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UNIVERSITY OF SAN DIEGO  
Hahn School of Nursing and Health Science  
DOCTOR OF PHILOSOPHY IN NURSING

UNINTENDED PREGNANCY PREVENTION AND ACTIVE DUTY WOMEN

By

Min S. Chung-Park, MSN, WHNP

A dissertation presented to the  
FACULTY OF THE HAHN SCHOOL OF NURSING  
AND HEALTH SCIENCE

UNIVERSITY OF SAN DIEGO

In partial fulfillment of the  
Requirements for the degree  
DOCTOR OF PHILOSOPHY IN NURSING

June 2005

Dissertation Committee

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## ABSTRACT

Studies have shown that a structured education program for women decreases risky sexual behavior identified as vulnerable for AIDS. However, the outcomes from a structured, repeated, educational intervention in reducing the rates of unintended pregnancies have not been studied in military females who are considered as a high risk. The purpose of this quasi-experimental longitudinal study was to implement and evaluate the effects of a reproductive health educational program regarding knowledge, attitudes, decisional balance, self-efficacy, stages of change, and contraceptive use, and to identify independent variables most likely to predict behavior change in the use of contraceptives among single, active duty women during the 4-month study period. The theoretical framework for this study was based on the proposed Contraceptive Behavior Change Model. Descriptive statistics, *t*-tests, contingency tables using chi square, two-way repeated measures ANOVA, regression, and correlation were used to analyze data from the sample of 104 Navy enlisted females recruited from the ships in San Diego, CA. In this study, the program was effective in increasing knowledge and repetitive intervention proved a better long-term effect in knowledge retention. A significant difference in a positive attitude change over time was seen in the experimental group, making subjects more accepting about contraception and family planning. Study variables of knowledge and stages of change correlated positively with contraceptive use, while knowledge, decisional balance measure, cons, and self-efficacy correlated with attitude. Regression analyses indicated that knowledge and stages of change over 4 months of the program explained 90% (experimental group) and 64% (control group) of the variance in contraceptive use at the end of the program. There was a decrease in sexual activity and

greater use of contraceptive methods over time among sexually active individuals in the experimental group, leading to decreased unintended pregnancies. The reduced rate has the potential benefit of a significant cost-savings to the society, as well as improved mobilization readiness and quality of life for sailors and their families. In addition to implementing effective interventions to reduce unintended pregnancy, future research is needed to examine issues surrounding contraceptive non-use and/or to investigate the motivational components of adolescent pregnancy.

## DISCLAIMER STATEMENT

This project was sponsored by the TriService Nursing Research Program, Uniformed Services University of the Health Sciences; however, the information or content and conclusions are those of the author and do not necessarily represent the official position or policy of , nor should any official endorsement be inferred by, the TriService Nursing Research Program, the Uniformed Services University of the Health Sciences, the Department of Defense, or the U.S. Government.

## DEDICATION

Personal support and encouragement for the completion of this project came from many sources and enabled me to carry this project to completion. Firstly, I dedicate this dissertation to the exceptional Navy enlisted females who participated in this study. I would also dedicate this dissertation to the following people.

Special thanks and appreciation go to my husband, Choung Park, who has been very patient, understanding, and flexible with the disruptions in our family life during the past few years and who always encouraged me to pursue my career goals and dreams of becoming a scholar.

Gratitude to my sons, Jeremy and John, for their understanding about mom not having much time to spend with them, knowing when not to disturb, and helping out with the household chores.

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Finally, a very special dedication to my parents for all of the lifetime love and support they have given me, always being there, and for giving me encouragement when I needed it most.

## PREFACE

During my practice as a women's health nurse practitioner, I have encountered many single young women whose lives were turned upside down because of their unintended pregnancies. Their stories raised my concerns and awareness that something needed to be done about it. My increased interest surrounding this issue of the unintended pregnancy led to this study. The following is one of the many women's stories.

Sally is a 20-year-old single active duty sailor who is pregnant. Her pregnancy was unintended. She did not use any contraceptives of her own since her boyfriend, Joe, was using either condoms or withdrawal method. They used the latter method more often than not since he did not like the feel of the condom. Prior to her pregnancy, she received her gynecology (GYN) care from a civilian clinic that was affiliated with the military. Now with the recent change in policy that active duty personnel can only receive care from the military facility, she stopped getting her GYN care. She avoided the military clinic for she did not want her GYN information to be on her military medical record.

When she first told Joe about her pregnancy, he told her to get an abortion. But when she informed him that she was keeping the pregnancy, he left her for another woman, Kelly, whom she knew. The day that she came in for her prenatal visit, she was quiet and withdrawn. Upon questioning, she told me that Joe got Kelly pregnant, too. She was upset at his irresponsible behavior. When he first left her, she was hoping that he would come back to her, since after all, he was the baby's father. Now with Kelly also pregnant by him, she is not sure whether she still wants him back.

Her parents took the news of her pregnancy very hard but now they are supportive of her. Her mother cannot come to help with the baby when she delivers for she cannot



take time off from work. Instead, her younger sister, age 18, who lives in Texas will be in town to help with the baby.

Sally would like to stay in the Navy but she is not sure how things will work out when she has to go out on a deployment. She acknowledges that being a single mom is not an easy task and that she cannot depend on her sister forever. She knows that soon or later, she has to come up with a plan, but for now, she is taking it one day at a time.

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I would like to express gratitude to Nancy Ryan-Wenger, RN. PhD, my consultant, for being such a great collaborator and guiding me through research grant proposal.

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## CHAPTER 1

### Introduction

Despite the reduction in adolescent pregnancy during the past decade, the United States continues to have one of the highest adolescent pregnancy rates in developed countries (Alan Guttmacher Institute [AGI], 2000a) with more than 900,000 adolescent pregnancies each year (AGI, 1999). Although these trends are encouraging, by 2010, the virtual population of girls between the ages of 15 – 19 is expected to increase by nearly 10%, which means ever declining rates may not necessarily mean fewer numbers of pregnancies and births (Kirby, 2001). Consequently, the reduction of adolescent pregnancy remains a *Healthy People 2010* priority (U.S. Department of Health & Human Services [USDHHS], 2000). This is also a concern for the military since unintended pregnancies in young enlisted females have a great impact on mission readiness. Furthermore, the number of unintended pregnancies also causes significant increases in single parents in the military, resulting in additional combat readiness concerns for military leaders. Consequently, the Defense Women's Health Research Program was established in response to Congressional action to address the health of military women. The program also calls for research that emphasizes interventions that directly address health issues influencing women's military service including unintended pregnancy. Although, it is important to provide interventions to women known to be at high risk for

unintended pregnancy, the success of the interventions rests on women adopting and maintaining specific behaviors. Hence, it is crucial to develop an effective intervention or refine existing programs by measuring program effectiveness and discovering what factors are modifiable as a result of intervention efforts.

Over several decades, considerable research has been undertaken to examine various risks and predictive factors in an attempt to better understand what influences adolescents' sexual risk taking behaviors. Kirby's (2001) seminal review of at least 250 studies identified over 100 antecedent-to-teen sexual activities, contraceptive use, pregnancy, and childbearing, and grouped them based upon three foci: sexual antecedents, non-sexual antecedents, and those with both antecedents. Based on these findings, programs have been developed and implemented, and the effect of these programs has been mixed. Overall, studies have shown that both adolescent risk taking behaviors and decision-making customs regarding safer sexual practice are influenced by multiple contextual factors. Thus, experts are increasingly citing the need to develop alternative conceptualizations and program development to address these important factors or determinants of risk-taking behaviors; this takes into account adolescent knowledge and attitudes towards sexual health (e.g., postponing sexual involvement, unintended pregnancy, STDs, safer sexual practices). However, military nursing research in this area is scarce.

#### *Statement of the Problem*

Readiness for combat is the ultimate purpose of the peacetime military; however, little research has been conducted addressing the multitude of health issues that impact readiness for the mobilization of female sailors. One critical readiness issue is unintended

pregnancy because pregnant females are excluded from personnel available for mobilization. Two-thirds of U.S. women (42 million) in the reproductive ages of 15 to 44 years are at risk for unintended pregnancy and over 3 million unintended pregnancies occur every year (AGI, 2000). Ten percent of these at risk women use no method of contraception. Sexual activity with no contraceptive protection carries increased risk. As a result, the 3 million women who use no contraceptives account for almost half of all unintended pregnancies (47%), while the 39 million method users account for 53% of unintended pregnancies (AGI, 2000). The majority of unintended pregnancies among contraceptive users result from inconsistent or incorrect use. For the military, the most recent data showed that 47% of active duty women delivering babies at a large Navy medical facility resulted from unintended pregnancies; 80% of these women were single, 70% were young (18-20 years old), and in low pay grades (Chung-Park, 1999). Although effective birth control measures are available for active duty enlisted women, the continuous trend of unintended pregnancies is a concern for line commanders. Studies have showed that a structured sex education program decreases risky sexual behavior in women identified as at risk for such behaviors. However, studies in the junior active duty Navy enlisted females is lacking.

#### *Purpose of the Study*

This present study is undertaken to implement and evaluate the effectiveness of the comprehensive reproductive health educational program in promoting contraceptive use to prevent unintended pregnancy in active duty Navy enlisted females. If the comprehensive reproductive health education shows significant differences in

contraceptive use over time, the long-term goal would be to incorporate the program into the Navy Training Curriculum and current command sex education briefings.

For the purposes of this study, specific aims included:

1. To examine the effects of the comprehensive reproductive health education program at 4 months on attitudes, decisional balance, self-efficacy, contraceptive use, stages of change, and contraceptive and sexual behavior.
2. To evaluate the effects of the intervention program at 2 months and 4 months for knowledge acquisition and maintenance.
3. To identify the independent variables (i.e., knowledge, attitudes, decisional balance, self-efficacy, stages of change) that help to predict behavior change in the use of contraceptives.

#### *Background of the Study*

Numerous studies have been conducted in the past three decades to examine effects of sexuality education programs in preventing adolescent pregnancy. However, results from these studies have been inconsistent, and there have been controversy over what the best programs and practices are. To overcome these limitations, the framework of this study is based on research findings of factors that place adolescents at risk for pregnancy, the outcomes of intervention programs, and the need to develop alternative research models and conceptualizations that take into account discrepancies addressed in the research literature.

#### *Adolescent Sexual Behavior*

Adolescence is a time of profound biological, social, and psychological change accompanied by an increased interest in sex. Sexual activity among adolescents has

increased during the past three decades (American Academy of Pediatrics, 1999) and many research studies indicated that American adolescents are becoming sexually active at younger ages (Abma & Sonenstein, 2001; Jarrill, 2000). The percentage of females aged 15 to 19 years who have had premarital intercourse doubled from 25% in 1970 to over 50% in 1995 (AGI, 2002b). It is uncommon for teens to revert to abstinence once they have engaged in sexual intercourse (Ehrhardt, 1992). Data from the 1995 National Survey of Family Growth (NSFG) concluded that, among unmarried 18- and 19-year-old females, 65% and 77% respectively had a sexual encounter (AGI, 1999).

In addition to their increased sexual activity, adolescents do not consistently use condoms to protect themselves from unintended pregnancy (AGI 1999; Mosher & McNally, 1991; Seidman & Rieder, 1994). Over three-quarters of adolescent girls in the 1995 NSFG who were sexually active used a contraceptive the first time; however, 29% reported having had unprotected sex in the preceding three months (Abma & Sonenstein, 2001). A sexually active adolescent who did not use contraceptives had a 90% chance of becoming pregnant within one year. As a result of increased sexual activity in the absence or incorrect use of contraceptives, almost 1 million U.S. adolescents become pregnant annually (AGI, 1999), and about one-half gave birth (Henshaw, 1998). Adolescents who become pregnant accounted for 10% of all adolescents aged 15-19 and 19% of those who have had sexual intercourse (AGI, 1999). Besides the risk of unintended pregnancy, the adverse social, financial, and emotional consequences that follow present difficulties for the individual, family, and community.

### *Adolescent Contraceptive Decision-Making*

Multiple factors influence adolescent decision-making in contraceptive use including: cognition, which relates to the mental process of reasoning, perceived risks and benefits, beliefs, attitude, and knowledge; demographic factors (e.g., age of the individual and male partner); role and personal preferences; past experiences; socioeconomic factors; influence of others; and situational factors (e.g., alcohol, drug use). However, in previous studies on adolescent decision-making, researchers have investigated one independent variable at a time instead of integrating all of the related factors into one. As a result, there exists a fragmented body of information regarding contraceptive decision-making by adolescents upon which intervention programs are based. Most importantly, the effects of many of the influencing factors have not been measured against actual contraceptive use, pregnancy, and the late adolescent population. Yet findings have been generalized without investigating the appropriateness of these assumptions. Even the studies that investigated the factors in relationship to adolescents and contraceptive use have failed to take into account the subcategories within the late adolescent age group. For example, the contraceptive behavior of single women in their 20s is markedly different from the contraceptive behavior of single middle adolescents and of married women of the same age. As a result, there is no clear understanding regarding how adolescents actually make contraceptive decisions. Furthermore, the risk (i.e., mediating) factors that have been identified in various categories have not been ranked in terms of significance to the subject or integrated into a model. Most of the research has not been evaluated or replicated in diverse populations or settings, but even those studies that have been repeated or were similar in nature had conflicting findings,



raising more questions than answers. Thus, to help adolescents make informed, rational decisions about the means of preventing unintended pregnancies, society must understand the context in which they make contraceptive decisions. In addition, a decision-making model with a more complete context in which adolescents make contraceptive decisions is essential.

### *Health Behavior Decision-Making Models*

Health behavior decision-making models have been applied to sexual and contraceptive behaviors. Three basic theoretical models, the Theory of Reasoned Action (TRA), the Health Belief Model (HBM), and the Social Cognitive Theory (SCT) have similarities in that they all view behavior to be affected by expected costs and benefits associated with risk reduction. However, abstract assessments of perceived costs and benefits of specific health risk behaviors leave little awareness of the impact of the context on a person's behavior. In the TRA, this cost-benefit dimension is labeled, *attitudes*; in the HBM, *benefits/barriers*; and in SCT, *outcome expectancies*. The TRA and SCT both incorporate social influences on behavior. In the SCT, they take on the form of comparisons with peers (i.e., models), and in the TRA, approval from significant others (i.e., subjective norms). These models do address factors that influence health behaviors, but they are incomplete when considered alone.

These models are geared to adult behavior and fail to take account of the variety of adolescents' experiences and beliefs about sexual matters. Adolescents have different beliefs than adults do about the risk of pregnancy. An adolescent's evaluation of a certain situation may be very different depending on the social environment. In order to evaluate an adolescent's risk behavior and attempt to change it, there must first be recognition of

the social and economic context of the individual adolescent's life circumstances. Thus, to provide a more complete decision-making model for the adolescent, an Adolescent Contraceptive Decision-Making Model (ACDMM), proposed in Figure 1, has been incorporated into this study's intervention.

#### *Adolescent Contraceptive Decision-Making Model*

This adolescent contraceptive decision-making model incorporates constructs from the TRA, HBM, and SCT (i.e., self-efficacy), with the contextual factors found to influence adolescent's contraceptive decision-making. However, unlike these other models, it includes mediating factors and a confluence of numerous interactions affecting behaviors specific to contraceptive use. The ACDMM takes into account the adolescents' different personal and social factors regarding their sexual relationship, with consideration of a developmental period, in an attempt to understand, evaluate, and influence adolescent contraceptive use behavior. Further, this model is dynamic and demonstrates the reciprocal nature of the person-environment relationship of the mediating factors and interaction of behaviors. The model is divided into four categories: cues to decision-making (i.e., problem recognition based on individual perception, situation formulation, alternative generation, and information collection), mediating factors (i.e., personal and environmental variables, consequences evaluation), individual perceptions (i.e., perceived risks, benefits and barriers, self-efficacy), and likelihood of contraceptive decision-making based on cognitive skills (i.e., choices, action plan, expectations). Each category needs to be considered from the adolescent's perspective

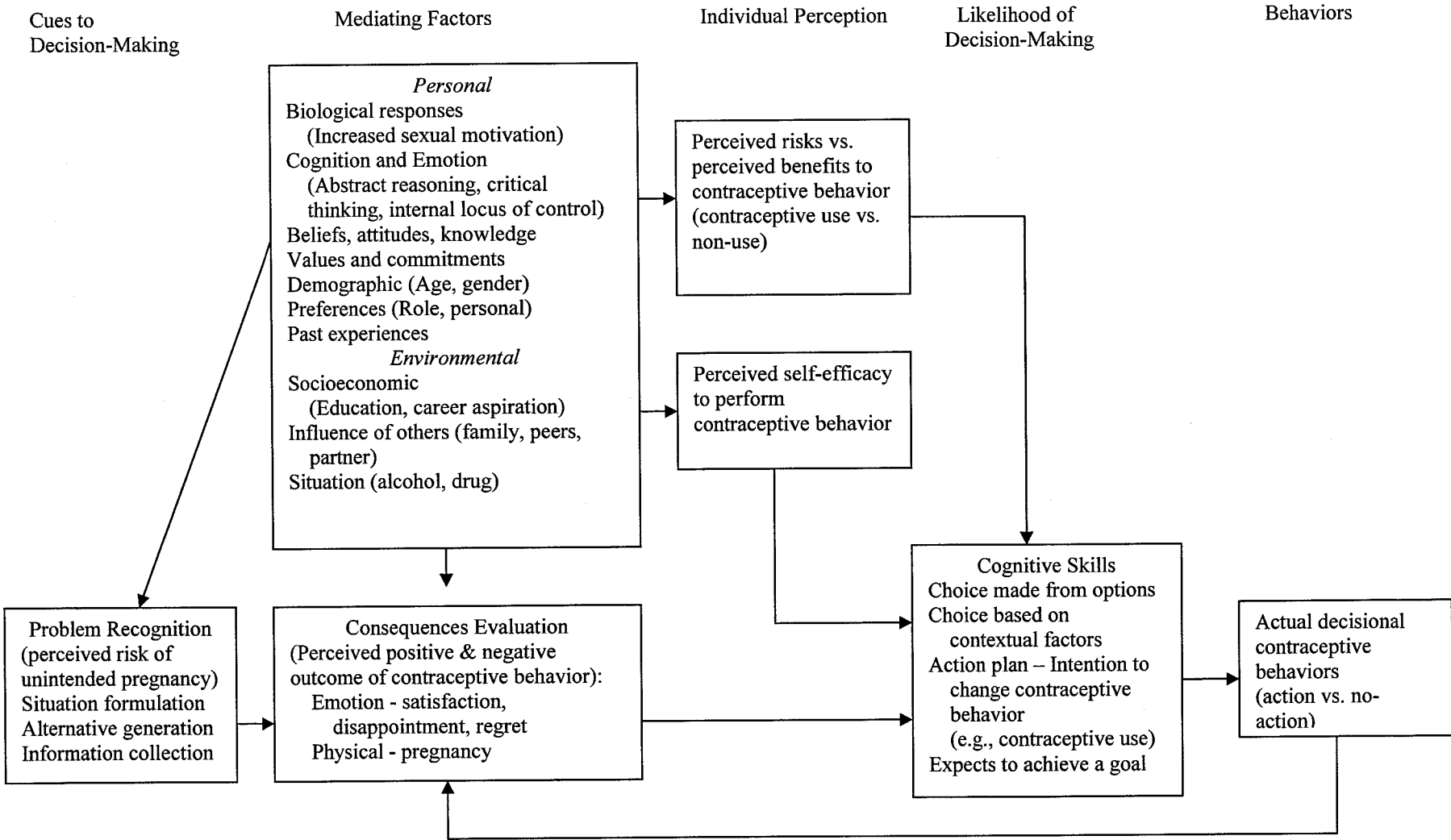


Figure 1: Adolescent Contraceptive Decision-Making Model

taking into account developmental and social structural differences. The following describes the four major cognitive constructs of the ACDMM.

1. *Perceived risk* includes the individual's belief of her own vulnerability to contraceptive behavior problems (e.g., unintended pregnancy, pregnancy-related consequences) and whether an occurrence of these problems will have a significant negative impact on that person's life.
2. *Perceived benefits* are an individual's belief in behavior changes to promote positive reproductive health (e.g., a belief that the use of effective contraceptives will prevent unintended pregnancy).
3. *Perceived barriers* are an individual's belief in the difficulties associated with implementing the recommended behaviors associated with positive reproductive health outcomes, and that the anticipated behaviors are not insurmountable or outweigh the benefits.
4. *Self-efficacy* is the confidence in one's ability to perform effective contraceptive behaviors (contraceptive use to prevent unintended pregnancy).

Additionally, an individual may be stimulated by *cues to decision-making* that may be either personal or environmental factors (e.g., attending an educational program advocating abstinence). Finally, modifying factors that influence health behaviors included in this model are: sexual motivations and current sexual practices, beliefs, attitudes and knowledge of reproductive health issues, psychosocial variables (e.g., values and commitments, preferences, past experiences, influence of others, differing situations), and demographic variables (e.g., age, gender, socioeconomic status). This model proposes that these cognitive constructs and mediating factors influence decision-

making to perform contraceptive behavior and actual behavior. Thus, intervention should be developed to influence the variables (e.g., knowledge, perceptions of beliefs/attitudes, self-efficacy, communication and decision-making skills).

### *Intervention Programs*

The mixed results of the programs in preventing pregnancies, based on the research findings, may reflect that increasing adolescents' knowledge about contraception and their access to family planning services are clearly important and necessary components of any intervention aimed at reducing early childbearing (Cowley, Farley, & Beamis, 2002). However, for many adolescents, other powerful social, economic, and motivational factors play a critical role in determining the extent to which they ultimately decide whether to take steps to prevent pregnancy. Thus, experts are increasingly citing the need to develop alternative research models and conceptualizations that address these important contextual factors or determinants of risk taking behaviors that take into account adolescents' attitudes towards contraceptive behaviors or pregnancy prevention (Kirby, 1999). On the other hand, part of the challenge of studying the adolescent contraceptive behavior and developing interventions to prevent unintended pregnancy is because of the difficulties involved in accurately measuring factors influencing contraceptive behavior change and measuring the cross-sectional and longitudinal intervention effect. Therefore, although programs are making a difference in encouraging youth to remain abstinent or use contraception when they have sex (Kirby, 2001), it remains unclear which emphasis is most compelling in effecting behavioral change.

The Transtheoretical model (TTM), or Stages of Change model (Prochaska, DiClemente, & Norcross, 1992), includes constructs, cognitive (e.g., feelings, beliefs,

attitudes), motivational and social learning believed to influence the progression between stages of change to explain intentional behavior (Prochaska & DiClemente, 1983). This framework offers the perspective that takes into account that not all adolescents are ready, willing, or able to engage in sexual health promotion activities specifically related to pregnancy prevention. This paper goes beyond the original TTM model by proposing the Contraceptive Behavior Change model (CBCM; depicted in Figure 2) as a mechanism for classifying existing primary pregnancy prevention programs, particularly those based on sexual health and HIV education. CBCM is a multidimensional TTM that includes the variables of knowledge, attitudes, sexual activity, contraceptive use, and pregnancy rate. An examination of existing programs provided an increased understanding of which domains were more effective in improving adolescent sexual health, safer sexual practices, and decreased pregnancy rates. A literature review of the previous 2 decades on primary prevention programs emphasizing the prevention of first time pregnancies were reviewed and classified based upon the CBCM (see Table 1).

### *Instrumentation*

Decision-making theory suggests that decision makers construct a *balance sheet* of comparative gains and losses (Janis & Mann, 1977). Hence, the decisional balance approach that emphasizes both the associated benefits and risks was developed to measure the particular behavior in question. Similarly, the TTM identified two constructs that individuals balance when contemplating behavior change: the pros (i.e., benefits) and the cons (i.e., barriers) scale associated with the positive and negative consequences of that behavior (Prochaska & DiClemente, 1986). These approaches, however, have not been applied specifically to adolescent contraceptive use.

Other than the decisional balance measures, there are no universal tools that measure decision-making variables. Instead, several factor-specific instruments to measure decision-making have been developed. The most widely used instrument is the self-efficacy scale. Bandura (1986) proposed that self-efficacy reflects an individual's judgment of his or her capability to perform particular behaviors in specific situations. Self-efficacy was found to be a strong correlate and predictor of participation in many health behaviors, including sexual activity, condom use, and contraceptive use (Galavotti et al., 1995; Levinson, 1995; Marin, Gomez, & Tschann, 1993; Schnell, Galavotti, & O'Reilly, 1993; Wulfert & Wan, 1993).

Thus, to effectively measure factors influencing contraceptive behavior change and the cross sectional and longitudinal intervention effect, the proposed CBCM, a combination of TTM and ACDMM, will address these areas and be used for this study.

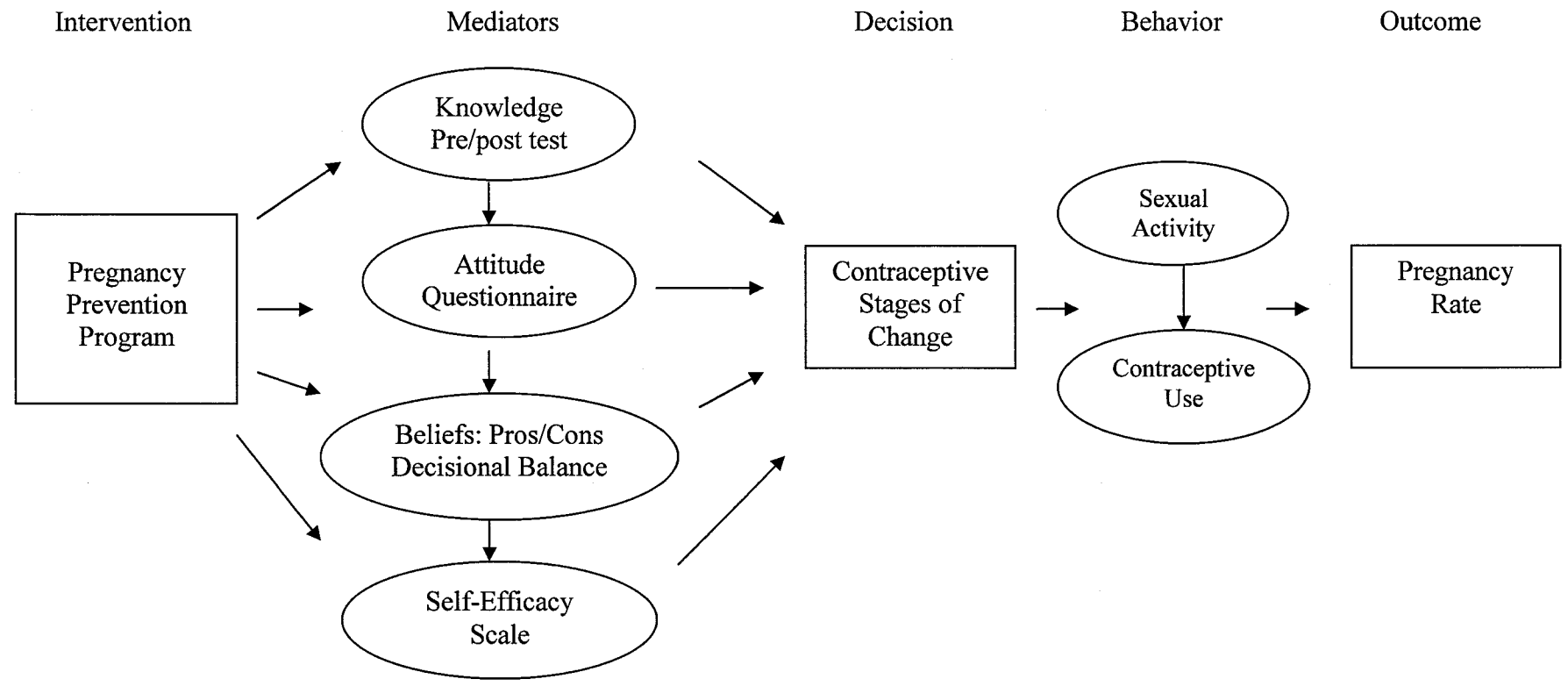


Figure 2. Contraceptive Behavior Change Model



Table 1

*Summary of the Literature Review of Pregnancy Prevention Programs*

Author	Objective	Knowledge	Attitudes /Beliefs	Self-Efficacy (Skills)	Sexual Activity	Contraceptive Use	Pregnancy Rate
Arnold, Smith, Harrison & Springer (2000)	Evaluation of the ENABL program - abstinence-based pregnancy prevention curriculum, Postponing Sexual Involvement (PSI).	X	X				
Berger et al (1987)	Community-based clinic				X	X	
Cagampang & Barth (1997)	School-wide and community-based activities targeted at delaying the onset of sexual activity among youths				X		
Christopher & Roosa (1990)	Abstinence program School-based				X		
Coyle et al. (1999)	Evaluation of effectiveness for the first year of Safer Choices.				X	X	
Dawson (1986)	Determine effect of sex education upon pregnancy & birth control	X			X	X	
Dycus & Costner (1990)	Sexuality course- Involving parents and school counselors on HIV, STDs, & decision-making						X.

Author	Objective	Knowledge	Attitudes /Beliefs	Self-Efficacy	Sexual Activity	Contraceptive Use	Pregnancy Rate
Eisen & Zellman (1992)	Community based program				X		
Eisen, Zellman, & McAlister (1990)	Comparing two types of sex education: Health Belief Model & social learning theory vs. customary sex ed. in school	X	X		X	X	
Ferguson (1998)	Pregnancy prevention program. Abstinence taught for avoiding an unwanted pregnancy, STDs, & HIV/AIDS.	X			X	X	
Franklin et al (1997)	Meta-analysis of 32 outcome studies on the primary prevention of adolescent pregnancy				X	X	X.
Frost & Forrest (1995) School-based adolescent pregnancy prevention programs	Postponing sexual involvement, reducing the risk, school-community program, self center, & teen talk				X	X	
Howard & McCabe (1990)	School-based program developed by hospital				X	X	
Jorgenson et al. (1993)	Abstinence-based pregnancy prevention program Self-development, family values, pregnancy, & STDs.				X		

Author	Objective	Knowledge	Attitudes /Beliefs	Self-Efficacy	Sexual Activity	Contraceptive Use	Pregnancy Rate
Kirby (1985)	Evaluating 9 different programs	X	X	X	X		
Kirby (1991a)	School-based program Preventing unprotected sexual contact by: 1) using contraception methods and 2) abstinence	X		X	X		
Kirby et al (1991b)	Analysis of 6 school-based clinics providing general medical & counseling services				X	X	X
Ku, Sonenstein, & Pleck (1992)	Evaluated formal instruction in AIDS, birth control, STDs, and resisting sexual activity					X	
Levinson (1995)	Sex Education Program					X	
Levy et al (1994)	STD/HIV prevention, pregnancy, resistance, and negotiating skills.				X		
Lewis et al (2000)	Examine the effects of a school-community partnership to reduce the risk of adolescent pregnancy				X		X
Lieberman et al (2000)	Abstinence-based prevention program				X		
McBride & Gienapp (2000)	Client-centered programs to prevent adolescent pregnancy				X	X	

Author	Objective	Knowledge	Attitudes /Beliefs	Self-Efficacy	Sexual Activity	Contraceptive Use	Pregnancy Rate
Malovizky, Lavi & Modan (1997)	Pregnancy and STD prevention workshop				X	X	
Marsiglio & Mott (1986)	National survey - school-based. Measure the sexual activity, effective CC-use, premarital pregnancy rate					X	
Mauldon & Luker (1996)	Effects of school-based sex education on sexual & contraceptive behavior					X	
Miller et al (1993)	Abstinence program				X		
Monahan (2001)	Community based adolescent pregnancy prevention program	X	X		X		
Parcel et al (1985)	Compared different kinds of sex education.	X		X			
Philliber & Allen (1992)	School-based program: Teen Outreach						X
Somers & Fahlman (2001)	Computerized infant simulator used as a teen pregnancy prevention program.		X			X	
Thomas et al. (1992)	School-based program				X	X	X
Vincent et al (1987)	Community-based program						X
Wang, Taylor-Nicholson, & Adame (1989)	Evaluate association between health education and contraceptive use					X	

Author	Objective	Knowledge	Attitudes /Beliefs	Self-Efficacy	Sexual Activity	Contraceptive Use	Pregnancy Rate
Weis et al (1992)	Human sexuality course				X		
Weed & Jensen (1993)	Reviewed 3 abstinence-based SE programs.		X				
Wight et al. (2002)	School based program. (SHARE)				X	X	
Zabin (1986a)	Evaluation of pregnancy-prevention program	X	X		X	X	
Zabin et al. (1986b)	3 yr sex education, counseling program, & contraceptives available at clinic nearby school				X	X	X

### *Gap*

Many studies have been conducted on adolescent decision-making that explore the specific factors influencing sexual behavior and the decision to use contraceptives. However, these studies failed to link these factors to actual execution of the planned action and outcome measures over time leaving a gap between decision-making regarding the practice of birth control protection and actual use. The gap must be closed if decisions are to lead to unwanted pregnancy prevention. Therefore, this study examines the missing link with the intent to close the gap by evaluating the effect of the intervention.

Exploring the link between decision-making and behavior is important since decision-making may not necessarily lend itself to the execution of the chosen course of action (Hewell & Andrews, 1996). This is particularly true because contraceptive decision-making is an ongoing process for adolescents. A decision made at a clinic visit

to practice safer sex may not be the same as the decision made at the time of the actual sexual encounter. Furthermore, no longitudinal research has been done to discover if adolescents who receive continual support in their decision-making will have better outcomes. Hence, longitudinal research is considered in this study to measure the effects of continual support of the adolescents' decision-making skills in relation to outcomes of their contraceptive use decision-making.

*Theoretical Framework: An Overview of Adolescent Decision-making and the  
Transtheoretical Model of Change*

*Definition*

Baumann and Deber (1989) defined decision-making as a situation where a choice was made among a number of possible alternatives, often involving a trade-off among the values given to different outcomes. Hastie (2001) relegated decision-making to the entire process of choosing a course of action, but defined it as *situation-behavior combinations* that included three essential components: alternative actions, consequences, and uncertain events.

The process of decision-making involved resolution, where a distinct and stable choice was made from the formulated alternatives (Friedman, 1996) and resulted in a chosen course of action (Noell, Ary, & Duncan, 1997). Decision-making was made based on knowledge and beliefs that (a) accentuated well-being (Koshar, 1999) and (b) achieved a goal (Dolan, 2000). Decision-making was also influenced by contextual factors (i.e., personal, environmental; Noone, 2002).

Decision-making, therefore, could be defined as a complex, dynamic, situational, and cognitive process influenced by the personal and environmental context of individual

lives. Hence, to have a better understanding of an adolescent's sexual behavior, one must understand the context in which adolescent females made sexual decisions (Rosenthal, 1996).

### *Decision-Making Theories*

Under the general term, decision-making, numerous cognitive and behavioral processes have been implied (e.g., problem solving, choice, options, risk, judgment). Many theories have been developed to explain, measure, and predict decision-making in various disciplines within scientific and social science paradigms. In fact, a variety of theories about decision-making has evolved in the last several decades. Some of the health behavior decision-making theories will be discussed to provide a historical overview of the various health decision-making models as applied to adolescent contraceptive behavior.

#### *Classical Decision Theory*

Theories in decision-making were originally developed in the 1940s by philosophers, mathematicians, and economists (Hastie, 2001) who were most interested in understanding how people chose what action to take to achieve fluid but sometimes conflicting goals in an uncertain world. These early economic theories, called *normative theories of choice*, or *classical decision theory*, were based on an expected utility theory first described by Von Neumann in the 1920s (Von Neumann & Morgenstern, 1947). According to Von Neumann, individuals chose the best alternative that provided the maximum positive utility; his theory prescribed how decisions were made in ideal situations. Evaluation of the quality of decisions often took the form of whether it was based on (a) logical and rational expectations, values, and preferences or (b) the

achievement of ideal optimal outcomes that usually involved comparing the behavior with the rational, normative models.

*Subjective expected utility.* The most common normative theory was the subjective expected utility (SEU) theory that posited that individuals chose one action among a possible set of actions based on their valuations (i.e., perceived costs and benefits) of the possible outcomes of each action. This theory was proposed as an appropriate framework for understanding how individuals made contraceptive decisions (Luker, 1975; McKinney, Sprecher, & DeLamater, 1984). The SEU corresponding to a particular action (e.g., using contraception or not using contraception) was the weighted sum of the valuations attached to that action's possible outcomes (e.g., getting pregnant or not getting pregnant), where the weights were the perceived probability of each outcome. A rational decision maker made the action with the highest SEU value relative to alternative actions (Von Wintefeldt & Edwards, 1986).

*Theory of reasoned action.* Ajzen and Fishbein's (1980) Theory of Reasoned Action (TRA) was applied to the prediction of adolescent risk taking (Lewis, Melton, Succop, & Rosenthal, 2000), but with only moderate success. It postulated that a specific health-protective action was determined mainly by the intention to perform it. Intention was shaped by attitudes toward performing the behavior that resulted from the knowledge of its likely outcome and a normative factor (e.g., beliefs about what significant others thought about the behavior in question). While this model worked relatively well in predicting adult behaviors that were premeditated and rationally governed (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), it was less successful in explaining actions where contextual and emotional factors had a major role. In these cases, intentions were



often thwarted or discarded. One example in the sexual domain was the limited relationship between intention to use a condom and actual use (Finkelstein & Brannick, 2000), with situational factors (e.g., sexual arousal, alcohol use) frequently interfered with young people's good intentions to engage in safe sex (Boldero, Moore, & Rosenthal, 1992). Such situational factors might be more likely to sway adolescents than adults because of their inexperience in dealing with the persuasive power of situations. It was also possible that adolescents actually defined risk differently from adults because of their feelings of being invincible.

*Health belief model (HBM).* This model contained elements of SEU theory, including perceived susceptibility (risk), perceived severity of outcomes, and perceived barriers and benefits of adopting a protective health behavior (Janz & Becker, 1984). This model generally did not compare alternative actions (e.g., using contraception versus not using contraception). Instead, the model assumed that a person weighed the potential benefits and costs of a particular behavior before deciding whether to change. It argued that specific *cues to action*, whether internal or external, were required to trigger changes in health-related behavior. This model was applied to a variety of preventive actions, including adolescents' sexuality education (Brock & Beazley, 1995), adolescent condom use (Hiltabiddle, 1996), and adolescent risk taking in the areas of sexual risk (Rosenthal & Moore, 1994), but with only limited success. One of the problems with this model was that it was geared to adult behavior and had not been specifically adapted to the particular contextual needs of adolescents. For example, an adolescent might report condom use on a paper-and-pencil task assuming a casual partner, but behave differently in a real life situation within an ongoing relationship. Another limitation was the failure to consider

the social and cultural contexts of the adolescent subgroups that resulted in a variety of adolescent responses to sexuality.

*Self-efficacy theory.* Yet, another decision-making model that had been applied to safer sex practices was the self-efficacy theory derived from SCT. This theory asserted that people were guided by perceptions of their competence; therefore, expectations about whether a person should and could execute a behavior would determine initiation and persistence in achieving a desired goal (Bandura, 1990). This theory argued that behavior, cognition, and environment existed in a mutually reinforcing, triadic relationship that could describe, explain, and predict behavior in individuals.

These classical decision theories, however, often failed to incorporate clients' preferences, making their application to nursing situations unsuitable as they did not provide a valid description of the details of the human decision-making processes (Pfetscher, 1997). Lastly, the most recent theory had been the naturalistic theory.

#### *Naturalistic Theory*

Naturalistic theories attempt to describe decision-making behaviors within the context of the personal and situational environment (Balneaves & Long 1999), under which falls the conflict theory model (CTM) of decision-making by Janis and Mann (1977). This model considers decision-making as a stressful process that is influenced by the risk, ambiguity, and conflict present within the choice situation. It describes the social conditions under which high quality decision-making occurs. Conversely, it also describes the stressors that lead to poor quality decisions.

*Conflict theory model of decision-making.* This model, reflective of a stimulus-response approach to decision-making, incorporates personal meaning and environmental

context that the normative theories of choice did not. However, the CTM has limitations. It does not consider the relational interplay among person, environment, and decision-making; instead, within the CTM, the environment is defined as the source of stress, discounting the influence of the person within the decision-making process. Another limitation of the CTM is the lack of consideration for temporal, variation shifts within the decision-making process. This static representation of decision-making fails to acknowledge that appraisal, patterns of coping, and the context of an event may all shift as an experience unfolds. As the relationship between environment and person change, so too will the meaning of an event and the desired outcome (Lazarus, 1990).

These theoretical limitations of the CTM were addressed within Balneaves and Long's (1998) decisional model of stress and coping that integrated decision-making with stress and coping theories. Thus, the concepts of stress, appraisal, and coping were placed within the context of decisional conflict. This embedded model of stress and decision-making is comprised of a series of questions that explore how decisions were made from the perspective of stress (e.g., pregnancy risk), appraisal (e.g., contraceptive use), and coping (e.g., pregnancy) theory. The theory posited that decisional conflict occurred when a choice of options was available and that decisions were made in a dynamic, contextual environment and were influenced by personal and situational factors. Most of the recent research reviewed on client decision-making begins to identify many of these contextual factors (Table 2).

Table 2  
Contextual Factors that Influence Decision-Making

Personal	Environmental
Biological Response	Socioeconomic
Sexual motivation	Education
Cognition and Emotion	Career
Perceived risks and benefits	Social norms
Beliefs, attitudes and knowledge	Influences of others
Self-efficacy	Peers
Self-esteem	Partners
Values and Commitments	Situation
Demographic Variables	Alcohol, drug
Age, gender	
Preferences	
Role	
Personal	
Past experiences	

*Transtheoretical Model of Behavior Change: Theory and Application*

To evaluate the effectiveness of the intervention, the TTM will be used as the theoretical framework. The measures of TTM (i.e., stages of change, decisional balance, self-efficacy) is a useful measurement tool for measuring program effect and understanding what factors are modifiable as a result of intervention efforts. Measures of

behavioral changes are important in determining the effectiveness of the program but measures of the influencing factors are also important in identifying factors that can be countered in the intervention.

The TTM emerged in the fields of addiction and psychotherapy and was originally developed by Prochaska and Carlo DiClemente (1983). The four major components of the TTM include: stages of change (SOC), processes of change (POC), decisional balance (DB), and self-efficacy (SE). SOC attempts to explain when individuals change, while POC focuses on how people change (Prochaska et al., 1992). The two components adopted from other models of behavior change, DB (Janis & Mann, 1977) and SE (Bandura, 1977) are posited as factors that influence the change process.

#### *Stages of Change*

The model postulates that behavior change is a gradual, continuous, dynamic process in which people move through a series of five stages when adopting a health-related behavior (Prochaska & DiClemente, 1983). Therefore, this model (Prochaska & DiClemente, 1983) suggests that interventions will be more efficacious and cost-effective when they match individual stages. However, in this study the intervention will not be stage-matched. No research has examined the outcomes of a contraceptive education intervention against the stages of contraceptive behavior change over time.

The sequence of five stages of change are pre-contemplation (i.e., not intending to change), contemplation (i.e., considering a change), preparation (i.e., actively planning change), action (i.e., actively engaging in a new behavior), and maintenance (i.e., taking steps to sustain change and resist temptation to relapse; Prochaska et al., 1994; see Figure 3). The five stages are best understood using a continuum perspective that depicts the

reality that individuals actually can and do move forward and backward through the stages. Movement backward to any stage is referred to as relapse (Prochaska et al., 1994). Although developed in the area of smoking cessation, TTM has been applied to the study of a wide variety of health issues worldwide with an emphasis on one or all of the model components.

The process of adopting health behaviors using the SOC model has been examined in several studies with adults (Habib, Morrissey, & Homes, 2003; Lam, Chan, Ho, & Chan, 2004; Santelli, Kouzis, Hoover, & Polacsek, 1996). In addition, several studies have used TTM as a tool to assess and describe adolescents' attitudes toward pregnancy, childbearing and level of readiness to contracept (Bloom & Hall, 1999; Cowley et al, 2002; O'Campo et al., 1999).

#### *Decisional Balance*

Decisional Balance (DB) refers to beliefs about the relative positive and negative aspects of a behavior where people tend to weigh the perceived benefits (i.e., pros) against the costs (i.e., cons) involved in adopting a new behavior. The balance between the pros and cons varies depending on where a person is on the continuum of SOC. In other words, with DB, the pros and cons of the behavior in question are used to validate the distinctions among the SOC. The model suggests that when people are in the action or maintenance stage, the decisional balance emphasizes the positive aspects of a behavior change, but when people are in the precontemplation stage, the decisional balance emphasizes the perceived negative aspects. The crossover in the balance between the pros and cons occurs during the contemplation or preparation stage (Prochaska et al., 1994).

<p style="text-align: center;"><b>PRE-CONTEMPLATION</b>          Not thinking about changing behavior          (At least not within the next 6 months)</p>
<p style="text-align: center;"><b>CONTEMPLATION</b>          Seriously thinking about changing behavior in the next 6 months</p>
<p style="text-align: center;"><b>PREPARATION</b>          Still thinking about changing behavior and intends to take action in the next month</p>
<p style="text-align: center;"><b>ACTION</b>          One day to 6 months after people have made the overt change of behavior</p>
<p style="text-align: center;"><b>MAINTENANCE</b>          Beginning 6 months after Action has started and continued with the new adopted behavior.</p>

*Figure 3.* The Transtheoretical Change Model

Studies that have examined the relationship between DB and the TTM for smoking behavior (Herzog, Abrams, Emmons, Linnan, & Shadel, 1999) showed that a person moved through stages of the TTM from pre-contemplation, to contemplation, and then to action. Their movement through the stages occurred as assessment of the pros of the behavior increased and their assessment of the cons decreased. Similarly, other health-related behaviors (e.g., use of condoms and other contraceptives) have shown that positive DB is a good predictor of successful change (Emmett & Ferguson, 1999; Galavotti et al., 1995).

### *Self-Efficacy*

SCT (Bandura, 1986), which postulated that confidence in one's ability to perform a specific behavior (i.e., self-efficacy) was strongly related to one's actual ability to perform it, has also been associated with stages of change. Self-efficacy scores tended to increase in a linear fashion from pre-contemplation to maintenance with individuals in

the later stages, reporting higher self-efficacy than those in the earlier stages (Astroth, Cross-Poline, Stach, Tilliss, & Annan, 2002). Self-efficacy has been linked to the performance of many health behaviors, including learning (Linnenbrink & Pintrich, 2003), exercise (Marcus & Eaton, 1994), body fluid loss (Molaison & Yadrick, 2003), smoking cessation (Segan, Borland, & Greenwood, 2002), sexual activity, condom use, and contraceptive use (Galavotti et al., 1995; Levinson, 1995).

#### *Application of the Model to Adolescent Contraceptive Behavior*

The TTM offers a theoretical framework that takes into account that not all adolescents are ready, willing, or able to use contraception in order to prevent pregnancy. According to the model, sexually active adolescents can be in any one of several different stages of readiness to contracept. While some adolescents are highly motivated to take steps to postpone pregnancy, adolescents at the other end of the continuum may be actively seeking pregnancy. A significant percentage of adolescents fall somewhere in between, harboring more ambivalent or conflicting feelings about pregnancy, childbearing, and contraceptive use (Bloom & Hall, 1999; Zabin, et al., 1993).

The TTM has important implications not only in terms of identifying adolescents at the highest risk for early childbearing but also with respect to the development of interventions aimed at preventing pregnancy. According to the model, different interventional approaches and goals are called for when working with adolescents in different stages of readiness to prevent pregnancy. Research in the areas of HIV and sexually transmissible infections (STIs) prevention has demonstrated that personalized, brief interventions tailored to an adolescent's current level of risk and stage of readiness to change are more effective at reducing high-risk sexual behavior than are approaches



that offer standardized messages and advise (Kamb et al., 1998; Shrier, Ancheta, Goodman, Chiou, Lyden, & Emans, 2001).

It stands to reason that pregnancy prevention interventions tailored to an adolescent's stage of readiness to contracept and that take into account her experiences, current life circumstances, and attitudes towards pregnancy and childbearing would be more efficacious than traditional intervention. Unfortunately, very little research to date has focused on the goals, content, and efficacy of interventions targeted at adolescents who are ambivalent about using contraception, are actively seeking pregnancy, or whose social economic life circumstances otherwise place them at high risk for early childbearing.

#### *Self-Report Measurement of Contraceptive Behavior*

Part of the challenges of studying the contraceptive behavior is due to the difficulties involved in accurately measuring contraceptive use. The term, contraceptive use, describes a very complex and diverse group of behaviors that differ in a variety of ways, including the type (e.g., condom vs. pills), frequency (i.e., how often), duration, and external influences or barriers (e.g., partner, alcohol, drugs). Given these many variables, it is not surprising that the assessment of contraceptive behavior remains as a major challenge for researchers.

A wide variety of methods has been developed to measure sexual behavior. However, available methods of measuring contraceptive behavior are limited. Measurement methods in current use include variety of self-reported measures (e.g., questionnaires, recall interviews; Geary, 2003; Powell-Dunford, 2003). The present study utilized self-report measures of contraceptive use that are often the only feasible method

of assessment in large-scale studies (Bouchard, Shepherd, & Stephens, 1994). Self-reported measures of contraceptive use, however, may be inaccurate due to errors in retrieving information or due to a social desirability bias (Baranowski, 1988).

Nonetheless, the advantages of self-reported measures include that they are relatively inexpensive to collect and require only moderate effort on the part of the subject (LaPorte et al., 1985). In addition, self-report measures, including the stages of change, decisional balance, and self-efficacy used in the present study, have undergone extensive evaluations of their reliability and validity and will be discussed in Chapter 3.

Many researchers and practitioners in the area of pregnancy and STD/HIV preventions are beginning to recognize that a single intervention approach may not be appropriate for all individuals who are engaging in unprotected sex. As with other health-related problems, change agents are shifting the focus of their efforts toward identifying the best fit between the individual's characteristics and intervention strategies.

For this study, the effects of the educational program are being evaluated by means of the model's three determinants: stages of behavioral change, decisional balance (e.g., pros/cons), and self-efficacy. The intention is to show the desired behavior can best be predicted by these determinants. The belief or perception towards the desired behavior, in this case effective contraceptive use is established by balancing the pros and cons of the desired behavior. Efficacy of behavioral skills means that the individual's assessment of her skills can overcome possible barriers of a personal or external nature. Barriers or a lack of certain skills influences the relation between intention and behavior. All remaining factors (i.e., external factors) influence the behavior through the said three determinants. The knowledge factor is not explicitly mentioned in this model but is

interpreted as an external factor in this study. This Model (Prochaska & DiClemente, 1983) suggests that interventions will be more efficacious and cost-effective when they are matched to individual stages. Thus, the intervention may have limited effectiveness if the individual is at the stages of pre-contemplation or contemplation and not prepared to take action. However, as stated earlier, because no research has examined the outcomes of a contraceptive education intervention against the stages of contraceptive behavior change over time, in this study the intervention will not be stage-matched.

### *Summary*

Sexual activity is a complex issue embedded in family, social, and economic factors; therefore, for the intervention to have an impact on unintended pregnancy prevention, it must address those factors. Hence, the TTM was used as a framework since it integrates key constructs from other theories in a way that facilitates the development and evaluation of specific intervention components. Strategies that sway the DB or enhance SE can be identified and directed toward people in different stages of change, and the effect of such program components on stage movement can be evaluated. Interventions that are sensitive to a youth's readiness to change behavior and focus on the cognitive processes important to stage of change may enhance program effectiveness. The proposed CBCM is based on TTM, and its use to examine existing and current intervention efforts may improve the ability to refine, re-design, and implement effective programs. Thus, the findings from this study will be useful in developing or refining existing health education interventions and materials for women in the military. This effort may influence the rate of unintended pregnancies in the military, improve the health and welfare of these women, and overall enhance their quality of life.

### *Significance of Study*

The literature review related to civilian adolescents is relevant to the military population since the problem of teenage pregnancy is similar to that of pregnancy in young single enlisted Navy women. Unintended pregnancies in active duty women are highest in enlisted women aged 18-20 years old and women who are adolescent and newly recruited from civilian life (Chung-Park, 1999; Clark, Holt, & Miser, 1998; Thomas & Lawson, 1989). In both populations, the women are young, experiencing an unintended pregnancy, or intended for the wrong reason, and limiting their opportunities should they decide to keep and raise the child. Young people need assistance in making an informed, rational decision about their contraceptive techniques and provided with the means of preventing unintended pregnancies. However, to date there are no reported studies of a structured, repeated, contraceptive decision-making, skills-building intervention that may reduce the rates of unintended pregnancies in junior active duty Navy enlisted females.

### *Research Question*

The research question considered in this study was, how effective is reproductive health education in promoting contraceptive use to prevent unintended pregnancy among single enlisted active duty women who are sexually active during a 4-month study period?

### *Hypotheses*

The basic hypotheses important to this study were as follows:

1. The experimental group will have changes of attitude in a positive direction at 4 months; the control group will have no changes.

2. The experimental group will have changes on decisional balance (i.e., pros and cons) of contraceptive behavior in a positive direction at 4 months; the control group will have no changes.
3. The experimental group will have changes on self-efficacy in a positive direction at 4 months; the control group will have no changes.
4. The experimental group will have changes on Stages of Change in a positive direction at 4 months; the control group will have no changes.
5. Sexually active women in the experimental group will have greater contraceptive use at 4 months than control group.
6. The experimental group will have a greater contraceptive knowledge acquisition and maintenance than control group at 4 months.
7. The independent variables will significantly predict the dependent variable.

The hypotheses are expressed as clinical hypotheses (i.e., what would represent beneficial clinical changes). In analysis, hypotheses technically expressed for statistical difference testing must be written as hypotheses of no difference. Later in the chapter, these clinical hypotheses will be restated as neutral (i.e., no change).

## CHAPTER 2

### Review of the Literature

The emphasis of this study is on older adolescents and young adults (i.e., 18 to 24 years olds) and their contraceptive behaviors based on their decision-making. The literature review will first describe and define adolescence, and then review contextual factors related to contraceptive decision-making and sexual behavior among older adolescents and young adults. It will then discuss the consequences of those behaviors – unintended pregnancy. The review will more specifically deal with adolescents in general, then adolescents in the military. Lastly, an evaluation of intervention programs and the application of the Transtheoretical Model of Change will be described

#### *Adolescence*

Lerner (2002) defined adolescence as a period of development related to puberty. It represented a physical, social, and emotional transition from the behavior and attitudes of childhood to the behavior, attitudes, and responsibilities of an adult. Understanding adolescent behavior was complicated by the dramatic overlapping changes that occurred physiologically, psychologically, and the changing roles that occurred in this age group. Adolescent development was thought of as three distinct periods: early, middle, and late adolescence (May & Mahlmeister, 1990). However, for the purpose of this study, only older adolescence will be discussed. The terms, *late* and *older*, were used interchangeably in the literature.

### *Adolescent Sexual Behavior and Contraceptive Use*

Adolescent sexual behavior was assessed by the age of the first sexual intercourse and by the patterns of sexual practices and number of partners. Sexuality varied in different cultures, within cultures, and over time. Ethnicity, religion, communication, and geographical location had a role in determining patterns of human sexuality. Education, socioeconomic background, family background, age, gender, and access to health-related information and health care services all influenced how people perceived sexual behavior, what they considered to be acceptable and normal, and what value and priority they attached to sex (Miller, Forehand, & Kotchick, 2000; Santelli, Lowry, Brener, & Robin, 2000b).

Sexual intimacy might be used by the adolescent as a tool for rebellion, as a means of coping with stress or loss, or in an attempt to hold onto a partner who was threatening to discontinue the relationship. Sexual intimacy in adolescence satisfied sexual urges and provided physical and emotional pleasure. It nonverbally expressed commitment and expressed maturity. It affirmed sexual identity as male or female to peers, parents, and oneself. Some adolescents engaged in sexual intimacy for reward, especially those who were runaways supporting themselves, exchanging sex for drugs, or money to buy drugs (Lerner, 2002).

In adolescence, sexual concerns and behaviors became an important part of daily living and were linked to falling in love, erotic imagery, and involvement with another person (Lerner, 2002). Once adolescents initiated sexual activity and were experienced, intercourse *just happened* and was not planned. It was uncommon for teens to revert to abstinence once they engaged in sexual intercourse (Ehrhardt, 1992).

Sexual activity among adolescents increased during the past three decades (American Academy of Pediatrics, 1999). Research studies indicated that American adolescents were becoming sexually active at younger ages each year (Abma & Sonenstein, 2001; Jarrill, 2000). Females aged 15 to 19 who experienced premarital intercourse doubled from 25% in 1970 to over 50% in 1995 (AGI, 2002b). Data from the 1995 National Survey of Family Growth (NSFG) concluded that, among unmarried adolescent females aged 18 to 19, 65% to 77%, respectively, had a sexual encounter (AGI, 1999b). An early age of sexual intercourse was associated with risky behaviors including drug use (Jessor, Costa, Jessor, & Donovan, 1983), not using contraception at first intercourse (Abma & Sonenstein, 2001; Mosher & McNally, 1991), having more sex partners (Ericksen & Trocki, 1994), and more frequent intercourse than older women (i.e., age 29-37; Borsay-Trindle, Gilzean, & Pass, 1991). In addition, their behaviors put them at risk for pregnancy.

Previously, researchers documented that adolescents did not consistently use condoms to protect themselves from an unintended pregnancy (AGI, 1999b; Seidman & Rieder, 1994). In fact, American adolescents used contraceptives much less than adolescents from other developed countries (AGI, 2002a), and often use contraceptives incorrectly (AGI, 1999b). According to the 1995 NSFG, of the high school students who had had sex during the preceding three months, 42% of females and 72% of males reported using a condom the last time they had intercourse (Santelli et al., 2000a).

Individuals were less likely to use condoms when consuming alcohol and previous studies found alcohol to be associated with increased risk of pregnancy (Ericksen & Trocki, 1994; Flinn, 1999; Keller, Duerst, B., & Zimmerman, 1996; Murphy,



Monahan, & Miller, 1998). In addition, among adolescents who were sexually active, 64% reported having sex after drinking and 15% reported engaging in sex after drug use. Strunin and Hingson (1992) report condoms were used more often when there was no drinking.

### *Military Women Sexual Behavior and Contraceptive Use*

Published literature on sexual behaviors and contraceptive use among military members was limited, particularly on the efficacy of the pregnancy prevention program in the military. Despite the pervasiveness of sexuality in the media and the wide spread existence of reproductive health education programs, many active duty women at the greatest risk of unintended pregnancy remained uninformed about appropriate preventive measures. For example, in a study of new female Army recruits ( $n = 13,204$ ), 91% of the women reported having vaginal sex prior to basic training, 31.4% had more than one partner, and only 16.9% stated that they always used a condom (Gaydos et al., 1998). Clearly, the risk for pregnancy was high among recruits. Borsay-Trindle et al. (1991) found that, among 112 active duty Army females, contraception was practiced by 44% of unmarried and 61% of married subjects. These findings were congruent with civilian sector data that confirmed unmarried females in casual relationships were least likely to use contraceptives (Abma & Sonenstein, 2001; Bachrach, 1984). Moreover, similar to the civilian counterparts, large proportions of both first-term and recruit marines were uninformed or confused about effective contraception (Thomas & Lawson, 1989). For example, less than one-third of female recruits and first duty assignment male marines could correctly identify the time of the month when a woman was most fertile. Of concern was the finding that less than half knew the likelihood of pregnancy when no

contraceptive method was used. Moreover, health risks and side effects of the *pill* were greatly overestimated. Gallagher, Lall, and Johnson (1997) also reported a substantial knowledge deficit regarding contraception and reproduction among a sample of 158 male and female U.S. Navy sailors assigned to Navy ships. Similarly, another study by Battista, Creedon, and Salyer (1999) showed that among 564 male and female active duty Army enlisted medical trainees, a knowledge deficit concerning the newer forms of contraceptives existed. The report also suggested that medical care access for obtaining contraceptives might be difficult for members while in training.

A study by Clark et al. (1998) showed that 55% ( $n = 347$ ) of soldiers presenting for prenatal care at a large Army facility reported that their pregnancies were unintended at the time of conception. In this study, junior enlisted (i.e., E1-E2) reported the highest rates (82%) of unintended pregnancies at the time of conception. These unintended pregnancies resulted from both contraceptive non-use (62%) and contraceptive failure (38%). Reasons cited for non-use of contraceptives included unanticipated intercourse, the desire for intercourse to be spontaneous, and fears of complications from BC methods, particularly oral contraceptives. Contraceptive failure resulted from incorrect and inconsistent use of contraceptives. Consistent contraceptive behavior involves a sequence of psychological and behavioral events. These events included awareness of pregnancy risk, obtaining adequate BC information and deciding to use this information regularly (Clark et al., 1998; Shuler, 1995). Thus, unintended pregnancies resulted not only from contraceptive non-use but from improper contraceptive use as well. In addition, these data suggest that young, single females were at high risk for unintended

pregnancies. The percentages of unintended pregnancies were significant enough to warrant the development of interventions to decrease the incidence of such pregnancies.

### *Unintended Pregnancy*

Approximately 42 million, or 7 in 10, women of reproductive age (i.e., 15-44 years) in the United States are at risk for unintended pregnancy. The level of contraceptive use in the United States among these women has grown to nearly 90 percent. Despite this high level of contraceptive use, unintended pregnancy remains a substantial problem. Of the 6.3 million pregnancies that occurred in the United States, almost half (49%) – over 3 million – are unintended (AGI, 1999a); 1 million occur in adolescents (AGI, 1999), and half of them actually give birth (Henshaw, 1998).

Maternal age, marital status, race, income, parity, and education are sociodemographic risk factors linked to unintended pregnancies. Independently or in combination with one or more of the other sociodemographic risk factors (e.g., maternal age, marital status, income) have been found to be predictors for unintended pregnancies. Although the level of unintended childbearing has been high in almost all socioeconomic subgroups of women, the proportion of births that were mistimed or unwanted was 50% or greater among the following: age groups 15-24 years, never married women (73%), black women (66%), women living below the poverty level (64%), women with fewer than 12 years of education (58%), and women who already had two children (53%) or three or more children (60%; Kost and Forrest, 1995). In addition, some socioeconomic subgroups of women who tended to have poor pregnancy outcomes, those who were unmarried, young, and poor or low-income, had disproportionately higher levels of

unintended childbearing (Denton & Scott, 1994; Forrest, 1994; Rosenfeld, Zaborik, & Batson, 1994).

Well documented in the literature was that women with unintended pregnancies were less likely to seek early prenatal care (Kost, Landry, & Darroch, 1998; Magrab & Danielson-Murphy, 1979), were more likely to expose the fetus to harmful substances (e.g., alcohol and tobacco: Kokotailo et al., 1992), and were more likely to be the victims of domestic violence (Naimi et al., 2003). Thus, developing and implementing an effective reproductive health education program to curtail these unintended pregnancies is essential.

#### *Unintended Pregnancy in the Military*

A literature review related to the civilian adolescent was relevant to the military population since the problem of teenage pregnancy was similar to that of pregnancy in single enlisted Navy women. Unintended pregnancies in active duty women were highest in enlisted adolescents aged 18-20 and those newly recruited from civilian status (Chung-Park, 1999; Clark et al., 1998; Thomas et al., 1989). In both populations, the women were young, either experiencing an unintended pregnancy or one intended for the wrong reason, and had limited their opportunities if they decided to keep and raise the child.

According to Thomas and Uriell (1998), the surveys of Navy women in 1988, 1990, 1992, and 1997 indicated that only about 40% of the pregnancies were planned, and the youngest women had the highest rate of unintended pregnancy. In 1999, approximately 12% of the enlisted women ( $n = 2647$ ) became pregnant. Of these pregnancies, 55% were unintended and birth control was not used. Moreover, almost half of the women (40%) who became pregnant were single and never married, and 75% of

them were in the pay grade of E4 and below (Thomas & Mottern, 2002). A study by Thomas et al. (2001) in 1995 of 299 Navy-enlisted women showed that, out of a 9.7% pregnancy rate, 48.3% were unintended. Unintended pregnancy was associated with single marital status, younger age, having new partners within the past six months, more partners within the last six months, and inconsistent condom use. Moreover, one study found that pregnancy accounted for 16% of medical evacuations out of Persian Gulf theater (Markeson, Raez, & Colavito, 1992).

This ongoing trend of unintended pregnancies has a great impact on readiness and has been a concern for line commanders. As more women enlisted in the military, the incidence of unintended pregnancies was likely increased and had an impact on one of the goals of military leaders, which was to have 100% of individuals in a unit able to perform at their full capacity. The impact of unintended pregnancy on the female sailor's unit might result in months of non-deployable and modified duty, 12 prenatal care visits during pregnancy, and 6-8 weeks of convalescent leave. She might be transferred out of her unit and military specialty if occupational hazards could affect her unborn child (Clark et al., 1998). There were many dangerous and critically important specialties in the military. As more and more fields opened up to women, it was critical to eliminate any threat of illness or condition, in particular, preventable conditions such as unintended pregnancy that would interfere with a woman's ability to perform her assigned duties and, consequently, perform and complete a mission.

Women in military service who became pregnant experienced conflict between their work and parental roles. Consequently, some left the service (Adde, 1988). Clark et al. (1998) reported 20% of soldiers at a large Army medical facility with unintended

pregnancy planned to leave the army because of the pregnancy. This loss in trained soldiers could significantly impact unit morale and readiness. Unintended pregnancy also had an impact on the member and family, which might consist of early marriage; social, emotional, and financial problems; abortion; and voluntary discharge from the service. Moreover, the costs of unintended pregnancy to society were likely to be considerable (Coley & Chase-Lansdale, 1998).

Historically, active duty women were separated involuntarily from the military if they became pregnant (Holm, 1982). In 1975, the Department of Defense issued a directive to all military services that instituted the policy to provide women who became pregnant the choice of remaining in the service or being given an honorable discharge (Gerrard & Royle, 1985). Currently, military women who want to remain in the service while pregnant may do so. However, if they determine that their pregnancy and/or the resulting demands of childbearing render them unable to perform their military duties, they could request a discharge (Evans & Rosen, 1997). Consequently, the military suffered the monetary loss spent in the training of those service women and unknown numbers of hours of anticipated service. Thus, unintended pregnancy became a readiness issue and a cause for concern when women were excluded from mobilization availability. Women have been a minority in the military. The overall numbers of active duty women in the Navy as of 30 September 2004 is 54,248 (14.5%) and of these 45,415 (83.7%) are enlisted women (Department of Defense, 2004). The hierarchical, paternalistic military culture might be a unique factor that put military women at higher risk for unprotected sexual behavior.

### *Adolescent Decision-Making*

Theoretical perspectives relative to adolescent cognitive and psychosocial development are important in understanding how adolescents make decisions based on their developmental stages. The tendency for adolescents to initiate sexual activity without the use of contraception, despite health education efforts provided by the school (Kann, Brener, & Allensworth, 2001), and clinicians to prevent unprotected intercourse, led numerous investigators to examine a host of potential predictors of contraceptive use and decision-making. Studies indicated that decisions were rooted in biological responses, cognitive and emotional development, individual perceptions, personal values, and personality (Gordon, 1996). Pressure from self, peers, partners, parents, other adults, and the media all affected the understanding of available alternatives that impacted decision-making (Flinn, 1999; Moschis & Moore, 1979; Pesa, Turner, & Mathews, 2001). It was assumed in the literature that decision-making was influenced by contextual factors that could be categorized as personal and environmental (see Table 2).

#### *Personal Factors in Adolescent Contraceptive Decision-Making*

##### *Biological Responses*

Increased sexual motivation in teens was the result of hormonally induced physiological changes. In addition, adolescence was a period of physical transition, identity formation, and autonomy development (Gage, 1998). Interrelated with the biological changes were psychological changes of cognition and emotion. Cognition became abstract and hypothetical and emotions involved feelings about sexuality and changing relationships. As adolescents went through these changes, they were vulnerable and at risk to peer pressure. Hence, perceptions about what their peers were doing and

what was accepted in their peer groups might influence their motivations to engage in sexual activity. To protect the self from fear, confusion, or alienation about what was happening, the adolescent must cope with these new psychological characteristics (Lerner, 2002).

Erickson's (1963) psychosocial development theory proposed eight psychosocial stages and accompanying crises. In Stage 5, puberty and adolescence, the crisis was between developing a sense of identity (e.g., knowing one's role in society, knowing what one believed in) versus role confusion or identity diffusion (e.g., not knowing what one believed in or what one could do with oneself in society). In Stage 6, young adulthood, there was a crisis between developing toward a sense of intimacy (e.g., establishing a strong love relationship) versus a sense of isolation (e.g., feeling alone and unable to be close to anyone).

Individuals in late adolescence (aged 18 to early 20s) looked like adults, were fertile, and were accepted as adults. Generally, they had a well-established sexual identity and the ability to have sexual intimacy that satisfied sexual urges and provided physical and emotional pleasure. Sexual intimacy might be used by the adolescent as a means of coping with stress or loss, or in an attempt to hold onto a partner who was threatening to discontinue the relationship (May & Mahlmeister, 1990).

The age ranges used in the literature varied. The U.S. Department of Education defined adolescence as ages 14 to 24 while the Office of Technology assessment used ages 10 to 19 (Rogers & Newcomer, 1999). Also, subcategories within that age range, such as ages 18 years into the early 20s, were categorized as late adolescent, the same as the ages used in this paper. Thus, Erickson's young adulthood stage was included above.



Furthermore, in the military service, the late adolescent age group was considered young adult.

### *Cognition and Emotion*

Piaget proposed that cognition developed through four stages: sensorimotor, preoperational, concrete operational, and formal operational. The concrete operational stage of reasoning was typical of an 8- or 10-year-old child, while the formal operational stage of reasoning was the stage representative of adolescents and adults in Western society. This formal operational reasoning stage was relevant to adolescent decision-making about contraceptives and pregnancy (Gordon, 1990). Three main concepts underlie these two operational stages: concrete versus abstract thinking, present versus future orientation, and consideration of only some options versus all options (Lerner, 2002). Early in the formal operational stage, young adolescents became increasingly able to reflect upon their own thinking as well as the thinking of others. However, before these abilities matured, the adolescent failed “to differentiate between the objects toward which the thoughts of others are directed and those which are the focus of his own concern” (Elkind, 1967, p. 1029). This lack of differentiation could lead a female adolescent to believe that others were as preoccupied with the object of her own thoughts, feelings, and experiences as she was (i.e., imaginary audience). Because of the attention, this adolescent came to believe (i.e., personal fable) that she was a special, unique person, immortal and invulnerable (Elkind), and that might lead her to engage in risk-taking behaviors.

Cognitive developmental skills have influenced the antecedent (i.e., cues) of decision-making. Hence, when an individual faced a sexual decision-making situation,

the decision maker might have the ability not only to recognize the situation requiring a decision, but also to formulate ideas about the situation. He or she must also be able to generate alternative coping actions, make predictions about the possible outcomes of various sexual behaviors (Holmbeck & Crossman, 1994), and realize that options were available (Noell, Ary, & Duncan, 1997). Thus, acquisition of resources and knowledge was important.

In Gilligan's (1996) moral development work, similar to intellectual development and the ability to reason, identified the period of adolescence for girls as a time of crisis and "out of reach of the intellect" (p. 241). Thus, the ability of adolescent girls to have the appropriate knowledge to make good decisions for themselves was influenced by their own personal life knowledge and experiences.

In Johnson and Green's (1993) study of 14- to 18- year-old unmarried females' cognitive capacity, the adolescent's abstract reasoning was the most significant predictor of contraceptive decision-making. This finding was consistent with the literature, which postulated that certain aspects of abstract reasoning (e.g., the ability to take more than one perspective), was required for more mature decision-making (Inhelder & Piaget, 1958; Keating, 1980). Likewise, cognitive developmental skills, such as critical thinking or verbal reasoning (Carroll & Johnson, 1990; Friedman, 1996; Green & Johnson, 1992; Haynie & Alexander, 1997; Noell, Ary, & Duncan, 1997; Sigman-Grant, 2002) and internal locus of control (Sandler, Watson, & Levine, 1992) were required in decision-making (Holmbeck & Crossman, 1994).

*Perceived risks and benefits.* According to Redelmeier, Rozin, and Kahneman (1993), an ideal decision maker, during the process of decision-making, gathered all

available information about a situation and calculated the costs and benefits of every feasible option before an optimal choice was made. Various options were evaluated based on desires (e.g., utilities, personal values, goals, ends) and beliefs (e.g., expectations, knowledge, means) for meeting the goal or goals (Byrnes, Miller, & Reynolds, 1999; Dolan, 2000).

Several studies reported the perception of being at risk for negative outcomes of risk-taking behaviors (e.g., pregnancy), as an influential factor in decision-making (Burns, 1999; Grimley, Riley, Bellis, & Prochaska, 1993; Redelmeier et al., 1993). Parsons, Siegel, and Cousins (1997), on the other hand, reported that perceived benefits were more predictive of involvement in risk-taking behaviors (e.g., having sex without condom), by late adolescent college students (ages 17 to 20) than were perceived risks. Yet, in another study by Rolison and Scherman (2002), who assessed the effects of perceived benefits and risks, sensation-seeking, and locus of control on risk-taking involvement, findings differed from those of Parsons et al. (1997).

In Rolison and Scherman's (2002) study, three validated measures were administered to 171 older adolescents (ages 18 to 21 years) at a southwestern U.S. university. Results indicated that perceived risks affected risk taking more significantly than perceived benefit; perceived risk correlated negatively with risk involvement. Rolison and Scherman also found a strong positive correlation between sensation-seeking and risk-taking involvement; however, locus of control had no correlation with risk-taking. In this study, risks and benefits were not defined, but left to the perception of the adolescents. Therefore, behaviors that were generally labeled as risky might not have been viewed as such by the participants. This limitation was addressed in Roye and

Seals's (2001) study of 39 female adolescents (aged 15 to 21), where risks were defined for a specific condom use behavior. This study was based on the HBM and involved open-ended interviews. Decision-making that was based on perceived risk of pregnancy was a more potent stimulus for condom use than perceived risk of disease with a steady partner (Roye & Seals).

*Beliefs, attitudes and knowledge.* Cognitive factors (e.g., beliefs, attitudes, knowledge), also functions of a person's perception, were shown to be strong predictors of social behaviors, such as adolescent contraceptive behavior (Conner & Norman, 1996), as well. Studies involving these factors related to contraceptive use found that positive attitudes and level of knowledge were significantly correlated with contraceptive use among adolescents (Adler et al., 1990; Barnett, Papini & Gibur, 1991; Morrison, 1985). Adolescents with higher levels of cognitive development had more knowledge about sexuality and contraception and were more likely to report using contraception during sexual intercourse (Holmbeck & Crossman, 1994; Mann et al., 1998). Similarly, increased knowledge among 80 adolescent females ages 16 to 20 was associated with perceived benefit and stronger intentions of seeking preconception counseling to prevent unplanned pregnancy (Charron-Prochownic et al., 2001). In this study, subjects participated in one-hour, structured phone interviews. Their beliefs, attitudes regarding pregnancy, and birth control use were assessed according to the HBM.

The personal beliefs toward the behavior, perceived social pressure, and perceived self-efficacy were also influential factors in condom use for safer sex decision-making among college students with a mean age of 21.4 years (Wulfert & Wan, 1993). However, sexual attitudes, AIDS knowledge, and perceived vulnerability did not predict condom

use. This study applied Bandura's self-efficacy theory to condom use. The participants completed a self-report questionnaire regarding sexual practices and attitudes, AIDS knowledge, peer group comparison, and condom use expectations. The limitation of this study related to the generality of its findings. The variables correlated with safer sex behavior in this study was related to the prevention of HIV infection and not pregnancy; thus, it was not specifically relevant for groups at risk for pregnancy.

*Self-efficacy.* Another factor having an impact in decision-making was contraceptive self-efficacy that related to contraceptive behavior. Self-efficacy, defined as a female's expectations as to whether she could exercise a behavior, determined initiation and persistence in achieving a desired goal (Levinson, 1995). Charron-Prochownic et al. (2001) found that greater self-efficacy was associated with lower barriers to seeking preconception counseling and stronger intentions to perform positive reproductive health behaviors. More social support was related to teens having greater knowledge and self-efficacy. Thus, knowledge, self-efficacy, and social support played a significant role in influencing health behaviors.

#### *Values and Commitments*

Valuations of pregnancy are influenced by perceptions of peer norms regarding contraceptive use and/or adolescent childbearing by perceptions of the partner's attitudes toward contraception and/or childbearing in the context of their relationship or of the partner's degree of commitment to the relationship. An additional stimulus is the perceptions of parents' attitudes toward contraception and or childbearing (Weisman et al., 1991).

### *Demographic Variables*

*Age.* Age emerged as salient in relationship to the contraceptive use outcome. Results indicated that older adolescents (i.e., aged 15-20) performed better on measures of contraceptive use than younger adolescents (i.e., aged 11-14; Franklin et al., 1997). An age differential, one of young age with an older partner, was also a critical predictor for a decreased chance of using birth control protection (Abma, Driscoll, & Moore, 1998). According to Charron-Prochownik et al. (2001), older adolescents used more effective birth control methods more frequently than younger adolescents did. Furthermore, older teens had greater self-efficacy and stronger intentions to perform positive reproductive health behaviors. In contrast, younger adolescents might be at higher risks for negative consequences. Thus, it supported the growing concern that younger teenagers were having sex earlier (Jarrill, 2000).

Age difference between the adolescent girl and her first sexual partner was significantly associated with contraceptive use at first intercourse. Adolescents who had their first sexual intercourse with men substantially older than they were (i.e., six or more years) reported lower rates of contraceptive use. Age and race of the first sexual partner, however, had no effect on contraceptive method use (Manning, Longmore, & Giordano, 2000).

*Gender and self-esteem.* Holmbeck and Crossman (1994) reported gender differences among adolescents where high self-esteem was predictive of contraceptive use for females as well as predictive of sexual activities for males. Gallagher, Lall, and Johnson (1997) evaluated the sexual knowledge (i.e., contraceptive and reproductive knowledge), contraceptive use, and self-esteem among a sample of 158 male and female

U.S. Navy sailors aged 17 to 44. In their study, there was a gender difference in that females demonstrated significantly greater sexual knowledge than their male counterparts did. Greater knowledge was predictive of a more consistent use of contraceptives during initial and subsequent sexual experiences. Higher self-esteem was also associated with greater sexual knowledge.

### *Preferences*

Another aspect of decision-making was preferences; behavioral expressions of choosing one course of action over others. Preferences were divided into two subcategories: role and personal (Hastie, 2001). Role preference referred to the degree of control desired by an individual over the decision process and was classified as passive, collaborative, or active (Pierce & Hicks, 2001). Personal preference, on the other hand, referred to where the individual had influence on the choice of action. This could cause decision conflict if the individual was pulled between his or her own preferences and the preference of a health care provider and/or family members (Pierce, 1993; Paterson, Russell, & Thorne, 2001). In a study that focused specifically on contraceptive preferences among younger adolescent (St. Lawrence, 1993), 195 adolescents (M = 15.3 years) completed self-administered measures regarding contraceptive preferences. Girls preferred the pill, which implied that pregnancy prevention was the most important factor in their selection. Boys, on the other hands, preferred condoms. A potential explanation for the pattern of preferences was that each sex opted for a method within its own control and was unwilling to entrust the sexual partner with contraception.

### *Past Experiences*

Decision-making was based on past experiences, expert knowledge, and expected outcomes (Bonner, 2001; Gilligan, 1996; Wulfert & Wan, 1993). Outcomes of the decision-making process were consequences, or the subjective evaluative reactions, that were measurable on a positive and negative (e.g., good-bad, gain-loss) scale. These consequences could be classified into two categories: (1) positive outcomes that provided satisfaction and where one accepted the decision and (2) negative outcomes that led to disappointment or regret causing dissatisfaction. The difference between the two negative outcomes was that disappointment might not influence the individual's future decisions, but regret might influence them (Hastie, 2001). One experienced disappointment when the chosen option turned out to be worse than one expected outcome (Schwarz, 2000). In contrast, regret might be experienced (Janis & Mann, 1977; Pierce & Hicks, 2001) even when one got what was expected and realized in hindsight that another course of action would have been better (Rolison & Scherman, 2002).

### *Environmental Factors in Adolescent Contraceptive Decision-making*

The quality of a decision was influenced by the interaction of internal and environmental factors (Koshar, 1999). Consequences were also dependent on the type of solution one chose as the most favorable course of action. *Good decisions* were defined as those that had been effectively chosen by the decision maker based on the means available in the given circumstance to achieve his or her goal that led to satisfaction (Byrnes, Miller, & Reynolds, 1999; Hastie, 2001; Pierce & Hicks, 2001). However, what constituted a good decision might vary depending on what decision makers themselves brought to the situation; hence, it could not be generalized.



*Socioeconomic*

Socioeconomic factors that increased the motivation to control fertility (i.e., pregnancy prevention) included educational and career aspirations (Tanfer & Cobbins, 1992), but the mother's education and religiousness did not attain statistical significance. Contraceptive decision-making was unaffected by race, length of the relationship, and current living arrangements. Data from the 1983 National Survey of Unmarried Women were used to analyze factors that affected contraceptive decision-making among single women aged 20-29 who were at risk of pregnancy. Data consisted of 1,314 interviews – 1,149 from a household sample and 165 from a dormitory sample. Similarly, religious affiliation had no influence on sexually active young women's contraceptive decision-making (Waiz, 2000).

*Influence of others.* Personal and social experiences (e.g., peer acceptance, peer pressures), were critical to contraceptive decision-making (Flinn, 1999; Kuiper & Miller, 1997; Pesa, Turner, & Mathews, 2001; Rosenthal, 1996) and risk taking behavior (Rolison & Scherman, 2002). Social influences, habit and enjoyment, and health value and worry were also influential in decision-making, in general, among high school students (Haynie & Alexander, 1997). Partners' attitudes, expectations, and characteristics were important predictors of contraceptive use to prevent pregnancy (Forste & Morgan, 1998; Grady & Tanfer, 1996; Harvey, Beckman, Browner, & Sherman, 2002; Manning, Longmore, & Giordano, 2000).

Manning, Longmore, and Giordano (2000) examined how partners' characteristics and relationship type influenced contraceptive decisions in adolescents. The sample, consisting of 1,593 females whom first had intercourse prior to age 18 and whom were

younger than age 25 at the time of the study, was drawn from the 1995 National Survey of Family Growth. They found that the majority of adolescents in casual relationships did not use any contraceptive at first intercourse compared to about 25% who were *going steady*. The findings were based on data obtained through a retrospective measure where the participants were asked to recall their first episode of intercourse. Therefore, the description of the partners' characteristics and relationship type may have been affected by recall and may not have been completely accurate. This study, nevertheless, identified sexual partners' relationship as an influencing factor for adolescent contraceptive decision-making.

#### *Situation*

Alcohol and drug use also had a strong impact on decisions; restraining forces of reason might weaken and yield under the pressure of the sexual desires (Flinn, 1999; Murphy, Monahan, & Miller, 1998) and led to unsafe sex (Keller, Duerst, & Zimmerman, 1996). Individuals were less likely to use condoms when consuming alcohol. Alcohol was found to be associated with increased risk of pregnancy (Ericksen & Trocki, 1994). Among adolescents who were sexually active, 64% reported having sex after drinking and 15% had sex after drug use. Condoms were used more often when there was no drinking (Strunin & Hingson, 1992).

#### *Summary*

Numerous factors were identified in various categories as risk factors related to adolescent decision-making in contraceptive use. Thus, given the complexity of the risk factors, development and implementation of an effective program could be a challenge. Nevertheless, with the problem of adolescent pregnancy, it is crucial that an effective

intervention be designed based on these contextual factors to reduce its incidence. Furthermore, evaluations of the programs with effective measures are even more important to reduce adolescent pregnancy effectively.

### *Sex Education Program*

#### *Application of Contraceptive Behavior Change Model (CBCM) to Sexual Education Programs*

Sexuality education continued to receive significant attention as a strategy for increasing safer sexual practices and reducing adolescent pregnancy rates. To assess the effectiveness of these programs with an emphasis on preventing first time pregnancies, a comprehensive literature review of studies conducted over the past two decades was completed. Behaviors emphasized in prior studies were classified based on the proposed CBCM: knowledge, attitudes, self-efficacy, sexual activity, contraceptive use, and pregnancy rate are presented in Table 1. In addition, this review included outcome measures related to sites of program delivery: school-based with and without clinic and community-based programs.

*Knowledge.* Adequate knowledge about contraceptive methods and the risks involved in coitus without contraception was essential to effective contraceptive use. In the review, knowledge about sexuality and contraceptive methods in an experimental group was found to increase significantly when compared with the knowledge in the control groups (Arnold, Smith, Harrison, & Springer, 2000; Dawson, 1986; Eisen, Zellman, & McAlister, 1990; Ferguson, 1998; Kirby, 1985, Kirby, Barth, Leland, & Batro, 1991a; Parcel, Luttmann, & Flaherty-Zonis, 1985; Wang, Taylor-Nicholson, & Adame, 1989; Zabin, 1986a). For example, Zabin (1986a) described a significant effect

of contraceptive education on knowledge and attitudes as the most effective method of promoting contraceptive use. Dawson (1986) also reported that adolescents who received education on pregnancy and birth control appeared to be aware of more contraception methods and were better informed as to how the different methods should be used in comparison with those who had not received the education. Although in most studies the long-term effects on knowledge were not investigated, Kirby et al. (1991a) observed that a long-term effect was maintained. They reported the effect continued up to and included the third posttest (i.e., 18 months after the pretest). They cautioned, however, that sexual education courses given over a longer period had less effect than the shorter courses because of the time involved between the course and the posttest. Parcel et al. (1985) examined whether there was a relationship between knowledge about sexual anatomy and physiology, sexual behavior, sexual development, fertilization, birth control, and understanding about the decision-making process of students and their attitudes towards sexuality. Results showed no significant relationship between the scores on the knowledge questions or on attitude. Based upon this review, it appeared educational programs on sexuality and contraception resulted in an increase in knowledge, although knowledge appeared not to be a sufficient condition for behavioral change.

*Attitudes.* A variety of attitudinal components was studied with most researchers observing a change in attitude towards sexuality at the end of the educational studies (Arnold et al., 2000; Eisen et al., 1990; Somers & Fahlman, 2001; Zabin, 1986a). Kirby (1985) observed that program participants became less tolerant toward premarital sex and more resistant to social pressure and sexual violence as social relationships grew. However, none of the programs that Kirby evaluated had any effect on reported attitudes

toward contraception. Monahan (2001), on the other hand, noted there was an attitude change with regard to responsible contraception use; after receiving sexual health education, youth recognized the importance of effective contraception more clearly. In addition, Wang et al. (1989) observed an attitude change with regard to the issue of whether parents should be informed if a contraception method was prescribed for their child. After studying the data, more students agreed that this should be the case. Although not conclusive, it appeared that sexual education was associated with positive attitude changes regarding contraceptive use.

*Self-efficacy.* Kirby (1985) and Parcel et al. (1985) examined the effects of educational programs on the communication and social skills of adolescents. Kirby found virtually no educational program had any effect on social decision-making behavior, sexual decision-making behavior, communication skills, assertiveness, or skills with regard to contraception. In contrast, Parcel et al. reported that students gained more insight into the decision-making process regarding sexual behavior and expanded their communication skills. Kirby and colleagues' (1991a) evaluation of the *Reducing the Risk* program also indicated that communication increased between parent(s) and child regarding pregnancy prevention and abstinence. This was partially due because youth, as a part of the program, had to ask their parents their opinion on contraception and abstinence. In a more recent study, Levinson (1995) found the assessment of one's own behavioral skills was a major determinant of contraceptive use. Overall, however, the review found that few studies have paid attention to the influence of sexual health and HIV education on social and communicative skills, and of those studies, results were mixed.

*Sexual activity.* A large body of evaluation research clearly supported that sexual health and HIV education programs neither encourage adolescents to have intercourse (Berger et al., 1987; Christopher & Rossa, 1990; Coyle et al., 1999; Eisen et al., 1990; Eisen & Zellman, 1992; Kirby, 1985; Kirby et al., 1991a; Lewis et al., 2000; Marsiglio & Mott, 1986; McBride & Glenapp, 2000; Miller et al., 1993) nor increase the levels of sexual activity (Cagampang & Barth, 1997; Dawson, 1986; Ferguson, 1998; Franklin, Grant, Corcoran, Miller, & Bultman, 1997; Kirby, Waszak, & Ziegler, 1991b; Levy et al., 1994; Lieberman, Gray, Wier, Florentino, & Maloney, 2000; Malovizky, Lavi & Modan, 1997; Monahan, 2001; Thomas et al., 1992; Weis, Ranbinowitz, & Ruckstuhl, 1992; Wight et al., 2002). Rather, such programs were associated with delayed initiation of intercourse (Frost & Forrest, 1995; Howard & McCabe, 1990; Jorgenson, Potts, & Camp, 1993; Zabin, Hirsch, Smith, Streett, & Hardy, 1986b), reduction in sexual activity and pregnancy (Ku, Sonenstein, & Peck, 1992; Turner, Korpita, Mohn, & Hill, 1993; Vincent, Clearie, & Schuler, 1987) and increased abstinence (Kirby et al.).

*Contraceptive use.* A number of studies found an increased use of contraception following sexual health and HIV education (Coyle et al., 1999; Dawson, 1986; Eizen et al., 1990; Franklin et al., 1997; Frost & Forrest, 1995; Howard & McCabe, 1990; Ku et al., 1992; Malovizky et al., 1997; McBride & Glenapp, 2000; Somers & Fahlman, 2001). In addition, a significantly larger number of teenagers who had this education used effective contraceptive methods compared with those who had not had this education (Marsiglio & Mott, 1986). Furthermore, young people who received education on conception and birth control were more likely to use contraception at their first coitus than those whom had not received education (Levinson, 1995). Mauldon and Luker

(1996) reported that if contraceptive education occurred in the same year that a teenager became sexually active, the odds of any method use increased by 70% to 80%.

*Pregnancy rates.* Although a less commonly used variable measure, pregnancy rate appeared positively influenced by educational programs (Lewis et al., 2000; Philliber & Allen, 1992). Vincent et al. (1987) found potential for a dramatic decrease in rates of adolescent pregnancy through the provision of sex education and family planning services. They argued that the effects of sexual health education initiatives might be observed on a larger-scale community approach rather than at a single school, class, or institution. In their study, the estimated pregnancy rate among female youth aged 14-17 years fell significantly in the community where education was provided following the program's inception in 1982. In addition, there was a drop in the pregnancy rate from 30 at preprogram to 8 for girls between 12 and 15 years of age in the first year of the pilot program (Dycus & Costner, 1990). Franklin et al. (1997) reviewed pregnancy prevention programs and revealed support for program effectiveness in reducing pregnancy rates. Contraceptive knowledge building and distribution were found to be the most effective intervention for decreasing risky behavior and reducing pregnancy rates among youth.

#### *Community Based vs. School-Based Programs*

*Contraceptive use and pregnancy rate.* Results of various studies indicated that community-based educational programs resulted in increased contraceptive use (Berger et al., 1987, Coyle et al., 1999; Eisen & Zellman, 1992; Franklin et al., 1997; Franklin & Corcoran, 2000; Zabin et al., 1986b) and reduced pregnancy rates (Howard & McCabe 1990; Vincent et al., 1987) over school-based programs (Barth, Leland, Kirby, & Fetro, 1992; Boyer, 2001; Kirby et al., 1991a, 1991b; Thomas et al., 1992; Zabin et al., 1986a)

although both resulted in significant positive effects. Furthermore, in the educational programs in which a clinic was involved, contraception use increased significantly (Kirby, 1985; Kirby et al., 1991b; Mauldon & Luker 1996) in comparison with non-clinical programs (Franklin et al.; Kirby et al., 1991a; Zabin et al, 1986b). Kirby observed that, because of the increased use of contraception, the number of pregnancies among young women declined sharply, suggesting the programs' effectiveness.

Hofferth (1991) concurred that community-based and school-liked clinics could reduce pregnancy rates, but the school-based clinics did not provide significant effects on contraceptive use or pregnancy rates. From Hofferth's review, it might be inferred that community-based program were more effective than school-based clinics for changing specific behavioral outcomes in pregnancy prevention. One possible explanation given for the better performance of the community-based clinics was that school-based clinics had a low percentage of contraceptive distribution compared with community-based family planning clinics.

Programs that emphasized contraceptive distribution and knowledge building (Malovizky, Lavi, & Modan, 1997; Philliber & Allen 1992; Zabin et al., 1986b) were more effective than programs that emphasized solely sex education (Baldwin, Whitely, & Baldwin, 1990) or abstinence only (Arnold et al., 2000; Ferguson, 1998; Kirby, 1994; Lieberman, Gray, Wier, Florentino, & Maloney, 2000). Franklin & Corcoran (2000) listed the following overall effects of the adolescent pregnancy prevention programs:

1. Community-based clinics were more effective than school-based clinics. School-based clinics, however, were more effective than other sex education programs.



2. Including contraceptive knowledge building and distribution was an essential component for developing an effective program.
3. An effective pregnancy prevention strategy required more than just contraceptive distribution. Comprehensive sex education and skills training must be a part of the program.
4. Sex education curricula based on social learning theory and skills training (e.g., decision-making, communication) were more effective than other types of curricula and should be used as interventions in programs.

#### *Military and Sex Education Programs*

Only two studies evaluated a pregnancy prevention program among women in the U.S. military. Boyer (2001) implemented an educational intervention based on the cognitive-behavioral model to 2,000 junior enlisted, women Marine recruits with an age of 17-20. The result showed that there were no significant differences in the pregnancy rates between the experimental and the control groups ( $n_s = 1,000$  in each group). The study did not investigate or distinguish between unintended and intended pregnancies. However, a retrospective analysis of 173 single active duty Navy women (<27 yrs. old) by Hughes and Staren-Doby (2003) demonstrated that there were significant differences in the unplanned pregnancy rates between those who had attended and those who had not attended a 2-day pregnancy prevention program, called *Choices*. Of the 86 women who attended *Choices*, 13% (11) became pregnant, while 41% (36) who did not attend *Choices* became pregnant within a 1-year period. Similar to other studies, these studies had limitations. They did not provide intervention over time to measure the effects of continual educational support. They failed to consider the individual's readiness for

contraceptive behavior change. In addition, they did not investigate or distinguish between unintended and intended pregnancies.

### *Summary*

This review identified that programs tended to target only one or two factors, particularly knowledge and attitudes. In contrast, virtually no program had an influence on communication skills, assertiveness, or social skills with regard to contraceptive use, even though these skills played an important role in the adolescents' assessment of the efficacy of their own behavioral skills. This review further underscored that sexual health education did not lead to greater sexual activity, but rather could potentially lead to more responsible and safer choices for young people. In essence, the quality and effectiveness of sexual health education programs were important in fostering safer sexual practices among adolescents. Programs that incorporated all the components of attitude toward sexuality, social influences, communication, and self-efficacy might be better able to enable youth to implement the desired behavior. The quality and effectiveness of sex education programs, as well as the quality of research evaluating such programs, is discussed below.

The current state of sex education in the Navy was similar to the traditional school-based format, which meant that little reduction in pregnancy rates would result. Knowledge of sexual matters was necessary but not sufficient for behavior change. Young single enlisted women, especially young recruits at the highest risk for unintended pregnancies, must be given the motivation to postpone pregnancy until a stable environment could be provided. Young people needed assistance in making informed, rational decisions about their contraceptive use and provided with the means of

preventing pregnancies that were unintended. However, to date there have been no reported studies of a structured, repeated, comprehensive reproductive health educational intervention in reducing the rate of unintended pregnancies in junior active duty Navy enlisted females. Therefore, this study proposed to implement and test the hypothesis that repeated comprehensive educational interventions would significantly increase the contraceptive use in sexually active, junior active duty Navy enlisted females and thus decrease the rate of unintended pregnancies.

The proposed CBCM based on TTM is a useful organizing framework for examining those factors that are modifiable because of intervention efforts. The use of this model to categorize intervention efforts helps to improve the accuracy of assessing adolescent behavior change in targeted areas and thus enhances the ability to design and refine existing health education interventions and materials for female youth at risk for unintended pregnancy. This effort may affect the rate of unintended pregnancies, improve the health and welfare of female youth, and enhance their quality of life overall.

#### *Components of an Effective Sex Education Program*

For sex education to be effective, it must provide general reproductive health-related information to impart knowledge. However, attention should also be focused on the type of planned intervention (e.g., cooperation with a clinic, the involvement of partners, the use of discussion groups) and integration of a behavioral model with a skills-building component (Kirby, 1985; Levinson, 1995; Mauldon & Luker, 1996; Stanton, Li, Galbraith, Feigelman, & Kaljee, 1996; Visser & Ketting, 1994; Zabin et al., 1986b). Levinson (1995) demonstrated that the assessment of the efficacy of one's behavioral skills was a major determinant of contraceptive use. Therefore, focus on the

efficacy of the adolescent's own behavioral skills by teaching decision-making and communication skills will enable her to feel she could actually implement the desired behavior. The attitude towards sexuality, social influences, and efficacy of one's behavioral skills did not get much attention in sex education programs until recently.

The effects of a structured intervention in improving desired patient outcomes were well documented in the literature (King & Tarsitano, 1982; Linderman & Van Aernam, 1971). The most recent and germane to this researcher's study was the research by Nymathi, Flaskerud, Keenan, and Leake (1998) and Nyamathi et al. (1999). These researchers hypothesized, then demonstrated, that a structured educational program decreased risky sexual behaviors in women identified as vulnerable for AIDS and other STDs. Their educational intervention included basic knowledge related to AIDS etiology, symptoms, modes of transmission, methods of protection (e.g., condom use), the pros and cons of HIV testing, and meaning of HIV results. This researcher's study program was designed to provide similar content regarding conception, methods of contraception, the pros and cons of contraception, and meaning of pregnancy. Although the population in their studies was different from the population in this proposed study, both have been identified as being at high risk for adverse outcomes from unprotected sex.

The innovative aspects of this intervention included:

- A refresher session
- Group exercises and discussions
- Offering GYN appointments
- Individualized calendar of menstrual cycle/fertility

*Transtheoretical Model of Change (TTM)*

Numerous countries have used the TTM to investigate various health behaviors, but its application to contraceptive behaviors has been limited to the United States. Lam et al. (2004) proposed general health promotion action (GHPA) to represent the general intention and actual practices aimed at promoting health. Their study was to determine whether TTM could be applied to Hong Kong Chinese adults by measuring the subjects' stage of change for GHPA and to study whether stage for GHPA was associated with health-related lifestyle practices. Pre-contemplators were less likely than maintainers to be nonsmokers, exercisers, eat fruit twice a day, and remove fat when eating, with increased trends in the odds of reporting these practices from pre-contemplation to maintenance. Their findings provided preliminary findings on the applicability of TTM on GHPA in Chinese adults with evidences of concurrent criterion validity.

Kristjánsson (2003) investigated the applicability of the TTM for skin cancer prevention in Swedish adolescents using a questionnaire that included three of the major constructs of the TTM (i.e., stages of change, processes of change, decisional balance). Findings indicated that the majority of the teenagers were in the pre-contemplation stage for giving up intentional tanning. In addition, the relationship between the stages of change and two other major constructs of the TTM (i.e., processes of change [POC], decisional balance [DB]) were consistent with data on other health behaviors. The findings gave support for the stages of change measurement used in this study and the applicability of the TTM.

In a study of assessing the general validity of the Pain Stages of Change Questionnaire (PSOCQ) with a sample of chronic pain patients not seen in a pain clinic,

Habib et al. (2003), examined the utility of the stages of change model as applied to this population. Participants were recruited from 19 medical and allied health clinics and practices in Australia. The findings demonstrated a number of limitations of the PSOCQ in terms of its ability to classify persons into specific stages of change. In this study, the stages of change model required adaptation in order to be useful for treatment planning in a non-pain-clinic sample of patients with chronic pain.

Integral to TTM is the stages of change. Thus, Aveyard et al. (2002) examined the reliability of the staging algorithm for smoking acquisition in United Kingdom adolescents. The findings indicated that the algorithm for acquisition in pre-contemplation was significantly more reliable than all other stages. Demographic characteristics did not predict reliability.

There was no established *gold standard* measure of sexual activity or contraceptive behavior stages of change. However, Grimley et al (1993) conducted the first published applications of the TMM to contraceptive use. They took a synergistic approach to contraceptive use adoption using two of the major constructs from the TTM: Stages of Change and Decisional Balance. They developed a 5-item forced-choice stage instrument and two Decision Balance measures: one for the prevention of pregnancy and one for disease prevention. Decision Balance measures consisted of two 10-item scale: one representing the positive aspects (i.e., pros) and one representing the negative aspects (i.e., cons) of contraceptive and condom use. The two scales demonstrated good internal consistency. The contraceptive behavior was assessed in relations to the stages of contraceptive use and Decisional Balance. Study findings indicated that behaviors would follow the general pattern found across a broad range of problem behaviors using a

variety of populations. These behaviors included both the cessation of negative behaviors (e.g., smoking, cocaine use) and the acquisition of such positive behaviors as exercise and mammography screening. Previous samples included college students, IV drug users, blue-collar workers, and physicians. The results from these studies demonstrated strong evidence for the generalizability of the TTM of behavior change.

Santelli et al. (1996) used a theoretical model to examine the influence of relationship factors, pregnancy intentions, contraceptive behavior, and other psychosocial characteristics on stages of behavior change in condom use among heterosexual black women of reproductive age. Findings indicated that the stage of change model might be a useful way to understand the process of adopting health behaviors (e.g., condom use) and its findings could be incorporated into future intervention.

Several other studies used the Stages of Change model as a tool to assess and more richly describe adolescents' attitudes toward pregnancy and childbearing and their level of readiness to contracept (Bloom & Hall, 1999; Grimley et al., 1993; O'Campo et al., 1999). Fundamental social, demographic, and economic differences were found as a function of their stage of readiness to contracept. Adolescents in the earlier stages of change were significantly more likely to become pregnant than those who expressed readiness to contracept. Adolescents who decided to contracept did so for varying lengths of time. Some contracepted for 1 or 2 months, while others continued for almost a year. Reasons for contraception included concerns about a current partner, a desire to become better prepared for motherhood, or as the result of a recent conversation with an important adult in their life.

In a Shrier et al. (2001) investigation, the implementation of an educational beginning with the Wheel of Change self-assessment to determine the participant's stage of change related to their sexual risk behavior, the identified intervention participants had positive movement through the stages at each follow-up visit. By the 12-month visit, most participants who completed the Wheel of Change indicated that they were in the action (38%) or maintenance (25%) stage. It seemed reasonable to extrapolate from these findings that pregnancy prevention interventions tailored to an adolescent's stage of readiness to contracept and took into account one's experiences, current life circumstances, and attitudes towards pregnancy and childbearing would be more efficacious than traditional interventions.

### *Summary*

Although evaluation of the success of behavioral unintended pregnancy prevention efforts relied on accurate assessment of change in specific behaviors, little attention has been paid to the development of valid measures for contraceptive behaviors among women at high risk for unintended pregnancy. Furthermore, longitudinal investigations were lacking that enhanced an understanding of the correlates of movement through stages of change. The TTM, however, has been successfully when applied to HIV and STD prevention programs for adults; therefore, its application to pregnancy prevention is reasonable. The model provides a dynamic paradigm for understanding contraceptive use, a paradigm that has already been examined in relation to outcome expectancies (i.e., perceived pros and cons), and self-efficacy. To this foundation, two further variables have been added: knowledge and attitude.



The measures of TTM (i.e., stages of change, decisional balance, self-efficacy) included in the Contraceptive Behavior Change Model (CBCM) is a useful measurement tool for evaluating a program's effect and understanding what factors are modifiable as a result of intervention efforts. The use of TTM to evaluate intervention efforts may improve the accuracy of assessing behavior change (e.g., contraceptive use) and enhance the ability to design and implement effective programs. Furthermore, longitudinal studies will allow researchers to trace individuals' movements between the stages, investigate how these movements occur, and better understand the role of TTM variables in stage transitions.

## CHAPTER 3

### Methods

The purpose and design of the researcher's study, as well as methods used for implementation, are described in this chapter. The sample population, the data collection procedures, the data collection instruments, and the methods of data analysis are presented in a sequential format.

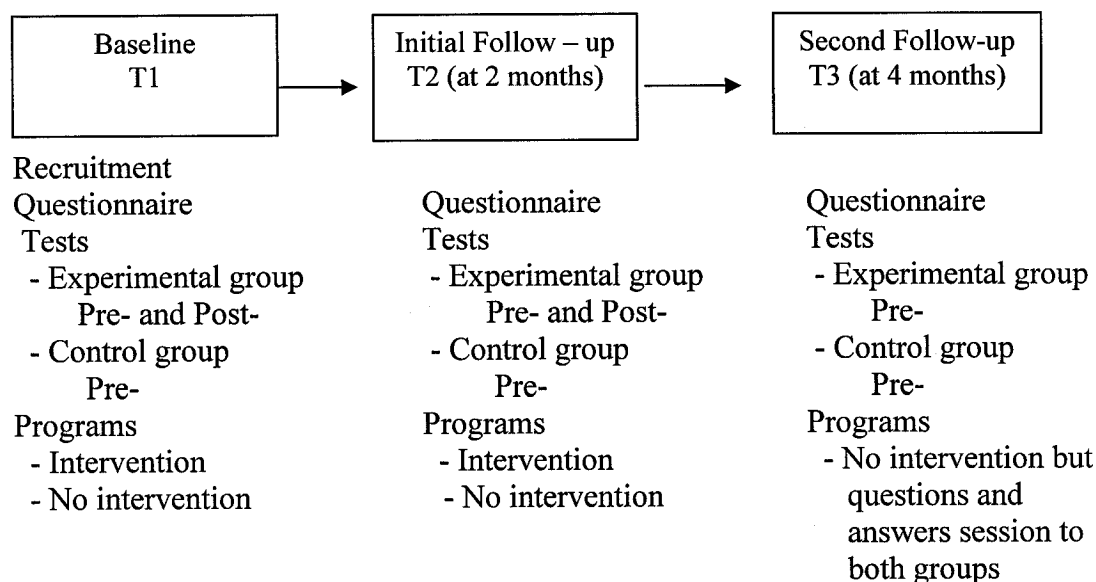
#### *Purpose*

The purpose of this study was to assess the effects of an innovative reproductive health educational program with follow-up training at two months and follow-up at four months without intervention on contraceptive knowledge, use, and behavior in junior, single, active duty, Navy enlisted females. An increase in contraceptive use in sexually active females, thus, a decrease in unintended pregnancy rates for this high-risk population could positively affect their lives, save taxpayer dollars, and ultimately improve readiness for mobilization. Interventions aimed at preventing unintended pregnancies were less expensive than the costs related to unintended pregnancies.

#### *Design*

The proposed model, depicted in Figure 2, reflected constructs and relations drawn from the reproductive health educational intervention that incorporated ACDMM (see Figure 1), the TTM (see Figure 3), decisional balance, and self-efficacy theories. This model was used to examine the association between several mediators and the pregnancy prevention decision to use contraceptives at baseline, 2 months, and 4 months

post interventions. The intervention included providing information and knowledge in a variety of ways and behavioral skills building. A quasi-experimental longitudinal design with repeated measures assigned by group, longitudinal pre-test/post-test control group design were used to test the hypothesis (see Figure 4).



*Figure 4. Study Design*

#### *Population and Sample*

The target population was U.S. active duty Navy, single, enlisted females, E4 and below, with a projected rotation date (PRD) greater than nine months, and stationed aboard ships in the San Diego area. The sample was selected for this intervention study since unintended pregnancies in active duty women are highest in enlisted adolescents aged 18-20 and those newly recruited from civilian status. Inclusion criteria included a signed consent. Based on inquiries, the investigators' personal clinical experience, and observations from previous studies, it was clear that active duty women (1) have a need

for training in the use of contraception and (2) prefer that classes on reproductive health are restricted to a female audience. Coursework for the study was designed to decrease unintended pregnancy in females; thus, men were excluded from the study. Limiting the study to women allowed for greater participation in group exercises and discussions on reproduction. Offering and scheduling gynecology (GYN) appointments to the study group was part of the intervention, and this was further reason for not making the study co-educational. However, a similar program will be designed for males at some future date.

Power analysis was performed to determine the risk of a Type II error (i.e., acceptance of the null hypothesis when it is false) and to estimate the minimum required sample size for a 10% knowledge improvement as measured by the knowledge scale. Based on alpha ( $\alpha = 0.05$ ), power ( $1 - \beta = 0.80$ ), mean for the pilot study ( $SD = 0.73$ ), and to detect a score improvement from 3 to 3.3 on the Likert scale, a sample size of 93 in each group ( $N = 186$ ) was required. To account for missing data and an attrition rate, the initial sample size was larger than the calculated number. Attrition rate could be due to a variety of events, such as failure to return the completed questionnaires, deployment, or service termination. The exact attrition rate for this area was not available; therefore, the target sample size for the study was increased by 20% ( $N = 224$ ,  $n = 112$  in each group). This was a reasonable sample size, since more than 600 active duty women were seen monthly in the Active Duty Women's Health Clinic at the Naval Station San Diego.

Female Navy subjects who voluntarily agree to participate in the study were enrolled in accordance with their assigned United States Ship (USS) to either the intervention group (experimental group) or no intervention group (control group) at the

time of recruitment. Prior to recruitment, ships were already identified as the experimental or control group by random draw.

### *Procedure*

#### *Subject Recruitment*

Prior to subject recruitment, permission to conduct the study was obtained from the ships' commanding officers (Appendices I-L). Ships' commanders supported this study by providing time off from their regular duties to attend classes and/or complete questionnaires for personnel who volunteered to participate. Logistics were organized with the identified points of contact on the ships and with the Fleet Medical Program Liaison. Ships were selected based upon the number of females aboard, on the operational platform type, and the deployment status. Ships that were more likely not to be deploying during the study period were identified and considered. USS ships with similar platform, such as LHDs (i.e., amphibious assault – multi purpose) and LHAs (i.e., amphibious assault – general purpose), and two aircraft carriers were randomly assigned either to the experimental group or control group. Separate and distinct ships were used for different groups to avoid study contamination. In addition, similar operational platforms were selected for each group to avoid bias.

To recruit subjects for the initial phase (T-1), information about the study was disseminated to department heads and chiefs whom then announced the upcoming project at their regular departmental meetings; information was also placed in the Plan of the Day. An open forum onboard each ship was scheduled by the Principal Investigator (PI) via the Fleet Medical Liaison and all eligible enlisted females were invited to attend. The PI explained the study, including facts regarding voluntary participation, and entertained

questions. Attendees filled out screening forms that indicated whether they were interested in enrolling (see Appendix M), and the PI collected the forms at the end of the forum. Potential subjects were briefed away from the ship to ensure confidentiality, and subjects were given the opportunity to ask questions before signing the consent form. Those willing to participate were given a \$10 phone card, along with the study questionnaire and consent form that explained the purpose of the research; copies of the signed informed consent forms were given to the subjects. The phone card was to be used to contact the researcher regarding questions, both initially and during the study period. Participants were assured of their confidentiality verbally (see Appendix N, mock dialogue) by the PI and in writing (see Appendices O-P, the consent form). Each subject was required to read and sign the Privacy Act (see Appendix Q) to comply with Department of Defense policy. To minimize coercion and maximize full disclosure, the investigator wore civilian clothing when interacted with subjects in all on and off-ship settings (when possible), but disclosed her rank and the purpose of this study (i.e., as part of her dissertation) to potential subjects. Although, a convenience sample of 112 for each group, experimental and control, was initially planned, 112 and 58, respectively, making a total of 170 subjects were recruited for the study. Recruitment took place from October 2004 to January 2005 and follow-up data were collected through May 2005 (Figure 5).

#### *Data Collection*

The study for both groups was conducted away from the workspaces due to confidentiality and privacy concerns for the participants. To minimize lost work-hours and accommodate transportation-related issues, as most sailors did not have a personal means of transportation, classes were held at a convenient location within walking

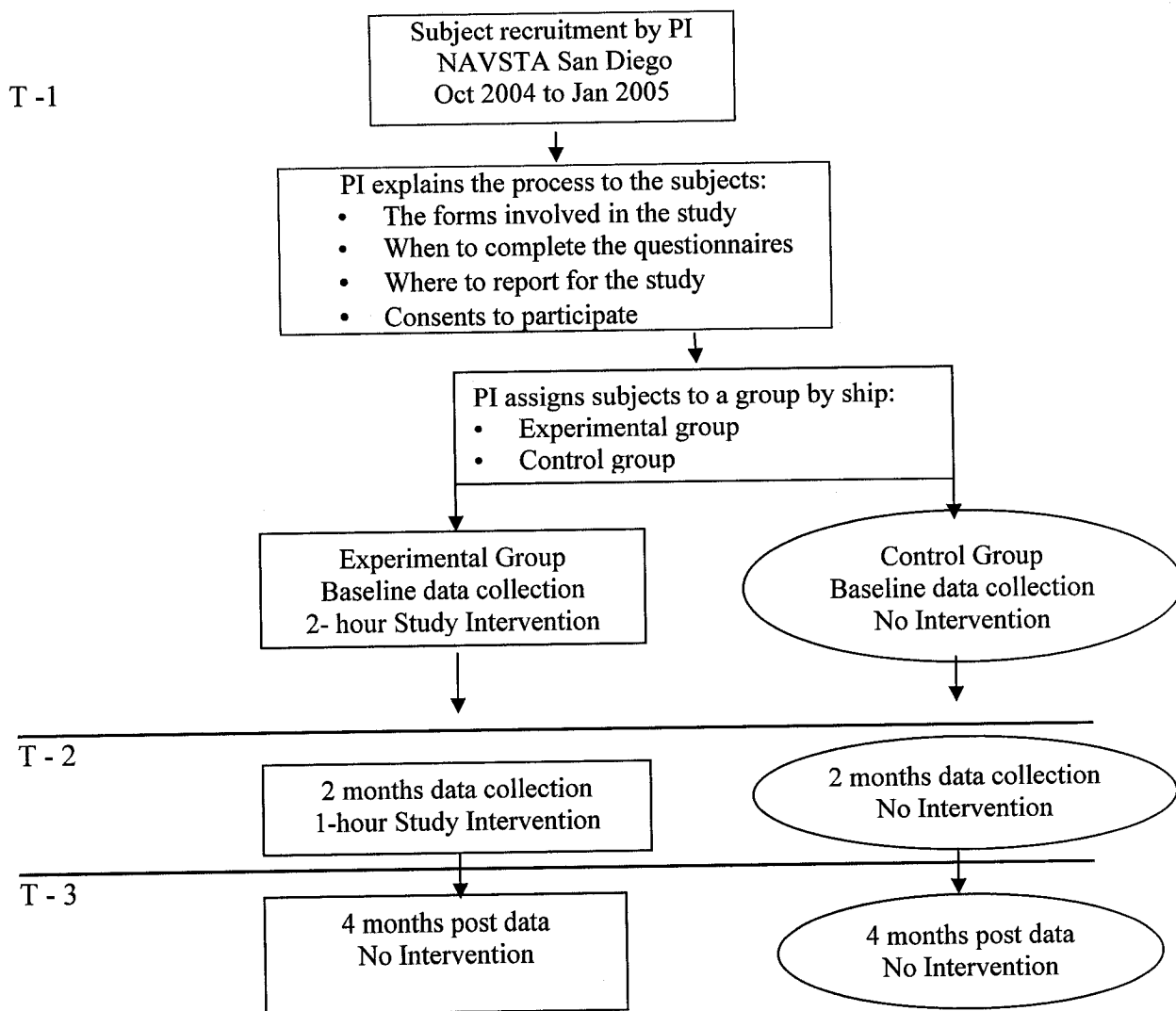


Figure 5. Overview of Data Collection Procedure

distance to the respective pier where the participant's ship was berthed during the program, either Naval Station or North Island San Diego. For example, when the participants' ship was docked at Pier 13, the class was held at the Construction Battalion Unit building adjacent to Pier 14. For the experimental group, data for T-1 and the initial follow-up period (T-2) were collected immediately before the first class via pre-test and questionnaire and after each class via a post-test. In the final follow-up period (T-3), data

only included a pre-test and questionnaire without a post-test, since there was no intervention. Similarly, the study for the control group was held away from their workspaces but at a different time and day from the experimental group. The PI collected data from all three phases of the control group, including the pre-test and questionnaires. Both groups completed the test and questionnaire at three different times, specifically T-1 initially, T-2 at two months, and T-3 at four months (see Figure 4). Subjects were instructed to return the completed questionnaires in the envelopes provided to ensure confidentiality. Confidentiality was further maintained by keeping hard copies of data and consent forms in a locked file with limited access. Electronic data were stored in a secured, password-protected, computer database accessible only to the PI.

#### *Intervention*

The structured intervention for the experimental group consisted of two class sessions, 2 months apart. Each class enrolled 9 to 12 women and several classes were held until all the sample size was met. The first session was 2 hours long, with the second session lasting 1 hour. The first class was a comprehensive lecture with a discussion period (see Appendix A), while the second class at 2 months was a refresher course (see Appendix B) based on the same course content covered in the first session. Subject matter was focused on menstrual cycle and sexual function, birth control methods, prevention of sexually transmitted diseases, and decision-making. Final follow-up began at 2 months following the second session. There was no scheduled intervention at 4 months (T-3) since there would be no additional follow-up data to assess; however, a general *Questions and Answers* session was provided to both groups at that time.



This study employed a modified version of the Madigan Army Medical Center's Pregnancy Prevention Program course of instructions for T-1 (see Appendix A) and for T-2 (see Appendix B); a PowerPoint presentation was used instead of traditional videotapes and the course consisted of slide presentations, interactive student worksheets, contraceptive information handouts, and educational videotapes (Flynn, 1998). One videotape of note, *Choosing a birth control method*, was developed by the Association of Reproductive Health Professionals staff, while the videotape, *Responsible parenting – give yourself a chance*, was developed by Norfolk Regional Electronic Media Center. Students participated in group exercises as well as presentations and a discussion of the details regarding reproductive functions and contraceptive choices. As part of the intervention, at the end of each class, GYN appointments were offered and scheduled for participants whom desired birth control and further evaluation. GYN services were provided either by the PI or the nurse practitioner assigned to the fleet. This multi-method approach included components of an effective program in that it provided information about: sexuality, reproduction, and contraception; training in decision-making and assertive communication skills; and practice in applying those skills a propos to personally difficult settings or situations, and with readily available health services.

For the control group, no intervention or GYN appointments was offered during the study. However, for the purpose of recruitment and retention of the subjects, classes and appointments were offered 4 months after the study was over. The PI will conduct classes using the same format as in the study. The class location will be determined through the Medical Department on board the ship prior to each session. During the recruitment period, line commanders might be more receptive in allowing units to

participate if it were made clear that all women could benefit from it. Regardless of the study, both experimental and control groups were still able to receive the usual active duty women's health care and contraceptive information from healthcare providers if they so chose.

### *Instruments*

#### *Sample Demographics*

A demographic questionnaire was used to obtain information regarding age, marital status, educational status, and race (see Appendix C: A1 - A10).

#### *Contraceptive Knowledge*

A 5-item multiple choice pre-/post-test was used to measure knowledge about pregnancy, contraception and sexually transmitted diseases before the intervention and after each intervention (see Appendix C: B1 - B5). References to support each question were included on the test for reviewers only (see Appendix D). A panel of experts, both at Naval Medical Center San Diego and at Madigan Army Medical Center, established the content validity of this instrument with an inter-rater agreement of .96. Total possible scores could range from zero to 5.

The operational definition of contraceptives, reliable, safe, effective methods used to prevent pregnancy, included condoms, birth control pills, patches, and injections.

#### *Attitude*

A 5-item questionnaire was used to measure attitudes about contraceptive behavior (see Appendix C: E5-E9). For example, subjects were asked, *What is your attitude toward using birth control?* Each item had response options ranging from 1 (very positive) to 5 (very negative). Scores from each item for each measure were summed and

the total possible scores ranged from 5 to 25. Content validity for this instrument had been established in a previous study, but the reliability measures were not noted (Gold, 1997).

#### *Reproductive History*

A 25-item questionnaire was used to measure reproductive history (see Appendix C: C1 - C24). This questionnaire provided information on reproductive history and contraceptive use. Content validity for this instrument had been established in previous reports (Borsay-Trindle et al., 1991; Clark et al., 1998; Denton & Scott, 1994; Shuler, 1995). Items 12, 14, and 16 were used to measure contraceptive use and, if they were sexually active, scored a yes (1) or a no (0). Reliability measures were not relevant because items were not totaled, but used independently from each other.

#### *Contraceptive Use Stages of Change*

Galavotti's (1995) 6-item Contraceptive Behavior Questionnaire (see Appendix C: D1) was used to measure contraceptive use stages of change for prevention of pregnancy. Scoring for this item related to contraception use had six response options that indicated stages of contraceptive behavior change: (1) pre-contemplation, (2) contemplation, (3) preparation, (4) action, (5) maintenance, and (6) not applicable (N/A). There was only one response to this question and stages of change were determined based on the selected response. The last response option, scored as a N/A response, did not have a stages of change score. This response option was given by those who were not sexually active.

The validity and reliability of this instrument in measuring the theorized constructs was well documented in the literature, with a Cronbach's alpha of .88 - .90 (Galavotti et al., 1995; Grimley et al., 1993). The use of such a tool was validated with at

least 15 different problem behaviors and was further supported by basing the instrument on an established theory of behavior change and research related to pregnancy and sexually transmitted disease prevention.

*Decisional Balance (Perceived Pros/Cons) and Self-Efficacy*

Galavotti's (1995) 10-item decisional balance (see Appendix C: E18 - E27) were scored as yes (2) and no (1), and a 7-item self-efficacy questionnaire (see Appendix C: E11 - E17) had response options ranging from 1 (very confident) to 3 (not confident), with a 4 (don't know). Scores from each item for each measure were summed and the total possible scores ranged from 10 to 20 and 7 to 21, respectively. Galavotti et al. (1995) developed the TMM measures of contraceptive and condom use attitudes and behaviors using a sample of women at high risk for HIV infection or transmission. Galavotti et al. adapted measures for the stages of change, decisional balance, and self-efficacy based on the TMC for contraceptive and condom use. They derived all items from empirical research and used solid methodological approaches to develop their measures. Findings from principal component analysis (PCA) procedures resulted in brief, psychometrically sound assessment tools. Each scale demonstrated appropriate internal consistency with coefficient values over .80 using a Cronbach's alpha calculation. The study was cross-validated by Grimley et al. (1996) by replicating the study using a second independent sample and a different method of analysis. Model fit indices were excellent (decisional balance = .94 and .95; self-efficacy = .97 and .99), suggesting that these more standardized measures could be used when assessing attitudes and behaviors toward condom use among heterosexual populations at various risk for HIV or STDs. Permission to use the instrument and modify as needed was obtained from Galavotti (see Appendix

E). The above instruments, an 8 page questionnaire, were piloted in young active duty enlisted females and took approximately 15 minutes to complete.

### *Data Analysis*

#### *Sample Demographics*

Descriptive statistics was used to describe the demographics of age, race/ethnicity, and education, and differences between groups was examined by chi square to evaluate the equality of groups. These data were compared to the known demographics of young Navy enlisted females to support generalizability for the study results.

Subscripts in the hypotheses represented phases in the testing timeline, with 1 designating baseline test; 2 for post first-intervention period test; 3 for pre second-intervention period test; 4 for post second-intervention test; and 5 and for the final test. A subscript, *e*, designated one as being with the experimental group and, *c*, as being with the control group.

*Primary aim.* The primary aim was to evaluate the effects of the intervention program at 4 months post-treatment on the attitudes, decisional balance, self-efficacy, stages of change, and contraceptive use.

Initially, the null hypotheses [ $H_0: \mu_{1(c)} = \mu_{1(e)}$ ] were tested for sampling bias: a *t*-test for baseline difference in knowledge, and a chi-square test of contingency for age, race, marital status, and educational status.

$H_{01}$ : There will be no significant mean differences between the two groups at 2 and 4 months on attitudes about contraceptive use.

Ho<sub>2</sub>: There will be no significant mean differences between the two groups at 2 and 4 months on contraceptive use decisional balance (Pros and Cons).

Ho<sub>3</sub>: There will be no significant mean differences between the two groups at 2 and 4 months on contraceptive use self-efficacy.

Ho<sub>4</sub>: There will be no significant mean differences between the two groups at 2 and 4 months on contraceptive use stages of change.

Ho<sub>5</sub>: There will be no significant mean differences between the two groups at 2 and 4 months on contraceptive use.

Attitudes, decisional balance, self-efficacy, stages of change, and contraceptive use within the groups were assessed by a two-way repeated measures ANOVA with interaction.

*Secondary aim.* The secondary aim was to evaluate the effects of the intervention program at 2 and 4 months on knowledge acquisition and maintenance.

Ho<sub>6</sub>: There will be no significant knowledge acquisition and knowledge maintenance during the experimental period.

Knowledge acquisition and knowledge maintenance within the groups were assessed by a two-way (2 x 3) repeated measures ANOVA with interaction.

Knowledge acquisition was defined as a knowledge test score differences for Phases 1 - 2 and Phases 3 - 4. Knowledge maintenance was defined as knowledge test score differences for Phases 2 - 3 and Phases 4 - 5.

*Tertiary aim.* The tertiary aim was to identify the independent variables (i.e., knowledge, attitudes, decisional balance, self-efficacy, stages of change) most likely to predict behavior change in the use of contraceptives.

H<sub>07</sub>: The independent variables will not significantly predict the dependent variable.

The variables were analyzed using multiple logistic regression analysis where the dependent variable was the level of change in contraceptive use: positive outcome (no use to use or continued use) = 1 and negative outcome (use to no use or continued non-use) = 0

### *Protection of Human Subjects*

#### *IRB Approval*

Institutional Review Board approvals were obtained from the University of San Diego (USD; see Appendix F), Naval Health Research Center (NHRC; see appendix G), and the Uniformed Services University of the Health Sciences (USU; see Appendix H).

#### *Method of Subject-Data Linking*

All eligible female sailors were invited to participate in this study. Participation was voluntary and members were able to refuse to participate or withdraw from the study at any time. After enrolling, if they chose to no longer participate, they were able to do so without concern of repercussion. Those willing to participate were given questionnaires along with the informed consent document that explained the purpose of the study and the potential value of the information. Members were assured of their confidentiality verbally by the investigator (see Appendix N, mock dialogue) and in writing (see Appendices O-P, the consent form). Hard copies of data and consent forms were kept in a locked file on-site at NHRC accessible only to the PI. Participants provided their names and social security numbers (SSNs) on questionnaires, due to potential difficulties in matching surveys over time. However, to safeguard confidentiality, respondents had a

unique code for the computer data entry for data analysis known only to the PI. This coding information linked names and SSNs and were stored separately in a secured password-protected computer database, accessible only to the PI. All data were aggregated for purposes of confidentiality and papers or presentations generated by information derived from the program used aggregated data to ensure the confidentiality of each participant. All data will be destroyed within 5 years of the study completion.

#### *Risks to subjects*

Certain questions related to sexuality (e.g., whether a member is sexually active, and if so, description of contraceptive methods being used) may have made members feel temporarily uncomfortable while answering the questions.

#### *Precautions*

Any perception of intimidation or coercion was removed by ensuring that the PI: (a) was in civilian clothes at all times when interacting with the subjects, and (b) addressed members without using rank, especially during the informed consent, intervention, and data collection periods.

#### *Limitations of the Study*

Some of the limitations of the study included the non-random selection of subjects within the identified population and the sample size.



## CHAPTER 4

### Results

#### *Sample*

Two hundred ninety-seven active duty women were approached to ascertain their interest in study participation. One hundred twenty-seven subjects declined to participate because they were either relocating before the study period, were soon to be married, or simply were not interested.

A convenience sample of 112, including a 20% attrition rate, was the target sample size for each group; experimental and control. However, for the experimental group, only 58 active-duty, single, Navy enlisted females in the rank of E4 and below were able to be recruit from the USS Navy ships in the San Diego area. Barriers and limitations of the recruitment and retention are discussed in Chapter 5 in the section, *Recommendations for Future Research*. Recruitment took place from October 2004 to January 2005, and follow-up data were collected through May 2005. The attrition rates were 10% and 54% for the experimental and control groups, respectively, resulting in a final sample size of 52 for each group, totaling 104 subjects. Subjects were omitted from data analysis for various reasons, as outlined in Table 3 below.

Table 3

*Reasons for Subject Attrition*

Subjects ( <i>n</i> )	Group	Reason for Omission
35	C	Failed to complete surveys in a timely manner
4	C	Incomplete surveys
9	C	Transferred from Command due to pregnancy
2	C	Transferred from Command due to medical problem
3	C: 2 E: 1	Absent from Command for training
5	C	Transferred from Command to attend training school
1	C	Transferred from Command for Permanent Change of Duty Station
1	C	Unauthorized absence from Command
4	C: 1 E: 3	Left on deployment
2	E	On leave

*Note.* C = Control Group; E = Experimental Group

### *Sample Demographics*

Frequency distributions and percentages were used to describe the demographic sample characteristics (see Table 4). All subjects recruited into this study were serving on active duty in the United States Navy. A Chi-square test indicated that the composition of the sample between the experimental and control groups were homogeneous. The age of the subjects ranged from 18 to 32 years ( $M_E = 21$  years;  $M_C = 22$  years). All subjects were single, and 69.2 % (experimental) and 63.5% (control) were involved in a relationship. The majority of subjects in the experimental group were E3s (44.2%), and the majority of subjects for the control group were E4s (55.8%). Fifty-nine point six percent of both groups lived on board the ship and their time of active duty service ranged from under 13 months (36.5% for the experimental group and 15.4% for the control group) to over 48 months (5.8% and 9.6%, respectively). Sixty-two percent of the experimental group had a minimum of a high school education, while 50% of the control group had attained that level; 34.6% and 42.3%, respectively, had some college education.

Data were collected on three separate occasions over a 4-month period. The periods were labeled as follows: T1 = beginning of the study, T2 = 2 months after T1, and T3 = 2 months after T2.

Statistical analyses were performed using the SPSS for Windows, Version 13.0. Modes of analysis are detailed in their respective sections. The same alpha value ( $\alpha = 0.05$ ) was used throughout. A post hoc power analysis indicated power = 0.982 for group contrast and 1.000 for time and interaction between group and time.

Table 4

*Subject Demographics*

Characteristic	Experimental		Control	
	<i>n</i> = 52	(%)	<i>n</i> = 52	(%)
<b>Age</b>				
18-19 years	13	(25.0%)	5	(9.6%)
20-21 years	29	(55.8%)	24	(46.2%)
22-24 years	8	(15.4%)	17	(32.7%)
Over 24	2	(3.8%)	6	(11.5%)
<b>Race</b>				
African American	11	(21.2%)	14	(26.9%)
White	23	(44.2%)	24	(46.2%)
Hispanic/Latina	11	(21.2%)	7	(13.3%)
Asian	1	(1.9%)	2	(3.8%)
Native American Indian	1	(1.9%)	2	(3.8%)
Other	5	(9.6%)	3	(5.8%)
<b>Marital Status</b>				
Single, involved in relationship	36	(69.2%)	33	(63.5%)
Single, not in a relationship	16	(30.8%)	19	(36.5%)
<b>Rank</b>				
E1	4	(7.7%)	0	(0.0%)
E2	10	(19.2%)	5	(9.6%)
E3	23	(44.2%)	18	(34.6%)
E4	15	(28.8%)	29	(55.8%)
<b>Months of Active Duty</b>				
0-12 months	19	(36.5%)	8	(15.4%)
13-24 months	16	(30.8%)	20	(38.5%)
25-36 months	6	(11.5%)	9	(17.3%)
37-48 months	8	(15.4%)	10	(19.2%)
> 48 months	3	(5.8%)	5	(9.6%)
<b>Housing Type</b>				
Barracks	5	(9.6%)	0	(0.0%)
Off-base housing	16	(30.8%)	21	(40.4%)
On board ship	31	(59.6%)	31	(59.6%)
<b>Education</b>				
GED	1	(1.9%)	2	(3.8%)
High School Graduate	32	(61.5%)	26	(50.0%)
Some College	18	(34.6%)	22	(42.3%)
Community College Degree	1	(1.9%)	2	(3.8%)

### *Effects of the Intervention Program*

#### *Reproductive History*

Results of sexual behaviors, including sexual activity and contraceptive use are presented in Table 5; the reproductive history of previous pregnancies are presented in Table 6. Findings were analyzed using Fisher's Exact Test for sexual behavior and frequency distributions for reproductive history by group and intervention time. At T1, 75% of the experimental group and 71% of the control group reported being sexually active at the time (*now*), and 69% and 73%, respectively, reported having had sexual intercourse in the past 2 months. Of these, 90% of the experimental and 84% of the control group reported current contraceptive use, and 89% and 84%, respectively, reported contraceptive use in the past 2 months. There were no significant differences between the two groups.

However, at T3, results (see Table 5) demonstrated that there were significant ( $p < .05$ ) behavior differences between the groups in that, (a) sexual activity decreased in the experimental group while it increased in the control group, and (b) contraceptive use remained high in the experimental group while it decreased in the control group. Furthermore, the experimental group reported no pregnancies over the previous 2 months at T3; while seven females in the control reported unintended pregnancies (see Table 6). The result of increased pregnancies in the control group can be interpreted as being consistent with sexual behavior; an increase in sexual activity, and a decrease in contraceptive use.

Table 5

*Sexual Behavior by Group and Intervention Time*

Variables	Experimental			Control			<i>p</i> of <i>FET</i>		
	T1	T2 (%)	T3	T1	T2 (%)	T3	T1	T2	T3
Sexually active now	39(75)	36(69)	31(60)	37(71)	38(73)	39(75)			
Contraceptive use now	35(90)	32(89)	28(90)	31(84)	25(66)	25(64)	.506	.026*	.013*
Sexually active past 2 mos	36(69)	36(69)	37(71)	38(73)	41(79)	40(77)			
Contraceptive use past 2 mos	32(89)	32(89)	34(92)	32(84)	32(78)	27(68)	.737	.238	.011*

\* *p* = significant at 0.05 level

Table 6

*Pregnancy Rates by Group and Intervention Time*

Variables	Experimental			Control		
	T1	T2	T3	T1	T2	T3
	<i>n</i>			<i>n</i>		
Pregnant past 2 mos.	0	1	0	1	6	7
Abortion past 2 mos.	0	1	0	1	1	1
Pregnant now	0	0	0	0	5	6

### *Reproductive Health Knowledge*

*Knowledge acquisition.* Changes in knowledge over repeated classes and group differences were assessed by using the *t*-test for the values of pre-test scores at three data collection times. Table 7 presents means and standard deviations, by group, for the pre-test scores. Means and deviations indicate that at baseline (T1), the experimental group showed more knowledge deficits to reproductive health knowledge than the control group, and the difference was statistically significant ( $p = .05$ ). At two months (pre-T2 intervention), scores from Time 1 to Time 2 showed statistically significant differences ( $p < 0.001$ ) in the means between the two groups (i.e., a knowledge gain in the experimental group, while nearly no gain in the control group). Again, at four months (pre-T3 intervention), knowledge differences between two groups were statistically significant ( $p < 0.001$ ); in the experimental group, knowledge was found to increase from T2 to T3, while it decreased in the control group ( $p < 0.001$ ). Overall results of the knowledge over time and between the groups, assessed by two-way repeated measures ANOVA (group by class number), were statistically significant ( $p < 0.001$ ; see Table 8). Knowledge by group and intervention time are depicted in Figure 6.

Table 7

*Statistical Results for Reproductive Health Knowledge*

Variable	Experimental		Control		Test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Pretest T1	2.27	1.03	2.67	1.04	1.986	0.050
Pretest T2	3.62	1.17	2.69	0.94	-4.425	0.000**
Pretest T3	4.04	0.97	2.58	1.14	-7.030	0.000**

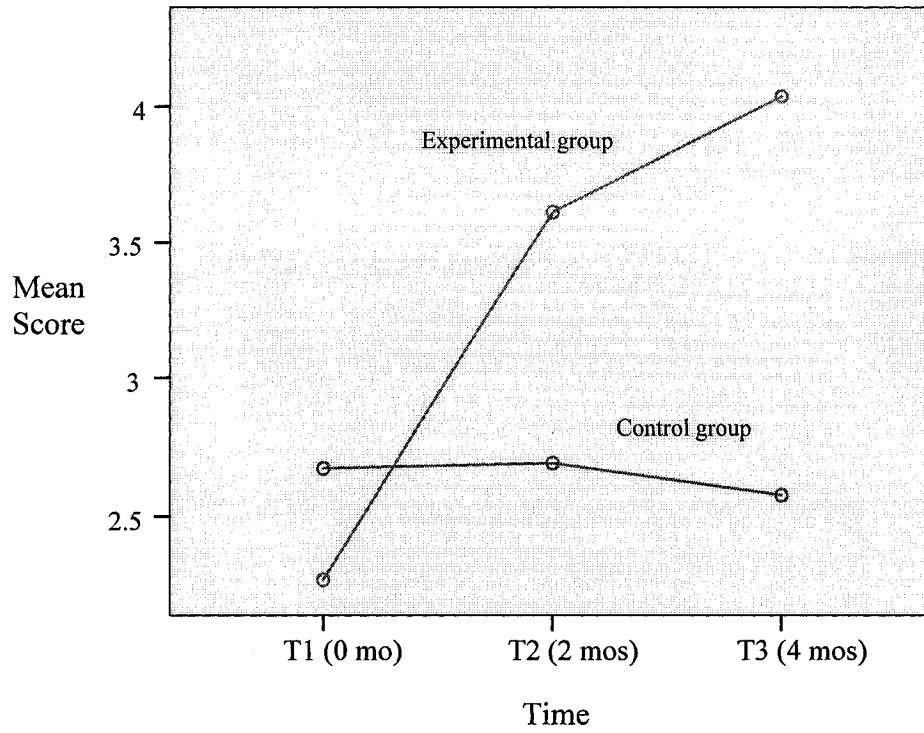
\*\**p* < .001

Table 8

*Reproductive Health Knowledge over Time*

Source (effect)	<i>df</i>	<i>F</i>	<i>p</i>
Group	1	16.768	<0.001
Error	102		
Time	2	31.665	<0.001
Group x Time	2	36.804	<0.001
Error	204		





*Figure 6.* Knowledge by group and intervention time

### *Knowledge Retention (Maintenance)*

Retention of knowledge was analyzed using the *t*-test for values of pre-test scores minus prior post-test scores. Learning and knowledge retention in the experimental group are depicted in Figure 7. The group showed a significant learning ( $p < .001$ ) following the first intervention. However, the data at two months (pre-T2 intervention), although not significant ( $p = 0.175$ ), showed a decrease in knowledge that was slightly less than it was at two months prior, and after the T1 intervention. The result suggests that some of the knowledge acquired at T1 intervention was forgotten. Again, the group showed a significant learning progress ( $p < 0.001$ ) following the second intervention at 2 months (T2). There was a significant knowledge decrease ( $p < 0.001$ ) at 4 months (T3) since two month prior, and after T2 intervention. However, knowledge at T3 was significantly higher than it was at four months prior, and after the T1 intervention, suggesting that a second intervention (T2; repetitive intervention) was more effective in knowledge acquisition. Overall, however, results of knowledge retention at 4 months were not significant ( $p=0.070$ ) when the test scores were compared to post-first intervention in the experimental group (T1; see Table 9).

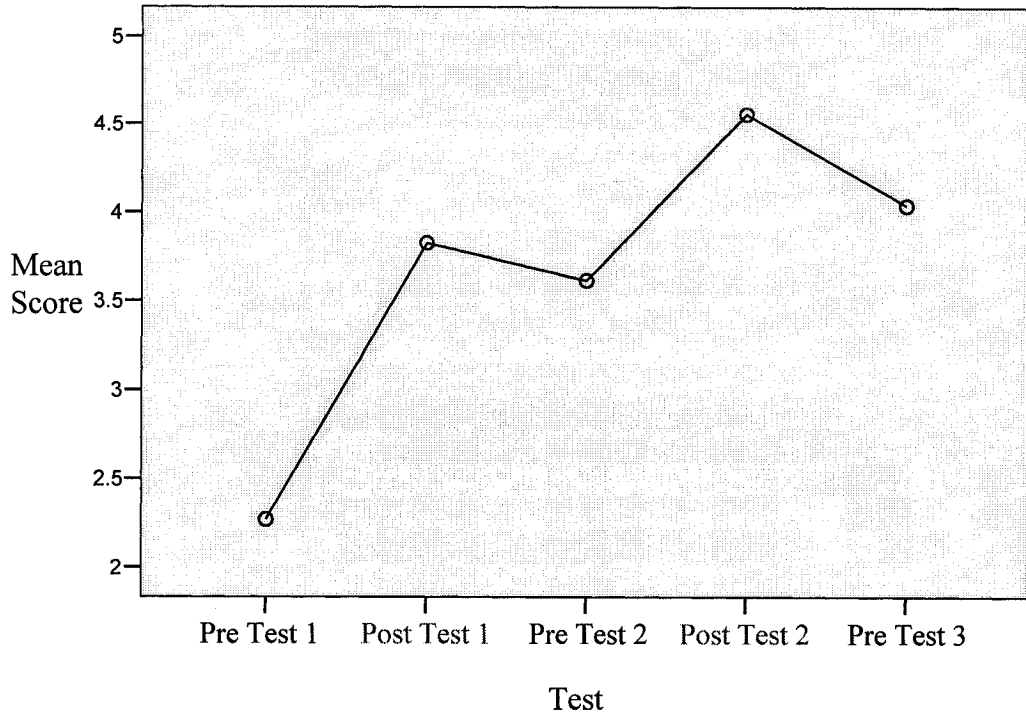


Figure 7. Knowledge acquisition and retention in the experimental group

Table 9

*Statistical Results for Knowledge Retention over Time*

Variable (Mean score)	Experimental		Test	
	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Post-test T1 (3.83)	1.56	1.19	9.400	< 0.001**
Pretest T2 (3.62)	0.21	1.11	1.376	0.175
Post-test T2 (4.56)	0.94	0.14	6.677	< 0.001**
Pretest T3 (4.04)	0.52	0.85	4.397	< 0.001**
Overall @ T3	0.21	0.82	1.850	0.070

\*\*  $p < .001$

### *Attitudes*

Attitude subscale responses were coded into SPSS for data analysis (1 = *very positive*, 2 = *positive*, 3 = *neutral*, 4 = *negative*, and 5 = *very negative*). Scores for the experimental group ranged from 1 to 3.25 at T1, 1 to 3.50 at T2, and 1 to 3.00 at T3, while for the control group, they ranged from 1 to 4.25, 1 to 4.25, and 1 to 4.00, respectively. For the experimental group, mean attitude scores over time were 1.83 ( $\pm 0.65$ ), 1.68 ( $\pm 0.55$ ), and 1.62 ( $\pm 0.56$ ) at data collection T1, 2, and 3, respectively, while the control group scored 1.85 ( $\pm 0.78$ ), 1.94 ( $\pm 0.77$ ), and 1.84 ( $\pm 0.74$ ), respectively (see Table 10). Time and group differences were assessed by a two-way analysis of variance,  $F(2, 204) = 3.040$ ,  $p = 0.050$ , and demonstrated a significant difference in attitude change toward positive direction over time in the experimental group, while it remained constant over time in the control group.

Table 10

### *Attitude Descriptive Statistics*

Variable	Experimental			Control		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
T1	1.83	.65	1-3.25	1.85	.78	1-4.25
T2	1.68	.55	1-3.50	1.94	.77	1-4.25
T3	1.62	.56	1-3.00	1.84	.74	1-4.00

### *Decisional Balance*

Decisional balance measures for contraceptive use behaviors were measured in two separate scores: a Pros score and a Cons score. Their subscale responses were coded as 1 (*no*) and 2 (*yes*). Higher scores reflect greater advantages of contraceptive use for Pros-component items, while higher scores reflect greater disadvantages of contraceptive use for Cons-component items. For the Pros, the mean decisional balance scores were 1.66 ( $\pm 0.26$ ), 1.70 ( $\pm 0.25$ ), and 1.67 ( $\pm 0.30$ ) at data collection T1, 2, and 3, respectively, while they were 1.54 ( $\pm 0.32$ ), 1.64 ( $\pm 0.28$ ), and 1.59 ( $\pm 0.33$ ), respectively, for the control group (see Table 11). There were significant differences between the two group at T1 and T3,  $F(2, 204) = 3.626, p = .028$ , while no significant differences were noted over time. For the Cons mean decisional balance scores, results showed no significant difference between the groups and over time,  $F(2, 204) = 1.252, p = .288$ . The findings indicate that intervention had no impact in the decisional measures for contraceptive use.

Table 11

*Decisional Balance Descriptive Statistics*

Variable	Experimental			Control		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
<b>Pros</b>						
T1	1.66	.26	1.20-2	1.54	.32	1.00-2
T2	1.70	.25	1.20-2	1.64	.28	1.00-2
T3	1.67	.30	1.00-2	1.59	.33	1.00-2
<b>Cons</b>						
T1	1.18	.27	1-2.00	1.19	.25	1-1.80
T2	1.16	.24	1-2.00	1.19	.24	1-1.80
T3	1.13	.21	1-2.00	1.18	.23	1-1.80

### *Self-Efficacy*

Self-efficacy subscale responses were coded into SPSS for data analysis (1 = *not confident*, 2 = *somewhat confident*, 3 = *very confident*, and 4 = *don't know*). A response to 4 was treated as a missing value. Scores were averaged per number of items answered, and they ranged from 1.20 to 3 over time for the experimental group, and 1 to 3 for the control group. Mean self-efficacy scores between the two groups and over time were constant (see Table 12), and there were no significant differences in groups over time,  $F(1, 100) = 1.593, p = 0.210$ .

Table 12

#### *Self-Efficacy Descriptive Statistics*

Variable	Experimental			Control		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
T1	2.50	.40	1.57-3	2.40	.56	1-3.00
T2	2.47	.44	1.20-3	2.35	.51	1-3.00
T3	2.50	.47	1.40-3	2.40	.52	1-3.00

### *Contraceptive Use Stages of Change*

Stages of change subscale responses were coded into SPSS for data analysis (1 = *I do not plan to start using birth control every time within the next six months*, 2 = *I plan to start using birth control every time within the next six months*, 3 = *I plan to start using birth control every time within the next 30 days*, 4 = *I have been using birth control every time but for less than six months*, 5 = *I have been using birth control every time for more*



than six months, and 6 = *I am not sexually active and do not plan to be sexually active within the next six months*). Response 6 was dropped from the calculation, thus the total scores for this study ranged from 1 to 5 at all data collection times. Mean scores for the experimental group over time were 4.22 ( $\pm 1.36$ ), 4.41 ( $\pm 1.19$ ), and 4.16 ( $\pm 1.37$ ) at T1, 2, and 3, respectively, and for the control group were 3.39 ( $\pm 1.60$ ), 3.16 ( $\pm 1.76$ ), and 2.89 ( $\pm 1.87$ ), respectively. Mean scores remained constant over time in the experimental group, but they gradually decreased over time in the control group (i.e., from 3.39 at T1 to 3.16 at T2, and to 2.89 at T3). Results listed in Table 13 show a significant difference in Stages of Change between the groups,  $F(1, 69) = 10.547, p = .002$ .

Table 13

*Contraceptive Use Stages of Change Descriptive Statistics*

Variable	Experimental			Control		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
T1	4.22	1.36	1-5.00	3.39	1.60	1-5.00
T2	4.41	1.19	1-5.00	3.16	1.76	1-5.00
T3	4.16	1.37	1-5.00	2.89	1.87	1-5.00

A summary of the mean scores and changes in attitudes, decisional balance, self-efficacy, and stages of change over time, and group differences assessed by two-way repeated measures ANOVA can be found in Table 14 and 15, respectively.

Table 14

*Mean Scores for Attitude, Decisional Balance, Self-Efficacy, and Stages of Change over Time*

Variables	Experimental			Control		
	T1	T2	T3	T1	T2	T3
Attitude	1.83(±.65)	1.68(±.55)	1.62(±.56)	1.85(±.78)	1.94(±.77)	1.846(±.74)
Decisional Balance						
Pros	1.66(±.65)	1.70(±.55)	1.67(±.56)	1.54(±.78)	1.64(±.77)	1.59(±.74)
Cons	1.18(±.27)	1.16(±.24)	1.13(±.21)	1.19(±.25)	1.16(±.24)	1.18(±.23)
Self-Efficacy	2.50(±.40)	2.47(±.44)	2.50(±.47)	2.40(±.56)	2.35(±.51)	2.40(±.52)
Stages of Change	4.22(±1.36)	4.41(±1.19)	4.16(±1.37)	3.39(±1.60)	3.16(±1.76)	2.89(±1.87)

Table 15

*ANOVA for Attitude, Decisional Balance, Self-Efficacy, and Stages of Change Over Time*

Variables	Source (effect)	<i>df</i>	<i>F</i>	<i>p</i>
Attitude	Group	1	1.971	0.163
	Error	102		
	Time	2	2.193	0.114
	Group x Time	2	3.040	0.050*
	Error	204		
Decisional Balance Pros	Group	1	3.166	0.078
	Error	102		
	Time	2	3.625	.028*
	Group x Time	2	.593	.554
	Error	204		
Cons	Group	1	.530	.468
	Error	102		
	Time	2	1.252	.288
	Group x Time	2	.469	.626
	Error	204		
Self-Efficacy	Group	1	1.593	.210
	Error	100		
	Time	2	.728	.484
	Group x Time	2	.042	.959
	Error	200		
Stages of Change	Group	1	10.547	.002*
	Error	68		
	Time	2	2.860	.061
	Group x Time	2	1.826	.165
	Error	136		

\**p* = significant at 0.05 level

*Contraceptive Use Stages of Change Rates over Time*

Approximately one-half of the subjects in both groups were in the maintenance stage at all three data collection times (nearly 60% of the experimental group and 40% of the control group; see Table 16). Of the 52 subjects in each group at baseline (T1), 9.8% of the experimental group and 13.6% of the control group were in precontemplation stage and were 13.5% and 38.1% at four months (T3), respectively. Among sexually active subjects, intention not to use contraceptives within the next six months remained constant for the experimental group, while the rate increased in the control group. Sexually active individuals not using a method of contraceptive every time they had intercourse were placing themselves at risk for unintended pregnancies. The preparation stage was sparsely populated with 4.8% at T2 and 8.1% at T3 for the experimental group and 9.3% and 2.4%, respectively, for the control group. The results indicate subjects' intention to start using contraceptive every time within the next 30 days increased from T2 to T3 in the experimental group, but decreased for the control group. Significant differences in stage of change for contraceptive use between the groups were found,  $F(1, 68) = 10.547, p = .002$ .

Table 16

*Contraceptive Use Intention Rates by Group and Intervention Time*

Contraceptive Use	Experimental			Control		
	T1	T2	T3	T1	T2	T3
	n (%)			n (%)		
<b>Stages of Change</b>						
Precontemplation	4(9.8)	4(9.5)	5(13.5)	6(13.6)	12(27.9)	16(38.1)
Contemplation	4(9.8)	6(14.3)	3(8.1)	8(18.2)	5(11.6)	5(11.9)
Preparation	5(12.2)	2(4.8)	3(8.1)	7(15.9)	4(9.3)	1(2.4)
Action	4(9.8)	6(14.3)	5(13.5)	6(13.6)	5(11.6)	3(7.1)
Maintenance	24(58.5)	24(57.1)	21(56.8)	17(38.6)	17(39.5)	17(40.5)
Not sexually active	11(21.2)	10(19.2)	15(28.8)	8(15.4)	9(17.3)	10(19.2)
Total: n (%)	52(100)	52(100)	52(100)	52(100)	52(100)	52(100)

### Contraceptive Behavior Change Predictor

To identify which variable(s) among the independent variables (i.e., knowledge, attitudes, decisional balance, self-efficacy, and stages of change) was most likely to predict behavior change in the use of contraceptives at T3, over 4 months of the intervention program, multiple logistic regression analyses were performed on data differences between T3 and T1. The overall findings showed that knowledge ( $p = .045$ ) and stages of change ( $p = .004$ ) were statistically significant in predicting behavior change. This finding suggests that an increase in knowledge and progression in the stages of change enhance contraceptive use. Results are shown in Table 17.

Table 17

*Logistic Regression Analysis of Predictors of Contraceptive use at T3 (4 months post-intervention)*

Variable	SE	z	p
Knowledge	.429	2.00	0.045*
Attitude	.698	0.25	0.802
Decisional Balance			
Pros	9.384	1.56	0.119
Cons	.928	-0.35	0.728
Self-Efficacy	1.247	0.49	0.621
Stages of Change	.658	2.84	0.004*

SE = Standard Error, \*  $p < .05$

### Relationship between Variables

To examine the relationships between variables, a Spearman rho ( $\rho$ ) correlation analysis was performed on data differences between T3 and T1. At T3, two variables (knowledge and stages of change) correlated positively with contraceptive use ( $p < .05$ ), while three variables (i.e., knowledge, self-efficacy, and cons) correlated with attitude (see Table 18).

Table 18

#### *Spearman Rho Correlation Coefficients at T3*

Variable	BC use	Knowledge	Attitude	Pros	Cons	Self-efficacy	Stages
BC use	1.000	.250*	.049	.182	.012	.117	.330*
Knowledge		1.000	.223*	.066	.155	.055	.058
Attitude			1.000	.128	.315*	.214*	.073
Pros				1.000	.163	.102	.061
Cons					1.000	.158	.070
Self-efficacy						1.000	.005
Stages							1.000

\*  $p < .05$

*Decisional Balance and Self-Efficacy by Stages of Change*

Tables 19, 20, and 21 present the scores on decisional balance and self-efficacy by stages of change. Analysis of variance (ANOVA) was used to determine relationships between stages of contraceptive change with decisional balance and self-efficacy measures. Tukey's post hoc comparison test was used to determine the significant differences between the separate stages of contraceptive change.

*Decisional balance measure.* The balance between the pros and cons varied depending on where a person was on the continuum of stages of change. Thus, one-way analysis of variance was used to determine if a relationship existed between the stages of contraceptive change and the perceived pros and cons. Stage of change was the independent variable and the mean scores for the pros and cons were the dependent variables. Significant mean differences in the pros scores across the stages were found for contraceptive use at T2,  $F(4, 80) = 3.113, p = .020$ , and T3,  $F(4, 80) = 2.50, p = .050$ . Similarly for cons, there were significant differences ( $p < .05$ ) at T2 and T3.

A Tukey's post hoc comparison test was used to determine the significant associations within each stage. For the pros measures, subjects in the preparation stage had the highest (i.e., more benefits) pros scores compared with all other stages at T2. Likewise, subjects in the precontemplation stage had lowest pros scores (i.e., less benefits) when compared with other stages that were significant (preparation,  $p = .041$ ; maintenance,  $p = .027$ ) at T2. For the cons measures, subjects in the precontemplation stage had higher scores (i.e., more barriers) than subjects in the preparation stage ( $p = .025$ ) and maintenance stage ( $p = .011$ ) at T2, and the action ( $p = .041$ ) and maintenance ( $p = .000$ ) stages at T3.



*Self-efficacy measure.* Social-cognitive theory (Bandura, 1986), which postulated that confidence in one's ability to perform a specific behavior (i.e., self-efficacy) was strongly related to one's actual ability to perform the behavior, had also been associated with stages of change. Thus, one-way analysis of variance was used to investigate the relationship between self-efficacy and stages of change. The stage of change for contraceptive use was the independent variable and the mean score for self-efficacy was the dependent variable. Mean scores of the 7-item self-efficacy measure were significantly related to stages of change at all three measurement times. Subjects in the precontemplation stage had significantly lower self-efficacy scores (i.e., lower level of confidence) than subjects in the maintenance stage at all three measurement times ( $p < .05$ ). Likewise, all subjects in the maintenance stage had higher self-efficacy scores (i.e., higher level of confidence) at all three measurement times. Figures 8, 9, and 10 illustrate the relationship of pros and cons, and self-efficacy scores to stages of contraceptive change at three measurement times, respectively.

Table 19

*ANOVA and Comparison of Decisional Balance and Self-Efficacy by Stages of Contraceptive Change among all subjects at T1*

	PC (n=10)	C (n=12)	P (n=12)	A (n=10)	M (n=41)	ANOVA	
Measure	M $\pm$ SD	M $\pm$ SD	M $\pm$ SD	M $\pm$ SD	M $\pm$ SD	F	p
Pros	1.40 $\pm$ .25	1.55 $\pm$ .39	1.58 $\pm$ .34	1.64 $\pm$ .26	1.64 $\pm$ .26	1.508	.208
Cons	1.29 $\pm$ .33	1.27 $\pm$ .31	1.20 $\pm$ .24	1.12 $\pm$ .25	1.13 $\pm$ .20	1.468	.220
Self-Efficacy	2.06 $\pm$ .69	1.92 $\pm$ .33	2.36 $\pm$ .56	2.51 $\pm$ .55	2.60 $\pm$ .33	6.859	.000*

PC: Precontemplation, C: Contemplation, P: Preparation, A: Action, M: Maintenance  
\* $p < .05$

Table 20

*ANOVA and Comparison of Decisional Balance and Self-Efficacy by Stages of Contraceptive Change among all subjects at T2*

Measure	PC (n=10)	C (n=12)	P (n=12)	A (n=10)	M (n=41)	ANOVA	
	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	F	p
Pros	1.48 ± .25	1.70 ± .34	1.83 ± .27	1.62 ± .28	1.71 ± .24	3.113	.020*
Cons	1.30 ± .31	1.24 ± .15	1.00 ± .00	1.27 ± .30	1.10 ± .14	4.877	.001*
Self-Efficacy	2.06 ± .66	2.26 ± .45	2.20 ± .60	2.48 ± .37	2.53 ± .40	3.338	.014*

PC: Precontemplation, C: Contemplation, P: Preparation, A: Action, M: Maintenance  
\*  $p < .05$

Table 21

*ANOVA Comparison of Decisional Balance and Self-Efficacy by Stages of Contraceptive Change among all subjects at T3*

	PC (n=10)	C (n=12)	P (n=12)	A (n=10)	M (n=41)	ANOVA	
Measure	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	F(4,80)	p
Pros	1.58 ± .32	1.50 ± .39	1.30 ± .26	1.80 ± .24	1.67 ± .28	2.500	.050
Cons	1.30 ± .28	1.08 ± .11	1.27 ± .32	1.07 ± .10	1.06 ± .11	6.588	.000*
Self-Efficacy	2.17 ± .59	2.20 ± .58	2.36 ± .63	2.59 ± .33	2.62 ± .35	4.064	.005*

PC: Precontemplation, C: Contemplation, P: Preparation, A: Action, M: Maintenance  
 \*  $p < .05$

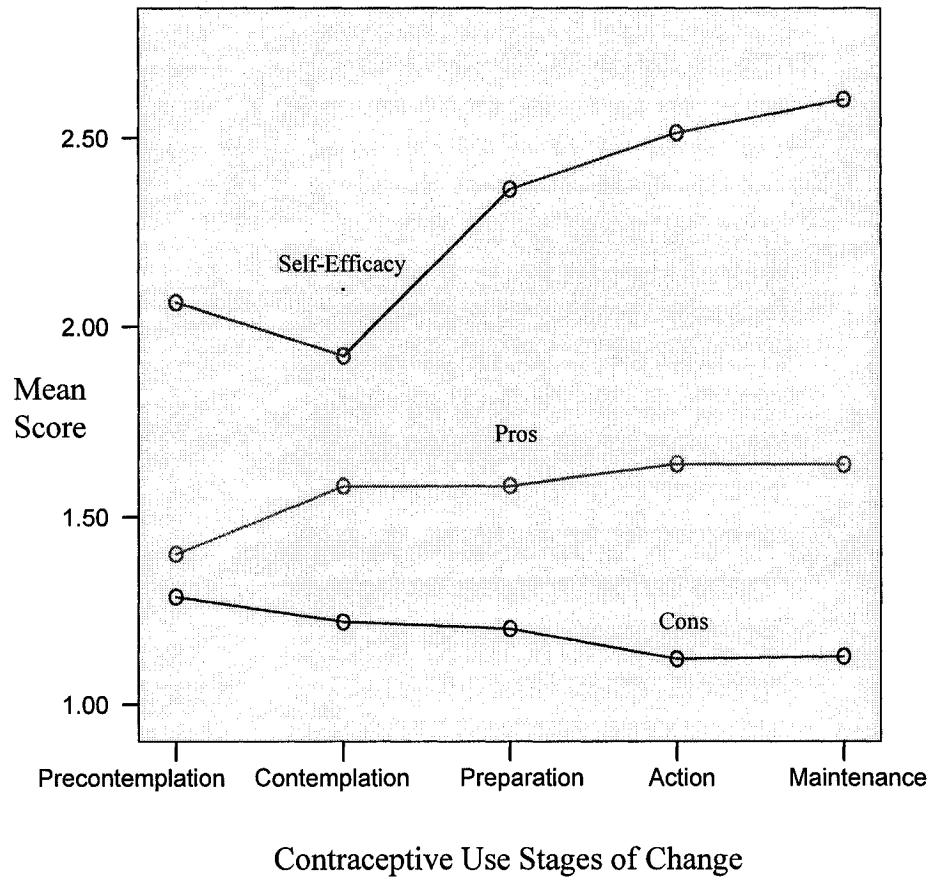
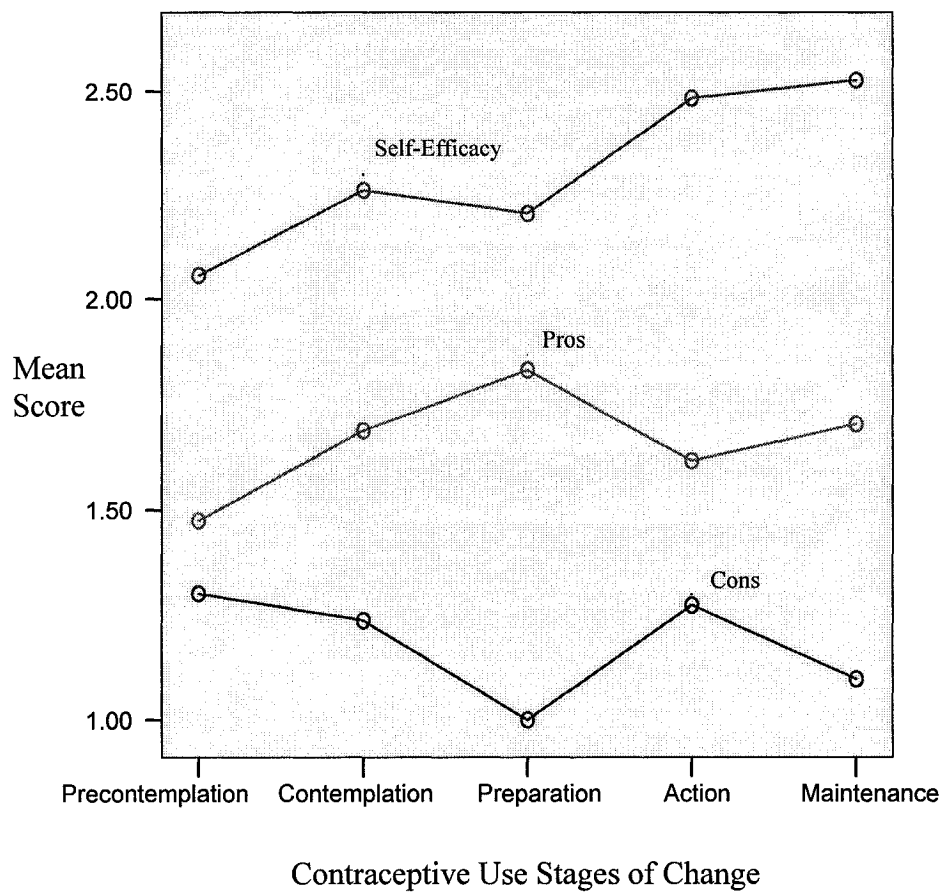


Figure 8. Perceived pros and cons, and self-efficacy for contraceptive use by stages of change at T1



*Figure 9.* Perceived pros and cons, and self-efficacy for contraceptive use by stage of change at T2

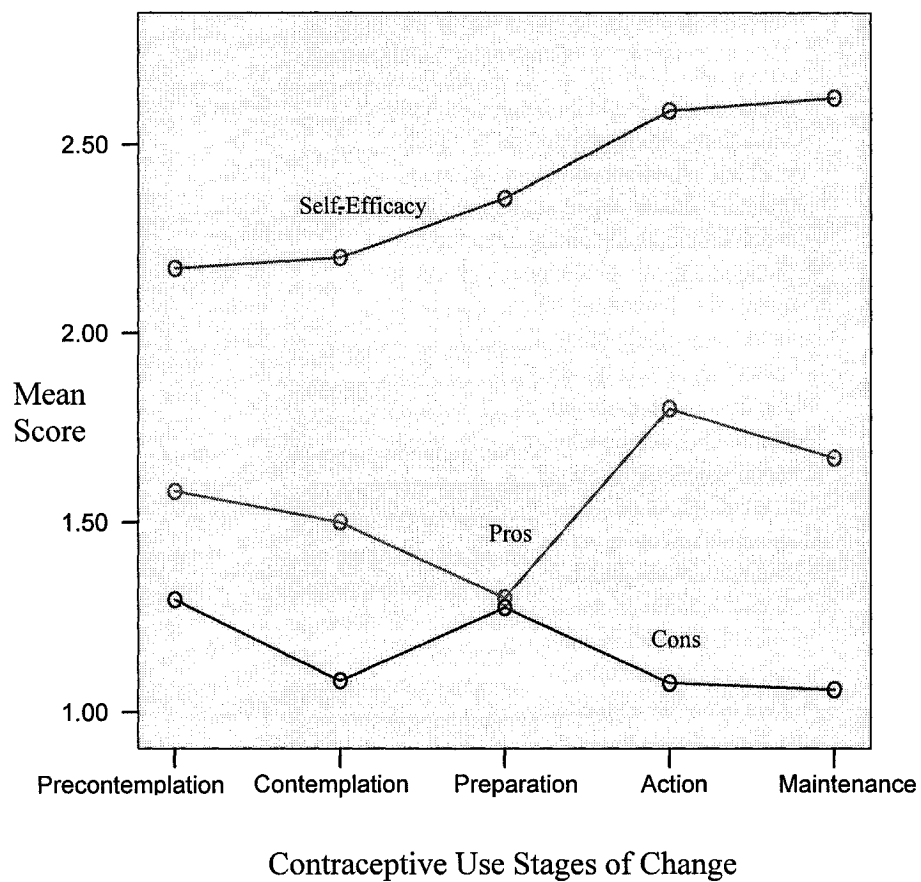


Figure 10. Perceived pros and cons, and self-efficacy for contraceptive use by stage of change at T3

### Stages of Change and Contraceptive Use

Contraceptive decision-making is an ongoing process. Therefore, to examine the intention to use contraception against actual contraception use, a Spearman rho ( $\rho$ ) correlation analysis was performed at all three measurement times. For example, intent to use contraception (stages of change) in the future – more specifically in the next two months – at T1 is measured against the contraceptive use now and in the past two months at T2.

All variables correlated with stages of change ( $p < .01$ ) at T1 and T2. All correlations indicated a positive linear relationship, representing a positive linkage between decision-making and actual outcome behavior. A detailed correlation matrix is shown in Table 22.

Table 22

#### *Spearman Rho Correlation Coefficients at T1 and T2*

Variable	Stages T1	BC use next 2 mos. T1	BC use now T2	BC use past 2 mos. T2
Stages T1	1.000	.446**	.563**	.485**
BC use next 2 mos. T1		1.000	.337**	.344**
BC use now T2			1.000	.763**
BC use past 2 mos. T2				1.000

\*\* . Correlation is significant at the 0.01 level (2-tailed).

At T2 and T3, all variables correlated with stages of change ( $p < .01$ ). Again, all correlations indicated a positive linear relationship. A detailed correlation matrix is shown in Table 23.

Table 23

*Spearman Rho Correlation Coefficients at T2 and T3*

Variable	Stages	BC use next 2 mos	BC use now	BC use past 2 mos.
	T2	T2	T3	T3
Stages T2	1.000	.586**	.604**	.706**
BC use next 2 mos. T2		1.000	.650**	.344**
BC use now T3			1.000	.820**
BC use past 2 mos. T3				1.000

\*\* . Correlation is significant at the 0.01 level (2-tailed).



## CHAPTER 5

### Findings

#### *Summary*

The purpose of this quasi-experimental longitudinal study was to implement and evaluate the effectiveness of a comprehensive reproductive health educational program in promoting contraceptive use to prevent unintended pregnancy in active duty Navy enlisted females. To determine which, if any, of the independent variables in the proposed CBCM used were actually effective in changing the contraceptive behavior factor targeted, these variables were also examined in relation to actual contraceptive use. These variables consisted of contraceptive knowledge, attitudes and beliefs, self-efficacy, readiness to change behavior, and the pros and cons a person considers when making decisions about contraceptive use.

This study revealed (1) a striking lack of knowledge about basic reproductive health among subjects; (2) the fact that participation in certain behaviors placed individuals at risk for unintended pregnancy and STDs; and (3) a reluctance to use, or avoidance of health care providers. Surprising is the lack of clarity about fertility and conception, matters most basic to one's ability to control reproduction.

Findings in the literature indicating that sex education did increase factual knowledge about sexuality were strongly supported. Arnold, Smith, Harrison, and Springer (2000) reported that knowledge about sexuality and contraceptive methods in an experimental group was found to increase significantly in relation to knowledge in the

control groups. Dawson (1986) also noted that adolescents who received education on pregnancy and birth control appeared to be aware of more contraception methods and were better informed as to how the different methods should be used in comparison with those who had not received the education. In the present study, the program was effective at increasing knowledge in the intervention group. The results further revealed that repetitive intervention had a better long-term effect in retaining knowledge.

The literature suggested the importance of addressing both real and perceived barriers in efforts to increase contraceptive use, particularly since the delay between the start of sexual activity and consistent contraception was one of the biggest obstacles to the prevention of adolescent pregnancy (Stevens-Simon, Singer, & Cox, 1996).

The results supported previous research that focused on attitudes toward birth control. Witte (1997) reported that inner-city teens felt it was important for health education programs to reach children at an early age in order to combat negative attitudes toward birth control, which deter its use and consequently increase the risk of unintended pregnancy. In the present study, females who did not use any contraceptive at most recent sexual intercourse (versus those who did) were more likely to have a negative attitude toward birth control and their decisions against birth control use was based on their negative perception of contraceptive use. This study saw a significant difference in attitude changed toward the positive direction over time in the experimental group, while attitude change remained constant in the control group. The results indicate that the program made subjects more accepting about contraception and family planning.

Evidence that school sex education programs have succeeded in altering attitudes by increasing knowledge could be found. Monahan (2001) noted an attitude change with

regard to responsible contraception use; after receiving sex health education, youth more clearly recognized the importance of effective contraception. Similarly, in this study, a significant positive correlation was made between attitudes and knowledge.

Results of this study clearly support the idea that sex health programs neither encourage adolescents to have intercourse (Coyle et al., 1999; Lewis et al., 1999; McBride & Glenapp, 2000) nor increase the levels of sexual activity (Lieberman, Gray, Wier, Florentino, & Maloney, 2000; Monahan, 2001; Wight et al., 2002). Rather, such programs were associated with reduction in sexual activity and pregnancy (Ku, Sonenstein, & Peck, 1992; Turner, Korpita, Mohn, & Hill, 1993) and increased abstinence (Kirby et al., 1991a).

No major differences were noted between the groups in baseline sociodemographic characteristics or sexual history. At baseline, 75% of participants in the experimental group and 71% in the control group reported being sexually active, and 90% and 81%, respectively, reported using contraceptives. At four months, however, the rate sexual activity decreased to 60% in the intervention group, while it increased to 75% in control group; inversely, the contraceptive use increased (90%) in the intervention group while it decreased (64%) in the control group. The results indicated that education was related to a decrease in sexual activity and greater use of contraceptive. More significantly, at four months (T3), no participants were pregnant in the experimental group, while six were pregnant in the control group. Results suggest that interventions aimed at increasing abstinence or contraceptive use (if sexually active) to prevent unintended pregnancy seemed to have an effect on the behavior of this study group of enlisted females.

Overall, this sample is representative of U.S. Navy active duty enlisted women in the pay grade of E1-E4 (Table 24). Reported race/ethnicity data for this study was very similar as reported by the Bureau of Naval Personnel (2005). Similarly, distribution of the reported pay grade for this study was consistent with the statistics reported by the Department of Defense (2004). The demographics indicate these findings can be generalized to active duty enlisted women.

Table 24

*Summary of Selected Study Demographics Compared to U.S. Navy Enlisted (E1-E4) Women Statistics*

Demographic	Criteria	Reported	This study
Race/Ethnicity	Black	27%	26%
	White	55%	49%
	Hispanic	9%	19%
	Asian	4%	3%
	American Indian	5%	3%
Pay grade	E1	6.6%	3.9%
	E2	12.9%	14.4%
	E3	37.4%	39.4%
	E4	43.1%	42.3%

The results support previous research on the effectiveness of sex education on pregnancy rates, which were observed to be positively influenced by educational programs (Lewis et al., 1999; Philliber & Allen, 1992). Vincent et al. (1987) found potential for a dramatic decrease in rates of adolescent pregnancy through the provision of sex education and family planning services. In their study, the estimated pregnancy rate among female youth aged 14-17 years fell significantly in a community where education was provided following the program's inception. In addition, there was a drop

in the pregnancy rate from 30 (at preprogram) to 8 for girls between 12 and 15 years of age in the first year of the pilot program (Dycus & Costner, 1990). Franklin and Associates' (1997) review of pregnancy prevention programs also revealed support for program effectiveness in reducing pregnancy rates. In this study, there were fewer pregnancies in the experimental group compared to the control group: one vs. seven.

The purposes of this study were also to investigate the effects of the program on decisional balance, pros and cons measures, and self-efficacy scores along the five stages of contraceptive change among subjects. Findings from this study indicate that there is stage specificity for perceived pros (i.e., benefits) and cons (i.e., barriers) to contraceptive use. Individual's perceptions that contraceptive use would help with pregnancy prevention were positively related to the higher stages of change (i.e., action and maintenance). On the contrary, individuals' perceived barriers that contraceptive use makes sex feel unnatural or less exciting were negatively associated with higher stages of change for contraceptive behavior.

The distribution of pros and cons measures by stages of change was also consistent with other health behavior studies (Prochaska et al, 1994; Tilliss, et al., 2003). The pros scores were the highest (i.e., more benefits) among the subjects in the action and maintenance stage at T1 and T3, while they were the lowest (i.e., less benefits) in the precontemplation stage at T1 and T2. At T2, however, the pros score was the highest in the preparation stage, while it was the lowest in the preparation stage at T3. Similar outcomes were found with the cons measure. Individuals had lowest (i.e., less barriers) cons scores in the action and maintenance stage when compared to the individuals in the precontemplation stage at T1 and T3, while they were the highest (i.e., more barriers) in

the precontemplation stage. A linear trend was found with the cons scores decreasing with subjects who were in the higher stages of contraceptive change, and the pros scores being higher for those in the advanced stage of contraceptive change.

The results support previous research that self-efficacy increased as individuals progress through the stages of change, with the greatest increases occurring in the action and maintenance stages (Astroth et al., 2002). The self-efficacy scores of the participants, the amount of confidence individuals had in their ability to carry out a desired behavior across tempting situations, varied at each stage of contraceptive change. Individuals identified in the earliest stages of contraceptive change (i.e., precontemplation and contemplation) had low confidence in their ability to engage in contraceptive use (e.g., using alcohol or drugs, when they have the side effects, when it is too much trouble). On the other hand, the participants identified in the action and maintenance stage of contraceptive change, expressed high levels of confidence to engage in contraceptive use during specific situations, and thus, could be viewed as having high self-efficacy for contraceptive use.

This study used the stages of contraceptive change, one of the components in the proposed CBCM, to evaluate how subjects were distributed along the continuum between the precontemplation and maintenance stages over time. Approximately 20% of the experimental group and 32% of the control group were not participating in contraceptive use (i.e., precontemplation and contemplation stages) at T1, which increased to 22% and 50%, respectively at T3. It appears the intervention was effective in keeping the percentage of contraceptive non-users lower while keeping the percentage of users higher in the experimental group when compared to the control group. Furthermore, nearly 70%

of the experimental group and 50% of the control group were using contraceptive on a regular basis (i.e., action and maintenance) over time.

Cognitive factors (e.g., beliefs, attitudes, knowledge), which were also functions of a person's perception, have shown to be strong predictors of social behaviors, including adolescent contraceptive behavior (Conner & Norman, 1996). The results in this study also showed that knowledge was statistically significant in predicting contraceptive use as well as stages of change. Studies involving these factors related to contraceptive use found that positive attitudes and level of knowledge were significantly correlated with contraceptive use among adolescents (Adler, 1990; Barnett, Papini & Gibur, 1991; Morrison, 1985). Zabin (1986a) described a significant effect of contraceptive education on knowledge and on attitudes as the most effective method of promoting contraceptive use. Similarly, at T3 in the present study, two variables (i.e., knowledge and stages of change) correlated positively with contraceptive use ( $p < .05$ ), while three variables (i.e., knowledge, self-efficacy, cons) correlated with attitude. Many studies have been conducted on adolescent decision-making that explore the specific factors influencing sexual behavior and the decision to use contraceptives. However, these studies failed to link these factors to actual execution of the planned action and outcome measures over time, leaving a gap between decision-making regarding the practice of birth control protection and actual use. This gap must be closed if decisions are to lead to unwanted pregnancy prevention. Therefore, this study examined the missing link with the intent to close the gap by evaluating the effect of the intervention.

This study also looked at the link between decision-making and behavior since Hewell and Andrews (1996) reported that decision-making might not necessarily lend

itself to the execution of the chosen course of action. The findings in this longitudinal study suggest that contraceptive decision-making made by the subjects at T1 and at T2 were carried out at T2 and at T3, respectively. Furthermore, results indicate adolescents who receive continual support in their decision-making have better outcomes; reduced unintended pregnancy rate.

#### *Usefulness of Proposed Model*

The proposed Contraceptive Behavior Change Model (see Figure 2), based on the Theory of Transtheoretical Model, was an appropriate model to guide the design and implementation of this study in military enlisted women. The contraceptive behavior was influenced by numerous factors, all of which could be labeled as either personal or environmental. Use of this theory allows investigators to evaluate which factors are modifiable as a result of intervention efforts and to identify factors that have impact on targeted behavior: choosing abstinence or using contraceptives if sexually active. The model can also be used as a guide to develop new effective interventions or refine existing programs.

#### *Conclusions*

The sample size of this study was smaller than originally planned due to recruitment difficulty and a greater attrition rate than anticipated; therefore, the findings should be considered within the limitations of its design. Nevertheless, a relationship was established between influencing factors or barriers to contraceptive use and actual use in a sample of active duty enlisted females on board U.S. Navy ships. By focusing on active duty Navy sailors on board ships, the common pitfall of amalgamating all military personnel together was avoided. The importance of further understanding of the sexual



attitudes, beliefs, and behaviors of specific active duty adolescent populations, particularly sailors assigned to ships, cannot be understated.

Four out of seven study hypotheses were supported:

1. There were positive changes on attitudes at 4 months in the experimental group while no change occurred in the control group,
2. Sexually active women in the experimental group had greater contraceptive use at 4 months than did the control group,
3. The experimental group had greater contraceptive knowledge acquisition and retention at 4 months than the control group, and
4. The independent variables, knowledge and stages of change, significantly predicted the dependent variable of contraceptive use.

The remaining three of seven study hypotheses were partially supported:

1. Although there were no significant changes on decisional balance measures over time in both groups, the Pros component scores in the experimental group remained more positive than in the control group at all three data collection times,
2. There were no changes on self-efficacy in a positive direction at 4 months in either group; nevertheless, the self-efficacy scores remained in a more positive direction in the experimental group than in the control group, and
3. For the stages of change, although mean scores remained fairly constant over time in the experimental group, it moved backward through the stages in the control group. Movement backward to any stage is referred to as relapse (Prochaska et al., 1994).

Based on these findings, it appears that educational programs dealing with reproductive health result in: (a) an increase in knowledge and contraceptive use, (b) improved attitude towards contraceptive use, and (c) prevention of relapse in the stages of change (i.e., intention to use contraceptive). Intervention appears not to have been a sufficient condition for behavior changes on decisional balance, self-efficacy, and stages of change; however, the intervention group remained in a more positive behavior toward contraceptive use than the control group. Multiple intervention approaches, such as incorporating increased skills-building components into the program, might affect a future positive behavioral change.

Despite increased contraceptive use in the experimental group, concern developed regarding the number of contraceptive non-users in the control group who subsequently became pregnant. The availability and access to equally effective methods was guaranteed to all participants; the fact that eight (15%) pregnancies occurred, including two therapeutic abortions, nonetheless, emphasizes the need to give more attention to reasons for contraceptive non-use and/or to the motivational component of adolescent pregnancy. As researchers preoccupied with the societal costs of adolescent pregnancy, one tends to disregard the potential benefits of childbearing for an individual teenager (e.g., a closer relationship with a boyfriend, an improved sense of self as a woman and mother, the love a baby gives the mother and the love a mother has for her child), and more specifically, for the sailor (e.g., avoiding deployment, getting her own place to live instead of on a ship, or getting out of the Navy). To the extent that the lack of motivation to prevent conception influenced these adolescents' decisions to either discontinue, practice inconsistent use, or not to initiate contraceptive use says that there is still a lack

of understanding in those factors that undermine the motivation to use contraceptives in these young women's lives.

Efforts to promote alternative behaviors that fulfill the same needs in a young women as pregnancy does may be far less compromising, thus may take time to be effective; however, a small number of sailors may find themselves in this situation. The unintended pregnancy rate within the military still continues to be military readiness issue, thus, preventing this condition is critical. The need exists for more comprehensive programs designed to help young sailors discover life options that will motivate them to postpone childbearing beyond adolescence.

*Implications for Health Care Providers, Health Educators, and Policymakers*

Health care providers, health educators, and policymakers can address reproductive health care needs of adolescent women. However, a paradigm shift may be needed to change the thinking about imparting facts and skills relating to sexual behavior plus work within the context of reality of people's lives and practices.

Individuals need knowledge regarding how to prevent pregnancy, attitudes favorable to preventing pregnancy, and the self-efficacy skills to prevent pregnancy. Knowledge can be provided through various teaching methods and tests for knowledge retention. Health professionals can motivate others through goal-setting exercises and broadening opportunities. To make information pertinent to the target population, real-life scenarios can be presented with people which whom they can relate. Opportunities can be provided to practice communication and decision-making skills (e.g., refusing unprotected sex, staying sober to reduce the risk of unintended sexual behavior).

### *Health Care Providers*

Health care providers can design and implement intervention programs to influence and reinforce behavioral changes, such as teaching about safer sex behavior to decrease unintended pregnancy rates in the active duty community. However, to implement effective pregnancy prevention programs Navy-wide, the programs have to partner with the fleet to sponsor command-wide pregnancy prevention symposiums. Other events would include training programs that are ongoing, including training for peer program providers.

Health care providers in any clinical setting who are specifically positioned to play an advocacy role in helping to combat adolescent pregnancy can provide effective counseling by working within the context of these young women's lives and personal practices rather than, for example, focusing solely on each method's side effects.

Health care providers should be more resourceful. Providers should prepare and distribute packets containing information relevant to women's reproductive health, such as sexuality, contraceptives, safe sex (i.e., sexually transmitted disease prevention), and other topics, along with contacts and phone numbers to have it readily available for adolescent and young women clients. The packet should be given to women, even if they do not specifically request it, as long as they could use the information.

Health care providers need to market their services so that people in the community know whom, when, and where to call or go for information. Multiple means should be used for the dissemination of information and to education these audiences. People learn in a variety of ways – through listening, seeing, and experiencing –and are more likely to retain information when exposed to a combination of teaching methods.

For example, to increase the number of people availing themselves of accessible health care, providers need to be more proactive by distributing printed material and interact with people where they live, work, and socialize. Even a Website could be set up with advice, information, and the option to submit questions about how to obtain services, as well as linking the site to reputable sources of information on reproductive health.

### *Health Educators*

Health Educators should present factual and skilled information within the context of relationships and readiness to engage in sexual activities, and not consider these as separate concepts. Lesson plans should include topics on knowledge, attitude, self-efficacy, decision-making, and behavior. In addition to information about pregnancy prevention, the following topics need to be addressed: consequences of pregnancy, childbearing, and childrearing, in relation to their personal and professional lives. For group discussion and exercises, application of real-life scenarios offered by the participants, the educator, or using a video clip, will help subjects to internalize information and apply it to themselves and their behaviors. Additionally, it is critical to address the issues of consent relative to knowledge, decision-making, and power dynamics.

Classes should be offered during Command orientation, then yearly thereafter with frequent booster lessons in between for high-risk populations. Additionally, given the anonymous quality of posing questions through the Internet that may account for its popularity, providing that opportunity, especially to young enlisted sailors, might increase questions about sexuality.

*Policymakers*

Despite the convenience of health care access onboard ship, sailors often seek women's health care onshore from nearby hospitals or branch medical clinics, even when timely appointments may not be readily available. Reasons for this may include embarrassment or a lack of trust in the ship's health care provider. Provider-patient relationships can be complicated by feelings of embarrassment or intimidation on the part of the patient. Because of busy and unpredictable ships' schedules, sailors often experience difficulty in booking medical appointments and end up on the delinquent list for their annual exams. In some cases, sailors are denied their contraceptive prescriptions due to lack of annual Pap results.

Future policy research could focus on providing women's health care onboard the ship by an outside female health care provider, on a scheduled basis, as a means of increasing health care access, improving health and behavior outcome, improving quality of life for female sailors and families, and most importantly, increasing the readiness of female sailors.

Policymakers need to involve health professionals, health educators, and young sailors when creating a new policy and revising existing policies related to reproductive health. Professionals who work with high-risk populations can provide insight into the health and welfare of these young women. They can advise on policies that will reach the most people and address their most pressing needs. Basing policies upon research is good policymaking practice.

### *Recommendations for Future Research*

The finding that some single enlisted adolescent women who are sexually active with the desire to become pregnant have either discontinued contraceptive use or are using no contraceptive needs further investigation. Exploration is needed into what motivates them to have positive attitudes toward pregnancy and the potential benefits of childbearing. One factor, ambivalence, may have an impact on pregnancy intentions not addressed in this study and needs further study. The efficacy of reproductive health education and counseling may be improved by addressing these issues.

During recruitment for this study, it was found that a large percentage of young enlisted females who would have been eligible if marital status were not the exclusion criteria, were married. This raises another study question of the reasons for early marriage and its underlying motivation. Thus, the study needs to be expanded to include married subjects. This study excluded male subjects and it is recommended that it be replicated to include men.

Subject recruitment of young, single, enlisted, active duty women from the Navy ships was very challenging - and even more so for the retention required by this longitudinal study. Reasons for subject attrition were listed in Chapter 4; therefore, they are not mentioned in this section. When designing a study, the limitations listed below need to be taken into consideration.

#### *Recruitment and Retention Issues*

Barriers to recruitment and retention that were encountered while conducting this study included: (a) limited access to the ship, (b) limited communication with the subjects, (c) unpredictable ships' schedules for underway and deployment, (d) ships'

mission priority, (e) ships' regular work hours and holiday schedule, and (f) subjects' unpredictable work schedule and training assignments, both on and off ship. All ship visits must be coordinated and approved before a visit can be made. The window for any available time and day may be limited because of a mission-related schedule, including operational training and underway schedules. Contacting subjects at work was a problem because no direct phone lines to their workspaces were usually available and no number was available for phone messages. Message via email to the subjects was also a problem because of limited access to computers or, if the individual was out to sea, email servers' connections might be poor. In addition, hectic work schedules could interfere with checking emails and may be a low priority for the sailor. Scheduling times to meet with subjects could be challenging due to unpredictable work and ships' movement schedules. Subjects most often could not attend scheduled classes, either because they conflicted with their work schedule or they were simply not allowed to attend any activity that would take them away from the ship's top priority (e.g., preparing for a major inspection). With the ship being on an operational tempo, mission-related schedules have top priority over research studies. During holiday periods, contacting subjects was even more difficult, since they were away from the ship and generally left no forwarding information. Subjects were sent to their work-related training either on or off the ship with very short notice and the researcher was the last person to be notified.



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## Appendix A

## Reproductive Health Education for T1

## Outline

- Review future family plans
- Statistics on unplanned pregnancy in soldiers
- Why do couples take risks
- Menstrual cycle and sexual function
- Personal challenges to birth control use
- Available birth control methods
- Sexually transmitted diseases and fertility
- Choosing a method of birth control

## Worksheet Exercise

## Questions 1-7

## The Issue

## Reproductive Risk Taking

## The Sexual Response Cycle

## Video -Menstrual Cycle

## The Menstrual Cycle

- time of the menstrual period
- time of ovulation (release of egg)
- time when most and least likely to become pregnant

## Personal Challenges

## Worksheet Question 8

## Health Benefits of Contraceptives

## Mortality Rates

## Effectiveness Rates

## Video - Choosing a Birth Control Method

## How Do They Work?

- Barrier methods: Condoms and diaphragms
- Hormonal Methods: Pill, shot, implants
- Intrauterine Device (IUD)
- Sterilization: Tubal Ligation, Vasectomy

Have you ever.....

- Made love unexpectedly?
- Been forced to have sex?
- Had a condom slip off or break?
- Forgotten several birth control pills?
- Awakened to realize you were having sex?
- Counted on your partner pulling out...but he didn't?
- Been caught in the act without having your act together?

Emergency Contraceptive Pills

- Emergency birth control pills can be taken within 72 hours of unprotected intercourse and prevent pregnancy
- Advantages: prevention of unintended pregnancy
- Disadvantages: nausea (50%), vomiting (25%)

Worksheet Questions 9 & 10

Sexually Transmitted Diseases

- Chlamydia
- Gonorrhea
- Herpes
- Human Papilloma Virus
- Hepatitis B
- HIV

Video - Scenarios

Worksheet Questions 11 - 13

Post-Test

Conclusion

- Future child-bearing plans
- Unplanned pregnancy in soldiers
- Why do some couples take risks
- Menstrual cycle and sexual function
- Available methods of birth control
- Emergency birth control
- Sexually transmitted diseases and fertility
- Is now a good time to get pregnant
- What is the best method of birth control FOR ME
- OB/GYN appointment if desired

Next Class: December-January 2005

## Reproductive Health Education Program

### Worksheet

**When instructed, please answer the questions on this page. Consider your responses to these questions throughout the rest of today's exercise. Your answers are personal and will not be discussed with the class.**

1. How old do I want to be when my first (or next) baby is born?

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2. About how old do I want to be when my last child is born?

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3. How many children do I want to have?

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4. How do I picture my life when my first (or next) child is born? For example, will I be in the service? Will I be married? Will I own my own home? Will I have completed my educational or vocational training goals?

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5. If I did not want to have a baby, how would I handle an unplanned pregnancy?

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6. How would I feel if I was unable to have children?

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7. How concerned would I be if I was pregnant before I was married?

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**When instructed please take about five minutes to answer question 8. Your responses are personal and will not be discussed with the class.**

8. Factors that have made it difficult for me to use birth control correctly and consistently include:

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_

**When instructed, take about 5 minutes to list 2 or 3 responses for questions 9 and 10. Your responses are personal and will not be discussed with the class.**

9. Now would be a GOOD time for me to get pregnant because:

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

10. Now would be a BAD time for me to get pregnant because:

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

**11. Your small group will be assigned with one of the following scenario. Please answer the questions on the space provided. You will have about 10 minutes for this exercise.**

- 1) Carol does not want to start a family for a few years and has been taking the birth control pill for several months. She has had no side effects, but she often forgets to take the pill and misses an average of five pills per month. She knows that the pill is much less effective at preventing pregnancy when pills are missed so she is thinking about changing birth control method.

What are some good birth control options for Carol? Why? If Carol is not in a stable, committed relationship, what else does she need to consider in order to protect her fertility? What could she do to prevent pregnancy if she had sex last night after missing four birth control pills in a row?

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- 2) Susan is not currently in a relationship. When she's attracted to a man and he shows an interest in her, she may have sex with him, even if she does not know him well. She has been relying on condoms and contraceptive foam for birth control. However, she sometimes gets carried away when she is intimate with a man and forgets to use the condoms, especially if she has had a few drinks. Susan know if something does not change, she is likely to end up pregnant or infected with an STD.

What are some good choices of birth control for Susan? How can Susan protect herself from STDs?

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3) Julie is an active duty soldier who is happy with her current method of birth control: the birth control pill. However, her unit is being deployed to Bosnia for an uncertain number of months. She does not know if she will be sexually active while in Bosnia and she does not know much about the hygiene facilities that will be available in Bosnia.

What methods of birth control would you advise Julie to consider? What does Julie need to consider in choosing a birth control method that will work for her and protect her from STDs?

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**Consider everything we talked about today to answer the following questions.**

12. The worst methods of birth control FOR ME are:

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13. The best methods of birth control FOR ME are:

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## Appendix B

### Reproductive Health Education for T-2

#### Outline

- Review future family plans
- Why do couples take risks
- Menstrual cycle and sexual function
- Personal challenges to birth control use
- Available birth control methods
- Sexually transmitted diseases and fertility
- Choosing a method of birth control

#### Future Family Plans

- How old do you want to be when your first (or next) baby is born?
- About how old do you want to be when your last child is born?
- How many children do you want to have?
- How do you picture your life when your first (or next) child is born?
- If you did not want to have a baby, how would you handle an unplanned pregnancy?
- How would you feel if you were unable to have children?
- How concerned would you be if you were pregnant before you were married?

#### Reproductive Risk Taking

#### The Sexual Response Cycle

#### The Menstrual Cycle

- time of the menstrual period
- time of ovulation (release of egg)
- time when most and least likely to become pregnant

#### Birth Control Use

- Factors that have made it difficult for you to use birth control correctly and consistently include:

#### Emergency Contraceptive Pills

- Emergency birth control pills can be taken within 72 hours of unprotected intercourse and prevent pregnancy
- Advantages: prevention of unintended pregnancy
- Disadvantages: nausea (50%), vomiting (25%)

### Sexually Transmitted Diseases

- Chlamydia
- Gonorrhea
- Herpes
- Human Papilloma Virus
- Hepatitis B
- HIV

Which method of birth control offers protection against STDs?

Am I ready to be a parent?

### OPNAVINST 6000.1A

- Management of Pregnant Servicewomen
- Assignments:
  - 1) Shipboard - up to 20th wk of pregnancy
  - 2) Aviation - pregnancy is considered disqualifying for designated flight status personnel.

Video: Responsible Parenting - Give Yourself a Chance

Post-Test

### Conclusion

- Future child-bearing plans
- Unplanned pregnancy in soldiers
- Why do some couples take risks
- Menstrual cycle and sexual function
- Available methods of birth control
- Emergency birth control
- Sexually transmitted diseases and fertility
- OB/GYN appointment if desired

Next Class: February - March 2005

## Appendix C

## REPRODUCTIVE HEALTH EDUCATION QUESTIONNAIRE

Full Name: \_\_\_\_\_ SS# \_\_\_\_\_

*The following information is needed for statistical purposes. This information will be kept confidential and your privacy will be protected.*

## A. DEMOGRAPHICS

A1. What is your age? \_\_\_\_\_

A2. What is your ethnic background?

- a) African American    b) White    c) Asian    d) Native American Indian  
 e) Latina/Hispanic    f) Other (Specify) \_\_\_\_\_

A3. What is your Marital Status?

- a) Married  
 b) Separated  
 c) Single, but involved in relationship  
 d) Single, and not in a relationship  
 e) Divorced

A4. How long have you been in this relationship?

- a) 1 yr or less    b) Greater than 1 yr    c) N/A

A5. What is your rank?

- a) E1    b) E2    c) E3    d) E4    e) Other \_\_\_\_\_

A6. How long have you been on active duty? \_\_\_\_\_ Months    \_\_\_\_\_ Years

A7. Where do you live now?

- a) Barracks    b) Other base housing    c) Off-base housing    d) On board ship  
 e) Other (Specify) \_\_\_\_\_

A8. With whom do you live now?

- a) Alone    b) Roommate(s)/friend(s)    c) Parent(s)    d) Relative(s)  
 e) Spouse    f) Other (Specify) \_\_\_\_\_

A9. What is the highest education level you have completed and received credit for?

- a) High School    b) HS Equivalency (GED)    c) Community College (completion of diploma program)  
 d) Some college    e) Bachelor's degree    f) Graduate degree

A10. Total household income per month?

- a) Less than \$2,000    b) \$2,000 to \$4,000    c) More than \$4,000

**B. KNOWLEDGE** – Please answer the questions to the best of your ability. It is important that we find out what women do and do not know about reproductive health, so please do not discuss your answers with anyone or ask anyone for help in answering the questions. You are not expected to know all the correct answers. **Mark only one answer.**

**B1. A woman with regular monthly cycles is MOST LIKELY to get pregnant:**

- 1) During her period.
- 2) A few days after her period ends.
- 3) About a week and a half after her period ends.
- 4) A few days before her period starts.
- 5) Don't know.

**B2. Which of the following IS NOT an advantage of using hormonal methods of contraception (birth control pills, shot or implant)?:**

- 1) It decreases the risk of ovarian cancer.
- 2) It is greater than 95% effective.
- 3) It is the best protection against Sexually Transmitted Diseases (STDs).
- 4) It may reduce blood loss and pain with period.
- 5) Don't know.

**B3. Which of the following is the most common Sexually Transmitted Disease (STD) causing infertility?**

- 1) Chlamydia    2) Herpes    3) Syphilis    4) Human Papilloma Virus    5) Don't know

**B4. What is the most common reason that birth control methods fail among American women?**

- 1) Incorrect use
- 2) Method does not work well
- 3) Lack of directions
- 4) Poor choice of method
- 5) Don't know

**B5. Which of the following is the most effective method of birth control?**

- 1) Pills
- 2) Condoms
- 3) Withdrawal
- 4) Occasional abstinence
- 5) Don't know

**C. REPRODUCTIVE HISTORY** - The following questions ask about your pregnancy and contraception history. Many people feel the need to give an answer that may be different from what they actually do. Please answer the following questions **honestly** so that we can find out the important health needs of enlisted women.

**C1. Are you pregnant now?**

- a) Yes      b) No

**C2. Have you ever been pregnant?**

- a) Yes      b) No

**C3. Total number of previous pregnancies?**

- a) 1      b) 2      c) 3 or more      d) N/A

**C4. Number of planned pregnancies?**

- a) 0      b) 1      c) 2      d) 3 or more      e) N/A

**C5. Number of unplanned but wanted (kept) pregnancies?**

- a) 0      b) 1      c) 2      d) 3 or more      e) N/A

**C6. Number of unplanned and unwanted (terminated) pregnancies/abortions?**

- a) 0      b) 1      c) 2      d) 3 or more      e) N/A

**C7. About (this/your last) pregnancy: were you trying to get pregnant, were you doing things to keep from getting pregnant or were you not thinking about the possibility of getting pregnant?**

- a) Trying to get pregnant  
 b) Doing things to keep from getting pregnant  
 c) Not thinking about it  
 d) N/A

**C8. Did you and/or your partner use a method of birth control every time you had intercourse before you became pregnant?**

- a) Yes      b) No      c) N/A

**C9. What method(s) of birth control were you and/or your partner using around the time you became pregnant? (Circle all those that apply)**

- a) None      b) Birth control pills (oral contraceptive)      c) Male condom  
 d) Norplant      e) Intra-uterine device (IUD)      f) Diaphragm  
 g) Depo Provera      h) Spermicidal: cream, foam, suppository, gel, or film  
 i) Rhythm method      j) Sterilization: tubal ligation or vasectomy  
 k) Withdrawal      l) Other (Specify) \_\_\_\_\_      m) N/A

**C10. If you and/or your partner were NOT practicing birth control around the time you became pregnant, indicate your reason (Circle all those that apply):**

- |                                                |                           |
|------------------------------------------------|---------------------------|
| a) Stopped secondary to adverse side effects   | b) Afraid of side effects |
| c) Unaware that methods of birth control exist | d) Forgot                 |
| e) Unintended sexual intercourse               | f) Partners attitudes     |
| g) Parents attitudes                           | h) Lack of supply         |
| i) Didn't think that I could become pregnant   | j) Religious reasons.     |
| k) Other (Specify) _____                       |                           |

**C11. Are you sexually active now?**

- a) Yes      b) No

**C12. What method of birth control are you and/or your partner using? (Circle all that apply)**

- |                                             |                                                        |                          |
|---------------------------------------------|--------------------------------------------------------|--------------------------|
| a) None                                     | If no method is being used, give reason _____          |                          |
| b) Birth control pills (oral contraceptive) |                                                        | c) Male condom           |
| d) Norplant                                 | e) Intra-uterine device (IUD)                          | f) Diaphragm             |
| g) Depo Provera                             | h) Spermicidal: cream, foam, suppository, gel, or film |                          |
| i) Rhythm method                            | j) Sterilization: tubal ligation or vasectomy          |                          |
| k) Withdrawal                               | l) N/A                                                 | m) Other (Specify) _____ |

**C13. Have you been sexually active in the past 2 months?**

- a) Yes      b) No

**C14. What method(s) of birth control did you and/or your partner use? (Circle all that apply)**

- |                                             |                                                        |                          |
|---------------------------------------------|--------------------------------------------------------|--------------------------|
| a) None                                     | If no method is being used, give reason _____          |                          |
| b) Birth control pills (oral contraceptive) |                                                        | c) Male condom           |
| d) Norplant                                 | e) Intra-uterine device (IUD)                          | f) Diaphragm             |
| g) Depo Provera                             | h) Spermicidal: cream, foam, suppository, gel, or film |                          |
| i) Rhythm method                            | j) Sterilization: tubal ligation or vasectomy          |                          |
| k) Withdrawal                               | l) N/A                                                 | m) Other (Specify) _____ |

**C15. Do you plan to be sexually active within the next 2 months?**

- a) Yes                      b) No                      c) Don't know

**C16. What method of birth control do you and/or partner plan to use? (Circle all that apply)**

- |                                             |                                                        |                          |
|---------------------------------------------|--------------------------------------------------------|--------------------------|
| a) None                                     | If no method is being used, give reason _____          |                          |
| b) Birth control pills (oral contraceptive) |                                                        | c) Male condom           |
| d) Norplant                                 | e) Intra-uterine device (IUD)                          | f) Diaphragm             |
| g) Depo Provera                             | h) Spermicidal: cream, foam, suppository, gel, or film |                          |
| i) Rhythm method                            | j) Sterilization: tubal ligation or vasectomy          |                          |
| k) Withdrawal                               | l) N/A                                                 | m) Other (Specify) _____ |

**C17. Have you had sex education in either junior high or senior high school?**

- a) No      b) Didn't attend one, but educated in doctor's office  
c) Yes, one class period      d) Yes, several class periods

**C18. If you did attend a sex education class, how would you describe its effectiveness of helping you understand about birth control?**

- a) Not Effective      b) Somewhat Effective      c) Very Effective

Explain \_\_\_\_\_

**C19. Did this sex education influence your decision about your use of birth control?**

- a) Yes      b) No (If you marked no, go to question C21)

Mark the one statement which best describes your feelings. **MARK ONLY ONE.**

**C20. The birth control education I received DID influence my decision about the use of birth control because:**

- a) It persuaded me to use birth control.  
b) It persuaded me to change my method of birth control.  
c) It persuaded me to continue the birth control method I was already using.  
d) It persuaded me to discontinue birth control.

Mark the one statement which best describes your feelings. **MARK ONLY ONE.**

**C21. The birth control education I received DID NOT influence my decision about the use of birth control because:**

- a) I did not need birth control at the time because \_\_\_\_\_  
b) I did not want to use birth control.  
c) I have a hard time using birth control, even though I know I should.  
d) I wanted to get pregnant.  
e) I was satisfied with my method of birth control.  
f) I did not learn anything from it.

**C22. Have you been pregnant in the past 2 months?**

- a) Yes      b) No

**C23. Have you been pregnant in the past 4 months?**

- a) Yes      b) No

**C24. Was your most recent pregnancy:**

- a) Planned      b) Unplanned but wanted (kept) pregnancy      c) Unwanted, abortion      d) N/A





**E5. In general, what is your attitude toward using birth control (contraception)?**

Very Positive      Positive      Neutral      Negative      Very Negative

**E6. My friends think it is important to use birth control to prevent an unintentional pregnancy.**

Strongly Agree      Agree      Unsure      Disagree      Strong Disagree

**E7. My health care provider thinks that I should use birth control to prevent an unintentional pregnancy.**

Strongly Agree      Agree      Unsure      Disagree      Strong Disagree

**E8. My parent(s) thinks that I should use birth control to prevent an unintentional pregnancy.**

Strongly Agree      Agree      Unsure      Disagree      Strong Disagree

**E9. In general, what is your current (or most recent) sexual partner's attitude toward using birth control?**

Very Positive      Positive      Neutral      Negative      Very Negative      NA

**E10. In general, who is responsible for making sure some method of birth control is used?**

1) Me      2) My partner      3) Both equally      4) NA/Not sexually active

**E11. How confident are you that you could put off having vaginal sex when you don't have a method of birth control with you?**

1) Very confident      2) Somewhat confident      3) Not confident      4) Don't know

**E12. How confident are you that you would use birth control to prevent pregnancy when you have been using alcohol or drugs?**

1) Very confident      2) Somewhat confident      3) Not confident      4) Don't know

**E13. How confident are you that you would use birth control when your partner gets upset about it?**

1) Very confident      2) Somewhat confident      3) Not confident      4) Don't know

**E14. How confident are you that you would use birth control when you feel the side effects or have negative reaction to it?**

1) Very confident      2) Somewhat confident      3) Not confident      4) Don't know

**E15. How confident are you that you would use birth control when it is too much trouble?**

1) Very confident      2) Somewhat confident      3) Not confident      4) Don't know

**E16. How confident are you that you can correctly use birth control to prevent pregnancy?**

1) Very confident      2) Somewhat confident      3) Not confident      4) Don't know

**E17. How confident are you that you would use condom to prevent sexually transmitted diseases when you are already using another method of birth control?**

- 1) Very confident      2) Somewhat confident      3) Not confident      4) Don't know

Following is a list of possible advantages of using birth control for vaginal sex. In these questions, think about the type of birth control that you are using or would think about using.

**E18. Do you think that using birth control gives you a sense of responsibility?**

- 1) Yes                      2) No

**E19. Do you think that using birth control makes you safer from pregnancy?**

- 1) Yes                      2) No

**E20. Do you think that if you used birth control, you would not have to deal with the results of a pregnancy?**

- 1) Yes                      2) No

**E21. Do you think that using birth control lets you have sex without worrying about getting pregnant?**

- 1) Yes                      2) No

**E22. Do you think that using birth control keeps your partner from worrying about you getting pregnant?**

- 1) Yes                      2) No

Following is a list of possible disadvantages of using birth control for vaginal sex.

**E23. Do you think that using birth control makes sex feel unnatural?**

- 1) Yes                      2) No

**E24. Do you think that using birth control is too much trouble?**

- 1) Yes                      2) No

**E25. Do you think that using birth control causes health problems?**

- 1) Yes                      2) No

**E26. Do you think that using birth control would be less exciting than not using one?**

- 1) Yes                      2) No

**E27. Do you think that using birth control is against your beliefs?**

- 1) Yes                      2) No

***THANK YOU FOR COMPLETING THIS FORM***

## Appendix D

REPRODUCTIVE HEALTH EDUCATION STUDY  
Post-Test

*Please answer the questions to the best of your ability.*

1. **A woman with regular monthly menstrual cycles is MOST LIKELY to get pregnant<sup>1</sup>:**
  - a. During her period.
  - b. A few days after her period ends.
  - c. About a week and a half after her period ends.
  - d. A few days before her period starts.
2. **What is the most common reason that birth control methods fail among American women<sup>2</sup>:**
  - a. Incorrect use
  - b. Method does not work well
  - c. Lack of directions
  - d. Poor choice of method.
3. **Which of the following IS NOT an advantage of using hormonal methods of contraception<sup>3</sup> (birth control pills, shot or implant):**
  - a. It decreases the risk of ovarian cancer.
  - b. It is greater than 95% effective.
  - c. It is the best protection against Sexually Transmitted Diseases (STDs).
  - d. It may reduce blood loss and pain with period.
4. **Which of the following is the most effective method of birth control<sup>4</sup>:**
  - a. Pill
  - b. Condom
  - c. Withdrawal
  - d. Periodic Abstinence
5. **Which of the following is the most common Sexually Transmitted Disease (STD) causing infertility<sup>5-6</sup>:**
  - a. Chlamydia
  - b. Herpes
  - c. Human Papilloma Virus (HPV)
  - d. Syphilis

## References

1. Roth, B. (1993). Fertility awareness as a component of sexuality education. Preliminary research findings with adolescents. *Nurse Pract*, 18 (3): 40-54.
2. Clark, J. B., & Holt, V. L. (1998). Unintended pregnancy among female soldiers presenting for prenatal care at Madigan Army Medical Center. *Mil Med*, 163 (7): 444-448.
3. Shulman, L.P., & Gilliam, M. (2003). Improving contraceptive use among adolescents. *Dialogues in Contraception* sponsored by the Keck School of Medicine of the University of Southern California, 7 (8): p.3
4. The Alan Guttmacher Institute (AGI), *Fulfilling the Promise*, 2000, p. 44
5. Centers for Disease Control and Prevention (2002). *STD facts and information*.
6. Shulman, L.P., & Gilliam, M. (2003). Improving contraceptive use among adolescents. *Dialogues in Contraception* sponsored by the Keck School of Medicine of the University of Southern California, 7 (8): p.3

## Appendix E

Fw: NCCDPHP Question-Comment

Page 1 of 2



Close

**From:** Chung Park [SMTP:cparkaia@sbcglobal.net]**To:** Chung-Park, Min S CDR**Cc:****Subject:** Fw: NCCDPHP Question-Comment**Sent:** 5/16/03 4:11 PM**Importance:** Normal

----- Original Message -----

From: "Galavotti, Christine" &lt;cxg2@cdc.gov&gt;

To: &lt;cparkaia@sbcglobal.net&gt;

Cc: "NCCD/DRH Public Inquiries" &lt;drhinfo@cdc.gov&gt;

Sent: Friday, May 16, 2003 1:52 PM

Subject: FW: NCCDPHP Question-Comment

> Ms. Chung-Park,  
 > Please forgive me for taking so long to respond to your request. I had a  
 > little trouble tracking down an electronic version of the data collection  
 > instrument we used. Please feel free to use it as you wish, citing the  
 > article as appropriate. Good luck with your dissertation research.

> Sincerely,  
 > Christine Galavotti, Ph.D.

> -----Original Message-----

> From: NCCD/DRH Public Inquiries

> Sent: Monday, May 05, 2003 3:58 PM

> To: Galavotti, Christine

> Subject: FW: NCCDPHP Question-Comment

> Hi,

> See public inquiry below from DRH website. Just a reminder to cc "NCCD/DRH  
 > Public Inquiries" for tracking purposes, or reply to this e-mail and I  
 will

> forward your response.

> Thanks!

> ~Kelly

<https://nmc-sdca-owa.med.navy.mil/exchange/forms/IPM/NOTE/read.asp?comm...> 5/22/2003


Fw: NCCDPHP Question-Comment

Page 2 of 2

```

> -----Original Message-----
> From: NCCD/OD CCDINFO
> Sent: Friday, May 02, 2003 11:21 AM
> To: NCCD/DRH Public Inquiries
> Subject: FW: NCCDPHP Question-Comment
>
>
>
>
> -----Original Message-----
> From: cparkaia@sbcglobal.net [mailto:cparkaia@sbcglobal.net]
> Sent: Thursday, May 01, 2003 11:59 PM
> To: ccdinfo@cdc.gov
> Subject: NCCDPHP Question-Comment
>
>
> Message-ID: <ACDC-XDV-WWWdreBBsQ0000179@acdc-xdv-www>
> X-OriginalArrivalTime: 02 May 2003 02:58:57.0421 (UTC)
> FILETIME=[C62768D0:01C31056]
>
>
>
> ----- NCCDPHP Comments/Questions -----
>
> NAME:      Min Chung-Park
> ORGANIZATION: University/College Student
> E-MAIL:    cparkaia@sbcglobal.net
>
> COMMENTS/QUESTIONS:
> I'm a doctoral student at the University of San Diego and planning to do
my
> dissertation on educational intervention designed to prevent adolescent
> pregnancy. Thus, I would like to contact Ms Galavotti to obtain
instruments
> that appears on her publication in 1995 (Health Psychology), and
permission
> to use them. Thank you. Min Chung-Park
>
>

```

 baseinstr.wpd

<https://nmc-sdca-owa.med.navy.mil/exchange/forms/IPM/NOTE/read.asp?comm...> 5/22/2003

## Appendix G

Chung-Park, Unintended Pregnancy Prevention, NHRC.2004.0017

## APPENDIX C. REVIEW FOR PROTECTION OF HUMAN RESEARCH VOLUNTEERS FROM RESEARCH RISKS

## INSTITUTIONAL REVIEW BOARD RECOMMENDATION

## INITIAL REVIEW

Date of Review: 26 February 2004

Protocol Number: NHRC.2004.0017

Title of Research Protocol: Unintended Pregnancy Prevention and Active Duty Women

Principal Investigator: Min S. Chung-Park, CAPT, NC, USN, PhD (c)

Work Unit Title and Number: Unintended Pregnancy Prevention and Active Duty Women

Approximate Dates of the Research: 01 June 2004 to 31 May 2005

The principal investigator submitted this protocol for initial review. The objective of this protocol is to implement and evaluate the effectiveness of a reproductive health education program, and identify variables most likely to predict a behavior change in the use of contraceptives in active duty Navy enlisted females. Toward that end, ship-based Navy enlisted females in the San Diego area will be randomized to one of two conditions: 1) a 2-hour educational program, followed by a 1-hr refresher course at 2 months; and 2) no educational program. All participants will be surveyed at baseline, two months and four months as to contraceptive knowledge, attitudes, and contraceptive use.

With a vote of 7 for, 0 against, Chair abstaining, and no members disqualified from the review, the Board classified this protocol as minimal risk. On a vote of 7 for, 0 against, Chair abstaining, and no members disqualified from the review, the Board recommended to approve this minimal risk protocol for a period of one year, contingent upon minor modifications. Those modifications have been made and approval is recommended.

The next scheduled review is on or before 25 February 2005.

Christopher G. Blood, JD, MA  
Chair, NHRC IRB

*2/23/04*  
\_\_\_\_\_  
Signature & Date



Chung-Park, Unintended Pregnancy Prevention, NHRC.2004.0017

\*\*\*\*\*

**DETERMINATION OF APPROVING AUTHORITY**

① I concur with the recommendation of the IRB, and I approve this research for a period of one year.

Next review is required no later than: 25 Feb 2005

2. I concur with the recommendations of the IRB, but I require additional modifications or restrictions prior to providing continuing approval (Attach modifications or restrictions required).

Next review is required no later than:

3. I disagree with the recommendations of the IRB and recommend (Attach statement regarding recommendations and reasons).

Signature

Date (DD/MM/YY)

James T. Luz  
Commanding Officer

\_\_\_\_\_

23 Mar 04

## Appendix H


**UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES**

 4301 JONES BRIDGE ROAD  
 BETHESDA, MARYLAND 20814-4712  
 www.usuhs.mil


September 15, 2004

 MEMORANDUM FOR CAPT MIN S. CHUNG-PARK, NC, USN, UNIVERSITY OF  
 SAN DIEGO AND TRISERVICE RESEARCH NURSING PROGRAM

 SUBJECT: Acceptance of USD IRB Approval of Protocol TSNRP (N04-P13)  
 [2003.12.018] for Human Research Participation

In accordance with Department of Defense Directive 3216.2 dated 25 March 2002, USUHS accepts the 30 December 2003 approval by the University of San Diego (USD) Institutional Review Board (IRB) of the research protocol entitled "*Unintended Pregnancy Prevention and Active Duty Women*" on which you are the principal investigator.

The purpose of this study is to implement and evaluate a reproductive health education program and identify variables most likely to predict a behavior change in the use of contraceptives in active duty Navy enlisted females. At least 224 ship-based Navy enlisted females in the San Diego area will be randomized to one of two conditions: (1) a 2-hour educational program followed by a 1-hr refresher course at two months; and (2) no educational program. All participants will be surveyed at baseline, two months and four months as to contraceptive knowledge, attitudes, and use. Control group participants will be offered the course at the end of their participation.

You are required to submit amendments to this protocol, changes to the consent form, continuing reviews, adverse event reports, and other pertinent information relative to human research protections for this project to this office for review.

If you have any questions regarding this action, please call me at 301-295-3303 or contact me at [rlevine@usuhs.mil](mailto:rlevine@usuhs.mil).

Richard R. Levine, Ph.D.  
 Assistant Vice President for Research

cc: Director, TSNRP (CDR P. Kelley)  
 File

SEP 17 2004 10:41

*Learning to Care for Those in Harm's Way*



UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES  
4301 JONES BRIDGE ROAD  
BETHESDA, MARYLAND 20814-4712  
www.usuhs.mil



September 15, 2004

MEMORANDUM FOR CAPT MIN S. CHUNG-PARK, NC, USN, UNIVERSITY OF  
SAN DIEGO AND TRISERVICE RESEARCH NURSING PROGRAM

SUBJECT: Acceptance of USD IRB Approval of **Amendment** to Protocol **TSNRP  
(N04-P13) [2003.12.018]** for Human Research Participation

In accordance with Department of Defense Directive 3216.2 dated 25 March 2002, USUHS accepts the 26 March 2004 approval by the University of San Diego (USD) Institutional Review Board (IRB) of the amendment to the research protocol entitled "*Unintended Pregnancy Prevention and Active Duty Women*" on which you are the principal investigator.

The purpose of this study is to implement and evaluate a reproductive health education program and identify variables most likely to predict a behavior change in the use of contraceptives in active duty Navy enlisted females. At least 224 ship-based Navy enlisted females in the San Diego area will be randomized to one of two conditions: (1) a 2-hour educational program followed by a 1-hr refresher course at two months; and (2) no educational program. All participants will be surveyed at baseline, two months and four months as to contraceptive knowledge, attitudes, and use. Control group participants will be offered the course at the end of their participation. This amendment approved a change in study site from Great Lakes, IL to San Diego, CA.

You are required to submit amendments to this protocol, changes to the consent form, continuing reviews, adverse event reports, and other pertinent information relative to human research protections for this project to this office for review.

If you have any questions regarding this action, please call me at 301-295-3303 or contact me at [rlevine@usuhs.mil](mailto:rlevine@usuhs.mil).

Richard R. Levine, Ph.D.  
Assistant Vice President for Research

cc: Director, TSNRP (CDR P. Kelley)  
File

SEP 17 2004

*Learning to Care for Those in Harm's Way*



**UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES**

4301 JONES BRIDGE ROAD  
BETHESDA, MARYLAND 20814-4712  
www.usuhs.mil



September 15, 2004

MEMORANDUM FOR CAPT MIN S. CHUNG-PARK, NC, USN, UNIVERSITY OF  
SAN DIEGO AND TRISERVICE RESEARCH NURSING PROGRAM

SUBJECT: Acceptance of NHRC IRB Approval of Protocol TSNRP (N04-P13)  
[NHRC.2004.0017] for Human Research Participation

In accordance with Department of Defense Directive 3216.2 dated 25 March 2002, USUHS accepts the 26 February 2004 (memo: 23 March 2004) approval by the Naval Health Research Center (NHRC) Institutional Review Board (IRB) of the research protocol entitled "*Unintended Pregnancy Prevention and Active Duty Women*" on which you are the principal investigator.

The purpose of this study is to implement and evaluate a reproductive health education program and identify variables most likely to predict a behavior change in the use of contraceptives in active duty Navy enlisted females. At least 224 ship-based Navy enlisted females in the San Diego area will be randomized to one of two conditions: (1) a 2-hour educational program followed by a 1-hr refresher course at two months; and (2) no educational program. All participants will be surveyed at baseline, two months and four months as to contraceptive knowledge, attitudes, and use. Control group participants will be offered the course at the end of their participation.

You are required to submit amendments to this protocol, changes to the consent form, continuing reviews, adverse event reports, and other pertinent information relative to human research protections for this project to this office for review.

If you have any questions regarding this action, please call me at 301-295-3303 or contact me at [rlevine@usuhs.mil](mailto:rlevine@usuhs.mil).

Richard R. Levine, Ph.D.  
Assistant Vice President for Research

cc: Director, TSNRP (CDR P. Kelley)  
File

SEP 17 04 11:41

*Learning to Care for Those in Harm's Way*

## Appendix I



DEPARTMENT OF THE NAVY  
 COMMANDING OFFICER  
 USS BOXER LHD 4  
 FPO AP 96681-1663

6000  
 Ser MED/  
 17 Mar 04

From: Commanding Officer, USS BOXER (LHD 4)  
 To: CAPT Min Chung-Park, NC, USN, Principal Investigator, Naval  
 Health Research Center, San Diego, CA 92186  
 Subj: COLLABORATION ON NAVAL HEALTH RESEARCH CENTER (NHRC) PROTOCOL  
 #2004.0018 TITLED, "UNINTENDED PREGNANCY PREVENTION AND ACTIVE  
 DUTY WOMEN."

1. I understand that BOXER's Medical Department is collaborating with NHRC on the research protocol entitled "Unintended Pregnancy Prevention and Active Duty Women." The primary benefit of this study will be an evaluation of the effects of the intervention program on contraceptive use among the enlisted females. The findings will help in developing intervention programs that may lead to decreased unintended pregnancies and improve mobilization readiness. The Navy training command may also benefit from identification of the type of training that should be in place for the women known to be at high risk for unintended pregnancy.
2. LCDR Gerald Blake, my Senior Medical Officer (SMO), will be responsible for all aspects of the study aboard USS BOXER and will serve as point of contact between NHRC and the BOXER. Our responsibilities will be as follows:
  - a. BOXER medical personnel will assist with the recruitment of the potential subjects and will maintain confidentiality of the subjects.
  - b. BOXER medical personnel will assist the PI with the scheduling of the data collection time and date as outlined in the protocol and ensure the information is communicated to the subjects.
3. Primary responsibility for human subject protection is assigned to the Naval Health Research Center.
4. My point of contact is LCDR Gerald Blake. If you have any questions, please email him at [doc@BOXER.navy.mil](mailto:doc@BOXER.navy.mil).

A. D. CROWLEY

## Appendix J



DEPARTMENT OF THE NAVY  
 USS TARAWA (LHA-1)  
 PPO AP 86622-1600

6000  
 12 Apr 04

From: Commanding Officer, USS TARAWA (LHA 1)  
 To: CAPT Min Chung-Park, NC, USN, Principal Investigator,  
 Naval Health Research Center, San Diego, CA 92186

Subj: COLLABORATION ON NAVAL HEALTH RESEARCH CENTER (NHRC)  
 PROTOCOL #2004.0018 TITLED, "UNINTENDED PREGNANCY  
 PREVENTION AND ACTIVE DUTY WOMEN."

1. I understand that TARAWA Medical Department is collaborating with NHRC on the research protocol entitled "Unintended Pregnancy Prevention and Active Duty Women." The primary benefit of this study will be an evaluation of the effects of the intervention program on contraceptive use among the enlisted females. The findings will help in developing intervention programs that may lead to decreased unintended pregnancies and improve mobilization readiness. The Navy training command may also benefit from identification of the type of training that should be in place for the women known to be at high risk for unintended pregnancy.

2. LCDR Steve Gabele, my Senior Medical Officer (SMO), will be responsible for all aspects of the study aboard TARAWA and will serve as our point of contact. Our responsibilities will be as follows:

a. Medical personnel will assist with the recruitment of the potential subjects and will maintain confidentiality of the subjects.

b. Medical personnel will assist the PI with the scheduling of the data collection time and date as outlined in the protocol and ensure the information is communicated to the subjects.

3. Primary responsibility for human subject protection is assigned to the Naval Health Research Center.

4. If you have any questions or concerns, my point of contact is LCDR Steve Gabele at (619) 556-3970 or email: docg@tarawa.navy.mil.

J/ W. RILEY III

Copy to:  
 LCDR Gabele

## Appendix K



## DEPARTMENT OF THE NAVY

COMMANDING OFFICER  
 USS RONALD REAGAN (CVN 76)  
 FPO AP 96616-2876

IN REPLY REFER TO:  
 5000  
 Ser MED/ 374  
 29 Oct 04

From: Commanding Officer, USS RONALD REAGAN (CVN 76)  
 To: CAPT Min Chung-Park, NC, USN, Principal Investigator,  
 Naval Health Research Center, San Diego, CA 92186

Subj: COLLABORATION ON NAVAL HEALTH RESEARCH CENTER (NHRC)  
 PROTOCOL #2004.0018 TITLED, "UNINTENDED PREGNANCY  
 PREVENTION AND ACTIVE DUTY WOMEN."

1. I understand that USS RONALD REAGAN's Medical Department is collaborating with NHRC on the research protocol entitled "Unintended Pregnancy Prevention and Active Duty Women." The primary benefit of this study will be an evaluation of the effects of the intervention program on contraceptive use among the enlisted females. The findings will help in developing intervention programs that may lead to decreased unintended pregnancies and improve mobilization readiness. The Navy training command may also benefit from identification of the type of training that should be in place for the women known to be at high risk for unintended pregnancy.

2. CDR John Burgess, my Senior Medical Officer (SMO), will be responsible for all aspects of the study aboard RONALD REAGAN and will serve as point of contact between NHRC and the ship. Our responsibilities will be as follows:

a. RONALD REAGAN medical personnel will assist with the recruitment of the potential subjects and will maintain confidentiality of the subjects.

b. RONALD REAGAN medical personnel will assist the PI with the scheduling of the data collection time and date as outlined in the protocol and ensure the information is communicated to the subjects.

3. Primary responsibility for human subject protection is assigned to the Naval Health Research Center.

4. USS RONALD REAGAN point of contact is CDR John Burgess; email [smo@reagan.navy.mil](mailto:smo@reagan.navy.mil), with questions or concerns.

J. A. SYMONDS

## Appendix L



DEPARTMENT OF THE NAVY  
 USS NIMITZ (CVN-68)  
 FPO AP 96620-2620

6200  
 Ser MED/035  
 27 Jan 05

From: Commanding Officer, USS NIMITZ (CVN 68)  
 To: CAPT Min Chung-Park, NC, USN, Principal Investigator,  
 Naval Health Research Center, San Diego, CA 92186.

Subj: COLLABORATION ON NAVAL HEALTH RESEARCH CENTER (NHRC)  
 PROTOCOL #2004.0018 TITLED, "UNINTENDED PREGNANCY  
 PREVENTION AND ACTIVE DUTY WOMEN"

1. I understand that NIMITZ' Medical Department is collaborating with NHRC on the research protocol entitled "Unintended Pregnancy Prevention and Active Duty Women." The primary benefit of this study will be an evaluation of the effects of the intervention program on contraceptive use among the enlisted females. The findings will help in developing intervention programs that may lead to decreased unintended pregnancies and improve mobilization readiness. The Navy training command may also benefit from identification of the type of training that should be in place for the women known to be at high risk for unintended pregnancy.

2. CDR Raymond Spaw, my Senior Medical Officer, will be responsible for all aspects of the study onboard NIMITZ and will serve as point of contact between NHRC and NIMITZ. Our responsibilities will be as follows:

a. NIMITZ Medical personnel will assist with the recruitment of the potential subjects and will maintain confidentiality of the subjects.

b. NIMITZ Medical personnel will assist the Principal Investigator with the scheduling of the data collection time and date as outlined in the protocol and ensure the information is communicated to the subjects.

3. Primary responsibility for human subject protection is assigned to NHRC.

4. NIMITZ point of contact is CDR Raymond Spaw; email: [SMO@nimitz.navy.mil](mailto:SMO@nimitz.navy.mil), with questions or concerns.

T. N. BRANCH



## Appendix M

## Research Study Participation (Enrollment Form)

Name: \_\_\_\_\_

Rate: \_\_\_\_\_

Age: \_\_\_\_\_

Marital Status: \_\_\_\_\_

Projected Rotation Date (PRD): \_\_\_\_\_

Work section: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

Are you interested in participating in the study?

Yes: \_\_\_\_\_

No: \_\_\_\_\_

Best time and day of the week to participate in the study: \_\_\_\_\_

## Appendix N

### Mock Dialogue

Dialogue for prospective volunteers for the study: *Unintended Pregnancy Prevention & Active Duty Women*.

I am a Navy nurse currently attending the University of San Diego to obtain a PhD in Nursing. My major area of study is women's health, particularly in the area of unintended pregnancies. I am recruiting volunteers to participate in a research study called "Unintended Pregnancy Prevention & Active Duty Women." Participation in this study is completely voluntary. There will be no loss of benefits or penalty to you if you decide not to participate. The results of this study will not be placed in your medical record. Information about you or your participation in this study will be kept in the strictest confidence and will not be released in any form identifiable to you personally.

The purpose of this research study is to assess the knowledge, attitudes and contraceptive behaviors of new female recruits concerning pregnancies, and evaluate the effectiveness of the reproductive health education program in promoting contraceptive use using a self administered questionnaire. Information will be gathered to determine your knowledge and attitude about contraceptives and unintended pregnancies, if you are using contraceptives, your readiness to use contraceptives, how confident you are using contraceptives, and your view of the advantages and disadvantages of using contraceptives. This would provide us with information whether the reproductive health intervention promotes contraceptive use. These results would help us to develop health education interventions to promote contraceptive use and help to prevent unintended pregnancies in the military women.

Approximately 224 active duty Navy enlisted females are expected to participate in the study. The duration of the study will be for a period of 4 months. What is involved in the study will depend on which group you are assigned to. If you are assigned to the **experimental group**, you will be asked to attend the 2 hour reproductive health course initially, a one hour refresher course at 2 months, and 15-30 minutes general questions and answers at 4 months. You will also be asked to complete an 8 page questionnaires at each class session. For the **control group** - you will not attend any training course but you will be asked to complete an 8 page questionnaires at 3 different times: initially, at 2 months, and at 4 months.

Questions on the survey consist of demographic factors, reproductive history, contraceptive use practices, and sexual attitudes and behaviors. It will take approximately 15 minutes to complete the surveys each time.

Let me repeat that participation in this study is completely voluntary. There will be no penalty to you if you do not volunteer. There are no risks or benefits to participating in this study, however, some of the questions are very personal and may cause some discomfort as they address issues of sexuality, pregnancy, and contraceptive use. You do not need to answer any question that upsets you and you can stop answering questions at any time. The results of this study will help us to know what type of information we should be providing to women concerning contraceptive knowledge and contraceptive practices, and thus help us to develop educational materials and programs that may help to protect military women from unintended pregnancies. I am available now or later in private to answer any questions that you may have about this study.

Please fill out the form and indicate whether or not you are interested in participating in the study.

## Appendix O



Chung-Park. Unintended Pregnancy Prevention, Protocol #NHRC.2004.0017

Unintended Pregnancy Prevention and Active Duty Women  
VOLUNTARY CONSENT TO PARTICIPATE (Experimental Group)

1. You are being asked to participate in a research study titled "Unintended Pregnancy Prevention and Active Duty Women," to be conducted by a medical researcher from the Naval Health Research Center with OB/GYN experience in collaboration with the University of San Diego. The purpose of the study is to assess knowledge, attitudes and contraceptive behaviors of active duty Navy enlisted females regarding pregnancies. Through a self-administered questionnaire, the effectiveness of the reproductive health education program in promoting contraceptive use will be evaluated. Information will be gathered to determine: (a) your knowledge and attitude concerning contraceptives and unintended pregnancies, (b) whether or not you are using contraceptives, (c) your readiness to use contraceptives, (d) how confident you are in using contraceptives, and (e) your view of the advantages and disadvantages of contraceptives. The study will take place between June 2004 and February 2005; the time involved for volunteers is a total of 3 1/2 hours over a period of three days. Approximately 224 members will participate. The results of this research will aid the investigator in developing health education interventions that will promote contraceptive use and help prevent unintended pregnancies in military women.

During the program, you will be involved in the following procedures that will take place off ship in one of the classrooms at Naval Station San Diego: (1) attend a 2-hour sex education class initially; (2) attend a 1-hour review class at 2 months; (3) attend a 15-30 minute general questions and answers session at 4 months; (4) fill out an 8-page questionnaire at each session.

It will take about 15 minutes to fill out each questionnaire. Survey questions call for responses regarding: personal data, pregnancy history, birth control use, and sexual activity.

2. The investigator believes that the risks or discomforts to you are that you may feel temporarily uncomfortable while answering certain questions related to sexuality (such as whether you are sexually active, and if so, describe the birth control methods being used). While scientific validity of this study is contingent upon obtaining as complete of responses as possible, you may skip a question if answering it would cause you undue discomfort.
3. The study may or may not be of direct benefit to you personally, but, the results may help the investigator gain important information regarding birth control knowledge and birth control practices among military women.
4. The confidentiality of the information related to your participation in this research will be protected by providing you with a sealable envelopes to return your completed surveys in and keeping all paper copies of your data in a locked file at the Naval Health Research Center, with access limited to study investigator. Computer data files will be stored in a secured computer database which is password protected and accessible only to the investigator.
5. If you have questions about this study you should contact the following individuals: for questions about research (science) aspects you should contact CAPT Min Chung-Park, the Principal Investigator, at (858) 794-0979; and for questions about the ethical aspects of this study, your rights as a volunteer, or any problem related to protection of research volunteers, you should contact Christopher G. Blood, JD, MA, Institutional Review Board Chair, at 619-553-8386.
6. Your participation in this study is completely voluntary. If you do not want to participate, there will be no penalty, and you will not lose any benefit to which you are otherwise entitled. You may discontinue your participation in this study at any time you choose. If you do choose to discontinue your participation, there will be no penalty, and you will not lose any benefit to which you are otherwise entitled.
7. The alternative to participating in this study is to receive the normal, standard of medical care to which all Navy service members are entitled. The alternative to being a member of the educational intervention group of this study is attending classes offered after study completion. Whether you participate as a member of the

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educational intervention group, or decide not to participate at all, your decision will not affect the standard of medical care you are entitled to as an active duty service member.

8. Your participation in this study may be stopped by the researcher without your consent. The anticipated reasons that would make this necessary are if you fail to complete the questionnaires, if you are separated from the military service, if you move or cannot be reached. If you are removed from the study, there will be no penalty, and you will not lose any benefit to which you are otherwise entitled.
9. You will not incur any monetary expenses from your voluntary participation in this study.
10. If you decide to withdraw from further participation in this study, it is requested that you inform the Principal Investigator at (858) 794-0979 so your name can be removed from the study. Again, you understand that you may discontinue your participation in this study at any time you choose, and without penalty.
11. Major new findings developed during the course of the research that may relate to your willingness to continue participation will be provided to you.
12. Official government agencies, such as the Department of Defense and the U.S. Navy, and the University of San Diego, may have a need to inspect the research records from this study, including yours, to fulfill their responsibilities.
13. You have received a statement informing you about the provisions of the Privacy Act.
14. You have been informed that the Principal Investigator is responsible for storage of your consent form and the research records related to your participation in this study. These records will be stored in locked files on-site at NHRC.
15. You have been given an opportunity to ask questions about this study and its related procedures and risks, as well as any of the other information contained in this consent form. All of your questions have been answered to your satisfaction. By your signature below, you give your voluntary informed consent to participate in the research as it has been explained to you, and you acknowledge receipt of a copy of this form for your own personal records. You will receive a \$10 phone card for your participation. This card is to be used if you have any questions of the investigator, or, if you have no questions, may be used as you wish.

\_\_\_\_\_  
Volunteer

\_\_\_\_\_  
Date (DD/MM/YY)

\_\_\_\_\_  
Investigator

\_\_\_\_\_  
Date (DD/MM/YY)



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## Appendix P

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### Unintended Pregnancy Prevention and Active Duty Women VOLUNTARY CONSENT TO PARTICIPATE (Control Group)

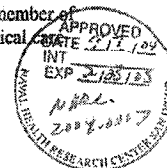
1. You are being asked to participate in a research study titled "Unintended Pregnancy Prevention and Active Duty Women," to be conducted by a medical researcher from the Naval Health Research Center with OB/GYN experience in collaboration with the University of San Diego. The purpose of the study is to assess knowledge, attitudes and contraceptive behaviors of active duty Navy enlisted females regarding pregnancies. Through a self-administered questionnaire, the effectiveness of a reproductive health education program in promoting contraceptive use will be evaluated. Information will be gathered to determine: (a) your knowledge and attitude concerning contraceptives and unintended pregnancies, (b) whether or not you are using contraceptives, (c) your readiness to use contraceptives, (d) how confident you are in using contraceptives, and (e) your view of the advantages and disadvantages of contraceptives. The study will take place between June 2004 and February 2005; the time involved for volunteers is a total of one hour over a period of three days. Approximately 224 members will participate. The results of this research will aid the investigator in developing health education interventions that will promote contraceptive use and help prevent unintended pregnancies in military women.

During the program, you will be involved in the following procedures that will take place off ship in one of the classrooms at Naval Station San Diego: (1) Fill out an 8-page questionnaire at 3 different times: the first survey initially, the second at 2 months, and the third at 4 months.

It will take about 15 minutes to fill out each questionnaire. Survey questions call for responses regarding: personal data, pregnancy history, birth control use, and sexual activity.

2. The investigator believes that the risks or discomforts to you are that you may feel temporarily uncomfortable while answering certain questions related to sexuality (such as whether you are sexually active, and if so, describe the birth control methods being used). While scientific validity of this study is contingent upon obtaining as complete of responses as possible, you may skip a question if answering it would cause you undue discomfort.
3. The study may or may not be of direct benefit to you personally, but, the results may help the investigator gain important information regarding birth control knowledge and birth control practices among military women.
4. The confidentiality of the information related to your participation in this research will be protected by providing you with a sealable envelopes to return your completed surveys in and keeping all paper copies of your data in a locked file at the Naval Health Research Center, with access limited to study investigator. Computer data files will be stored in a secured computer database which is password protected and accessible only to the investigator.
5. If you have questions about this study you should contact the following individuals: for questions about research (science) aspects you should contact CAPT Min Chung-Park, the Principal Investigator, at (858) 794-0979; and for questions about the ethical aspects of this study, your rights as a volunteer, or any problem related to protection of research volunteers, you should contact Christopher G. Blood, JD, MA, Institutional Review Board Chair, at 619-553-8386.
6. Your participation in this study is completely voluntary. If you do not want to participate, there will be no penalty, and you will not lose any benefit to which you are otherwise entitled. You may discontinue your participation in this study at any time you choose. If you do choose to discontinue your participation, there will be no penalty, and you will not lose any benefit to which you are otherwise entitled.
7. The alternative to participating in this study is to receive the normal, standard of medical care to which all Navy service members are entitled. The alternative to being a member of the non-educational intervention group of this study is attending classes offered after study completion. Whether you participate as a member of the control group, or decide not to participate at all, your decision will not affect the standard of medical care you are entitled to as an active duty service member.

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8. Your participation in this study may be stopped by the researcher without your consent. The anticipated reasons that would make this necessary are if you fail to complete the questionnaires, if you are separated from the military service, if you move or cannot be reached. If you are removed from the study, there will be no penalty, and you will not lose any benefit to which you are otherwise entitled.
9. You will not incur any monetary expenses from your voluntary participation in this study.
10. If you decide to withdraw from further participation in this study, it is requested that you inform the Principal Investigator at (858) 794-0979 so your name can be removed from the study. Again, you understand that you may discontinue your participation in this study at any time you choose, and without penalty.
11. Major new findings developed during the course of the research that may relate to your willingness to continue participation will be provided to you.
12. Official government agencies, such as the Department of Defense and the U.S. Navy, and the University of San Diego, may have a need to inspect the research records from this study, including yours, to fulfill their responsibilities.
13. You have received a statement informing you about the provisions of the Privacy Act.
14. You have been informed that the Principal Investigator is responsible for storage of your consent form and the research records related to your participation in this study. These records will be stored in locked files on-site at NHRC.
15. You have been given an opportunity to ask questions about this study and its related procedures and risks, as well as any of the other information contained in this consent form. All of your questions have been answered to your satisfaction. By your signature below, you give your voluntary informed consent to participate in the research as it has been explained to you, and you acknowledge receipt of a copy of this form for your own personal records. You will receive a \$10 phone card for your participation. This card is to be used if you have any questions of the investigator, or, if you have no questions, may be used as you wish.

\_\_\_\_\_  
Volunteer

\_\_\_\_\_  
Date (DD/MM/YY)

\_\_\_\_\_  
Investigator

\_\_\_\_\_  
Date (DD/MM/YY)



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## Appendix Q

Chung-Park, Unintended Pregnancy Prevention, Protocol #NHRC.2004.0017

## PRIVACY ACT STATEMENT

1. Authority. 5 U.S.C. 301
2. Purpose. Medical research information will be collected in an experimental research project # NHRC.2004.0017, titled Unintended Pregnancy Prevention and Active Duty Women, to enhance basic medical knowledge, or to develop tests, procedures, and equipment to improve the diagnosis, treatment, or prevention of illness, injury, or performance impairment.
3. Routine Uses. Medical research information will be used for analysis and reports by the Departments of the Navy and Defense, and other U.S. Government agencies. Use of the information may be granted to non-Government agencies or individuals by the Navy Surgeon General following the provisions of the Freedom of Information Act or as may be indicated in the accompanying Informed Consent Form.
4. Disclosure. Provision of information is voluntary. There are no penalties for not providing the requested information but failure to provide the requested information may result in failure to be accepted as a research volunteer in an experiment, or in removal from the program.

Attached: Consent statement for this experiment signed by the research volunteer.



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