
4. Correct angle	[]	[]
5. Correct depth (1.5-2 inches)	[]	[]
6. Correct rate (80-100 per minute)	[]	[]
7. Correct rhythm (steady)	[]	[]
8. Correct releases (complete releases without hands leaving chest)	[]	[]
Breaths (2nd set)		
1. Establishes correct head tilt chin lift	[]	[]
2. Pinches off nostrils	[]	[]
3. Forms seal over mouth	[]	[]
4. Gives two breaths	[]	[]
a. Correct speed (1-2.0 seconds per breath)		
b. Correct volume		
c. Turns or lifts head between breaths		

One-Person Adult CPR Evaluation Instrument

	P	F
Compressions (3rd set)		
1. Correct hand position	[]	[]
2. Locks elbows	[]	[]
3. Gives 15 compressions	[]	[]
4. Correct angle	[]	[]
5. Correct depth (1.5-2 inches)	[]	[]
6. Correct rate (80-100 per minute)	[]	[]
7. Correct rhythm (steady)	[]	[]
8. Correct releases (complete releases without hands leaving chest)	[]	[]
Breaths (3rd set)		
1. Establishes correct head tilt chin lift	[]	[]
2. Pinches off nostrils	[]	[]
3. Forms seal over mouth	[]	[]
4. Gives two breaths	[]	[]
a. Correct speed (1-2.0 seconds per breath)		
b. Correct volume		
c. Turns or lifts head between breaths		
Compressions (4th set)		
1. Correct hand position	[]	[]
2. Locks elbows	[]	[]
3. Gives 15 compressions	[]	[]
4. Correct angle	[]	[]
5. Correct depth (1.5-2 inches)	[]	[]
6. Correct rate (80-100 per minute)	[]	[]
7. Correct rhythm (steady)	[]	[]
8. Correct releases (complete releases without hands leaving chest)	[]	[]
Breaths (4th set)		
1. Establishes correct head tilt chin lift	[]	[]
2. Pinches off nostrils	[]	[]
3. Forms seal over mouth	[]	[]
4. Gives two breaths	[]	[]
a. Correct speed (1-2.0 seconds per breath)		
b. Correct volume		
c. Turns or lifts head between breaths		

One-Person Adult CPR Evaluation Instrument

	P	F
Reevaluate Victim		
1. Check Pulse (3-5 seconds)	[]	[]
2. Watches chest for movement	[]	[]
3. Resume CPR as necessary	[]	[]

Total Errors: _____

APPENDIX C

23 Mar 92

Dear Patricia:

I'm happy to hear your study is going well. I was wondering what had happened to you. Please feel free to use my OPACOREI.

Please forgive this handwritten letter. I now own my own company and am so busy at this particular time, that this is the fastest way for me to respond to you. Thanks.

I'm still interested in your study and would very much appreciate that when you return my dissertation, you send a copy of your study or results as best fits your schedule. I like to keep abreast of research in this area and would love to have a copy for my files. Thanks and Best of Luck!

[redacted]

APPENDIX D

DEMOGRAPHIC DATA SHEET

DATE: _____ ID # _____

PLEASE ANSWER THESE QUESTIONS

1. How old are you: _____ (in years)

2. How many years have you been a nurse or Patient Care Tech: _____

3. Number of courses completed in Basic Cardiac Life Support: _____

Date of last completion: _____

4. What is your position: (Please check appropriate answer)

___ 1. Registered Nurse _____ 2. Licensed Practica Nurse

___ 3. Patient Care Tech _____ 4. Graduate Nurse

___ 5. Other (please specify) _____

5. Clinical Area you work in (most of the time):

_____ 1. Cardiology _____ 2. Neuroscience

_____ 3. Nephrology _____ 4. Short Stay

_____ 5. Dialysis _____ 6. Out Patient Clinic

_____ 7. Oncology _____ 8. Orthopedics

_____ 9. Other _____ 10. Outpatient Surgery

_____ 11. Gastroenterology _____ 12. General Surgery

_____ 13. Gero Psych

6. Previous experience in Advanced Cardiac Life Support training:

_____ 1. Yes _____ 2. No

7. Previous experience in performing Basic Cardiac Life Support on an actual sudden death victim:

_____ 1. Yes (where?_____) _____ 2. No

8. Preferred learning method: (Please check all that apply)

_____ 1. Lecture _____ 2. Self-study

_____ 3. Simulation _____ 4. Demonstration

9. Number of one-minute practice cycles needed for course competency:

_____

10. What did you like about this teaching method? Why?

11. What did you not like about this teaching method? Why?

APPENDIX E

LUTHERAN HOSPITAL

LA CROSSE

The following party/individual has the right/permission to use the CPR Self-Learning System for no other uses besides individual educational study:

Patricia Merrill
5473 Bilger Court, Apt. F
Ft. Polk, LA. 71459

[redacted]

David D. Erickson
Marketing Coordinator
Product Marketing
Lutheran Hospital-LaCrosse

1910 South Avenue, La Crosse, Wisconsin, 54601-5400, Telephone (608) 785-0530, FAX (608)785-2181

APPENDIX F

LETTER EXPLAINING STUDY TO EXPERIMENTAL GROUP

Date

Dear Nurse Colleague:

I am a nurse and a master's student in nursing at Grand Valley State University. I am conducting a study regarding the effectiveness of learning methods on BCLS training.

My study involves the use of a self-learning packet as a method to learn and/or review the material necessary to recertify in BCLS. If you agree to enter this study, you will receive a self-learning program instead of attending the BCLS class. This program consists of a self-learning manual and a video demonstrating the performance skills. In addition you may schedule practice on manikins by calling this number 6798. Also enclosed is a consent form if you are willing to participate. After completing the program you may recertify in BCLS at the end of the course you signed up for.

A summary of the results will be available to you upon request. If you have any questions or concerns regarding the study, please contact me at 388-6798.

Thank you for your cooperation and participation in this research project.

Sincerely,

Patricia Merrill, R.N.
Grand Valley State University
M.S.N. Student

APPENDIX G

INFORMATION AND INFORMED CONSENT FOR CPR STUDY

The research you are asked to participate in is a study of different methods of teaching BCLS. As a participant you will agree to be assigned to either of two types of teaching BCLS. You will be asked to fill out a short questionnaire.

Every effort will be made to protect your confidentiality. All data collected will be coded with a number, your name will never be attached. All reports, papers and articles will report findings in group format, no individual data will ever be reported. It is not anticipated that you will be harmed in any way by participating. Your decision to participate or not participate will not affect your employment. You may withdraw your participation in the study at any time.

The personal (and) direct benefits to you are limited. The results of this study will help design BCLS programs that are most effective in learning and retention of BCLS skills.

This study is being conducted by Pat Merrill. She is a graduate nursing student at Grand Valley State University. If you have any questions, she can be contacted at her home 1-(616)-673-8117 or a message may be left at (616) 383-7260.

I have read and understand the information above. I consent, of my free will to participate in the study. I will receive a copy of this permission for my records.

_____ _____

Participant Witness

_____

Date

APPENDIX H

INSTRUCTIONS FOR SELF-STUDY MODULE

This self-study manual contains all the material you need to recertify in BCLS. You need to only follow instructions and complete modules for course A which includes pages 1-43. Short tests are available after each section. You may prefer to take these tests prior to completing each section as a self assessment tool.

In the back of the manual are sheets to use for practice on mannikins. Mannikins are available for practice in Room *** during these times *** ***. A face shield will be available to you at the time you receive your self-study packet.

Please do not discuss this study among people on your unit to maintain the integrity of the study. If you have any questions or concerns, please call Pat Merrill at 383-6798.

*The video should be viewed at the time you practice. Instructions for using the VCR are printed on the top of the video screen.

APPENDIX I

SCRIPT FOR CONTROL GROUP

I am a nurse and a master's student in nursing as Grand Valley State University. I am conducting a study regarding the effectiveness of learning methods on BCLS training.

The only difference required from participants in this study than the usual course is to take the written test and perform BCLS on a mannikin for one minute before training. Results from the pretests are anonymous and in no way affect your BCLS certification.

A summary of the results will be available to you upon request.

Thank you for your cooperation and participation this research project.

APPENDIX J

INFORMED CONSENT FOR CPR COURSES

The course for which you are enrolled may include physical strain, possibility of cross-infection, and emotional stress. If your physician has recommended that you avoid strenuous activity or limit your activity in any way, you need to realize that CPR is hard work! This is true both in practicing on the manikin and doing CPR for cardiac arrest victims.

If you have a medical or cardiac history that may be aggravated by this course, you should consult your physician and ask his advice as to whether or not you should participate in a CPR course.

If you have reservations about being able to perform CPR on a cardiac arrest victim, you should consider this before beginning the course.

If you have recently had any type of infectious disease, including upper respiratory infection or open sores on your mouth or hands, it may be better to defer manikin practice until you are well.

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