BIRTH CONTROL EDUCATION AND ITS RELATIONSHIP TO ACCURACY OF KNOWLEDGE AND BIRTH CONTROL USE AMONG ADOLESCENT FEMALES

by

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STATEMENT BY AUTHOR

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ABSTRACT

Pregnancy and childbirth among adolescent females have been documented as detrimental to all those involved and as a key factor central to a variety of social problems. The purpose of this study is to determine the role that birth control information and education may have in pregnancy prevention by maximizing contraceptive use among sexually-active adolescents.

It is hypothesized that compared to non-professional sources of birth control information, professional information sources and formal birth control education will lead to more accurate knowledge of birth control and its availability which, in turn, will lead to more regular and effective birth control use.

Data for this study was gathered through self-administered questionnaires from 167 adolescent females attending birth control clinics throughout urban and rural Arizona. The hypothesized relationships were analyzed by means of correlation, multiple regression, and path analysis.

Results indicated that formal birth control education is more effective than professional birth control information sources in general, and when combined with knowledge of birth control availability it facilitates effective birth control use. Formal birth control
education is a necessary but not sufficient factor in maximizing birth control use. Implications are drawn for educational program design.
CHAPTER 1

INTRODUCTION

There has been widespread concern in this country over the increasingly high rate of adolescent pregnancy during the past decade. The birth rate for women under the age of 18 has increased while the birth rate for women over 20 has sharply declined (National Center for Health Statistics, 1977). In addition to the increasing prevalence of premarital sexual activity among adolescents, it has been estimated that more than 80 percent of the sexually-active adolescents do not consistently practice birth control (Arnold and Hoffman, 1974; Shah, Zelnik, and Kantner, 1975; Van der Ahe, 1969). As a result, three in ten sexually-active adolescent women experience premarital pregnancy (Zelnik and Kantner, 1974).

Adolescent pregnancy has been documented as detrimental to all those involved and as a key factor central to a variety of social problems. At least one-fourth of all adolescent pregnancies are terminated by abortion and about one-third of all abortions performed in this country are to teenage females (Guttmacher Institute, 1976; Zelnik and Kantner, 1974). Suicide among
pregnant adolescents is seven times the rate for other adolescents (Nye, 1976). Pregnancy is the most common cause of teenage females dropping out of school (Guttmacher Institute, 1976). For those pregnancies carried to term, the consequences of births to adolescent mothers are reported to include increased prematurity, low-birth weight infants, birth defects, infant mortality, and a higher maternal death rate during birth (Guttmacher Institute, 1976).

Fifty-four percent of all births to teenagers are conceived out-of-wedlock and one-third of all births conceived premaritally are legitimated by marriage (Guttmacher Institute, 1976). School-aged parents require increased parental support or support from public funds for hospital and health costs, for welfare support, or for support through Aid to Families with Dependent Children (AFDC) (Nye, 1976; Moore, 1978). Teenage mothers are less likely to work and more likely to be on welfare than mothers who first give birth in their 20's (Guttmacher Institute, 1976). Teenage fathers who are forced to marry in their teens are more likely to hold unskilled, low-paying jobs than their unmarried counterparts and are often forced to drop out of school (Nye, 1976). In 1975, half of all AFDC funds were paid to households with women having borne her first child during her teenage years (Moore, 1978).

Among those marriages resulting from premarital pregnancies, three out of five mothers aged 17 or younger
are separated or divorced within six years. Women who begin childbearing in their teen years have more children and in more rapid succession than do mothers who begin childbearing later (Guttmacher Institute, 1976; Nye, 1976). In addition, the personal, social, and economic frustrations coupled with lack of knowledge and unrealistic expectations of child development serve to lower teenage parents' tolerance and effectiveness in coping with their child's behavior. Children raised by adolescent parents have been described as high-risk candidates for child abuse (deLissovoy, 1973).

The adversities inherent in adolescent pregnancy and its rate of increase have directed attention to the need for prevention. Throughout the numerous recommendations made by researchers and practitioners in the field for reducing and preventing adolescent pregnancy, a common theme has been to maximize the use of effective contraception among sexually-active adolescents. However, the use or non-use of contraception among teenagers is a complex issue involving a combination of physical, psychological, sociocultural, and educational factors.

It has been proposed that a major factor in inconsistent contraceptive use is a lack of accurate knowledge and information (Furstenberg, 1971; Kantner and Zelnik, 1973), and indeed, seven out of ten sexually-active adolescents not using contraception have reported
that they did not think they could become pregnant as the most often stated reason for non-use. Problems in obtaining contraception was the second-most common reason for non-use (Shah, Zelnik, and Kantner, 1975).

Given its potential for maximizing consistent and effective contraceptive use, teenagers should be insured of having accurate knowledge of birth control and its availability if the rate of adolescent pregnancy is to be reduced. A teenager's state of knowledge may come from a variety of sources, such as parents, peers, or professionals. It is assumed that the most accurate knowledge for facilitating consistent and effective birth control use would most likely come from professional sources, but this assumption has not been conclusively researched. Even less research attention has been directed to the assumption that accurate knowledge about birth control will insure effective and consistent use.

The purpose of this research is to determine the relationships between education, knowledge, and birth control use among adolescent females. Specifically, it is hypothesized that professional sources of birth control information and formal birth control education will lead to more knowledge of birth control and its availability, which will in turn lead to more regular and effective use of birth control. These relationships will be analyzed
through Pearsonian correlation, multiple regression, and path analysis in an attempt to partially explain why contraception is not consistently practiced by those sexually-active adolescents not intending to become pregnant and to help determine the role that birth control education may have in preventing adolescent pregnancy.

Hypotheses and Path Model

To determine the relationships between birth control education, knowledge, and use, the following hypotheses are proposed:

1. The higher the proportion of an adolescent's birth control information received from professional sources, the more knowledgeable about birth control she will be.

2. The higher the proportion of an adolescent's birth control information received from professional sources, the more knowledgeable about birth control availability she will be.

3. Participation in a formal program for birth control education leads to more accurate knowledge of birth control.

4. Participation in a formal program for birth control education leads to more accurate knowledge of birth control availability.

5. The more knowledgeable about birth control an adolescent is, the more likely she is to practice birth control regularly and effectively.

6. The more knowledgeable about birth control availability an adolescent is, the more likely she is to practice birth control regularly and effectively.
These hypotheses suggest an interrelated system of relationships which combine together to form a causal model. The combinations and directions of hypothesized relationships comprise an additive, recursive system as can be seen in the path model in Figure 1.

**Definition of Terms**

The proportion of knowledge having been received from professional sources is defined as the proportion of an adolescent's knowledge she rates as having been received from a school class or other source, a doctor, minister, clinic, or a counselor as opposed to having been received from girlfriends, boyfriends, family members, or books and magazines.

Participation in a formal program for birth control education is defined as having been involved with a class, group, or professional person who provided information about birth control. It is left to the judgment of the respondent to decide whether her experience fits into this category.

Accuracy of birth control knowledge is defined as the proportion of correct responses given to multiple-choice questions which ask factual information about most effective birth control methods and time during the menstrual cycle most likely to become pregnant. Knowledge
Numbered paths (1-6) correspond with numbered hypotheses (1-6).

Figure 1. Path Model of Hypothesized Relationships
of birth control availability is defined as the number of correct places the respondent lists where contraceptive devices could be obtained.

Regularity of birth control use is defined as the proportion of sexual encounters which were protected through the use of some method of birth control as reported by the teenager. Effective use of birth control is defined as the proportion of birth control usage in which the more effective methods were utilized (i.e., pills, IUD, diaphragm, and condoms as compared to the less effective methods of foams, rhythm, douche, and withdrawal).

Limitations

The population to be studied for this analysis will be limited to unmarried adolescent females, ages 13-19, who are attending birth control clinics. Most of the girls in the study, therefore, will be sexually-active and will have at least enough awareness of birth control to prompt them to come into the clinic. Although the ideal sample would be a random representation of the entire population of adolescents, access to this type of sample proved to be impossible due to resistance from parents and school-administrators.

Birth control education is often combined with or confused with sex education. Although birth control is sometimes treated as a subtopic within sex education
programs or discussions, this is not true for all programs (Arizona Department of Health Services, 1979). This report focuses only on birth control education and knowledge as potential means for maximizing birth control use among sexually-active adolescents and does not address other sex education issues.

It is acknowledged that factors other than birth control education may influence the accuracy of knowledge and the regularity of birth control use. However, for this analysis, variables will be limited to those stated in the hypotheses.

Assumptions

Data for this study was gathered through self-administered questionnaires asking for information about personal aspects of the respondent's behavior and attitudes. The validity of the data rests on the assumption that the respondents actually reported factual information undistorted due to memory, embarrassment, or other personal motivation.

Considering the medical risks, the social limitations, and the costs to society, it is assumed that adolescent pregnancy is defined as a social problem of such magnitude as to merit preventive measures. It is also assumed that pregnancy among adolescents can be substantially reduced and that society has the right and responsibility to provide its members with the information necessary
to make life decisions in the best interests of society and the individual.
The literature which focuses on the area of adolescent sexuality extends as far back as the early 1900's, with the majority of the research being conducted within the past ten years in response to the increased rate of teenage pregnancy. Although throughout this literature the predominant recommendation for reducing the rates of adolescent pregnancy has pointed to the need for more birth control education, relatively little of the existing literature focuses specifically on the impact birth control education has on the actual use of contraception among adolescents.

The research that has been done has been primarily descriptive in nature or has correlated birth control education with variables other than accuracy of knowledge or birth control use. The majority of the existing literature focuses only upon sex education without distinguishing it from or identifying it to include birth control education. Although the two issues are often used in combination or interchangeably, one cannot always be generalized to include the other (Linner, 1966). Since
very few studies have focused specifically on birth control education, knowledge, and use, those studies which focus on the more general topic of sex education and knowledge which are relevant to this report will be reviewed.

**Sources of Birth Control Information**

In examining the variety of sources from which birth control information may be obtained, several researchers have attempted to identify both preferred sources and actual sources of information by surveying teenagers and parents. Libby, Acock, and Payne (1974) surveyed a probability sample of 250 parents (125 couples) and found that parental preferences do include agencies outside the home as significant sources for sex education for today's teenagers. Approximately 47 percent of the parents identified a home-school combination as ideal, 39 percent of the parents identified a combination of home and church, and the remaining 14 percent identified other combinations of sources such as home-peer group, school-peer group, and home-other. Although no significant differences were found between SES groups, age of the parents and children did appear to affect parental preferences. The younger parents were more likely to prefer a home-school combination, while older parents preferred home-church. Parents with pre-pubescent children were more liberal toward high school sex education than parents with post-pubescent children.
In contrast to parental preferences, Thiebaux (1972) surveyed a sample of 115 pregnant girls seeking abortion, asking them to describe the educational sources they felt would have been most appropriate for them to have learned about birth control. Approximately 55 percent of the respondents stated that sex education should be part of all levels of school or at least a part of every high school and 30 percent stated that their home would have been the best source had their parents felt they could have talked about it. The remaining 15 percent stated a doctor or some social organization would have been the best source.

Angrist (1966) explored the topic of communication about birth control using individual interviews of a random sample of 50 freshman women in college. Nearly all the students in the sample stated a need for authoritative information on birth control and suggested that physicians, school, medical literature, or professional people would be the best sources for this information. Approximately 85 percent of the sample had had some discussion of birth control during high school or college, primarily with peers. Mothers or teachers were cited as sources of information during high school if discussion about birth control occurred.
In a study conducted by Connell and Jacobson (1971), 48 recently delivered teenage mothers participated in a survey asking actual sources of their sex education. The results showed that 48 percent of the sample identified their primary source of sex education as girlfriends, 25 percent as boyfriends, 22 percent as school nurses or teachers, and only 5 percent as parents or other relatives.

Burchinal (1960) studied the question of first and primary sources of information about sex with 117 Iowa high school girls, both married and unmarried. Mothers were cited more than other sources as the first and primary source about sex, whereas girlfriends were stated as the second most common source, and books were stated as the third most common source. However, Burchinal warns that mothers being cited as first and primary source does not indicate that adequate knowledge was acquired by the girls. Almost 60 percent of the unmarried girls and 28 percent of the married girls reported that their sexual knowledge was inadequate for marriage.

Thornburg (1970) surveyed 88 college females as to their age and first source of information on several sex topics, including contraception. For sex information in general, girlfriends were reported by 34.9 percent, parents by 23.8 percent, literature by 16.7 percent, and school by 12.2 percent as the first source of information. For the
specific topic of contraception, girlfriends were reported by 37 percent, literature by 22 percent, parents by 15 percent, and school by eight percent as the first source of information. The peak age for first contraception information was reported to have been between 13 and 15 years. It was concluded that although adolescents are exposed to sexual concepts, they are not getting adequate information either at home or at school.

In a second study conducted by Thornburg (1972), 381 female college students were asked to recall their first sources of sex information on a variety of sexual topics, including contraception. This sample yielded very similar results. General sex information and information specifically about birth control followed the same pattern. Peers were reported as the major source of initial information, while literature was reported second, mothers third, and school fourth.

Sources of Information and Accuracy of Knowledge

In a third study by Thornburg (1978), 450 university students were asked to report the first source of information about various sexual topics including contraception, as well as to report their subjective perception of the accuracy of the information they received. Again, the results showed that peers were the primary source of information about sex and contraception. For contraception
specifically, school was reported second, literature was reported third, and parents were reported as fourth primary source of information. Concerning the degree of accuracy perceived by the respondents, 77.2 percent of the sample rated their contraceptive information as accurate or highly accurate.

Juhasz (1969) administered a questionnaire to 893 Canadian male and female university students to measure sources of information and accuracy of knowledge. Over half of the sample reported that printed material was the most frequent source of sex information. Peer group ranked second in frequency with parents ranking third. Parents were reported as the most frequent source twice as often for girls than for boys. Although no correlational relationship between source of information and accuracy of sex knowledge was reported, it was found that 22 percent of those reporting printed material as their major source, 21 percent of those reporting parents as their major source, and 18 percent of those reporting peers as their major source scored above the median on the sex knowledge test. Thus regardless of source, less than one-fourth of the sample had a fair or satisfactory degree of information. Printed material and parents provided more accurate information than did peers, although the differences were quite small.
Sources of Information, Knowledge, and Birth Control Use

Miller (1973) studied a representative sample of both male and female students attending a middle-class high school and a lower-class high school in California. The lower-class school had no sex education program, while the middle-class school had a comprehensive program which had been well received and popular among the students. A total of 334 students filled out anonymous questionnaires which asked about their attitudes and behavior concerning sex and contraception. Although information was gathered on the sources on information, contraceptive knowledge, and use, the findings were presented in percentage form only with no correlations calculated between the variables.

In response to a question asking their most complete and factual sources of information on sexual matters, the group as a whole ranked friends first, school second, books and magazines third, and parents fifth just under the category other. However, for the middle-class sample which had had access to a school sex education program, school was ranked first, friends second, and books and magazines third, whereas the lower-class sample ranked friends first and books and magazines second.

The students were also asked when the fertile period occurred during the ovulatory cycle as an indication of contraceptive knowledge. For the middle-class females,
over three-fourths answered correctly, whereas in the lower-class females approximately two-fifths answered correctly.

The sexually-active portion of the sample (approximately 50 percent) were asked about their contraceptive behavior. Between 40 and 60 percent reported having used withdrawal, rhythm, and condom as the most common methods. About 25 percent reported having used oral contraceptives and about 40 percent reported using nothing at all on some occasions.

**Formal Birth Control Education and Knowledge**

A study conducted by Bardis (1963) focused on the effects that a family life education course had on sex knowledge. A pre- and post-test was administered to 45 college students attending the family life course and 45 students in the control group. The family life course included two films and a textbook on the topic of sex. The exposure to sex information in the family life course resulted in a significant increase \((p<.001)\) in sex knowledge whereas the control group showed no change.

Furstenberg (1974) conducted a longitudinal study of the impact of a birth control education program on a group of pregnant adolescent girls attending a hospital clinic for prenatal and delivery services. Of an original sample of 404 girls, 226 were assigned to a program
providing a wide array of medical and social services including birth control education, and 149 were assigned to a control group receiving routine pre- and post-natal services which did not include any special effort to encourage contraceptive use. Follow-up interviews were conducted one year post-partum with 382 of the original sample. Results indicated that experience in the birth control program appeared to increase the girl's knowledge of how to use birth control more so than experience in the routine services provided to the control group (no statistical significance test provided). No information was reported as to the actual use of birth control in the experimental group, but Furstenberg did state that merely providing access to contraceptives does not insure that they will be used.

A third study examining these variables was conducted by Goldsmith, Gabrielson, Gabrielson, Mathews, and Potts (1972) between 1969 and 1970 in birth control clinics and maternity homes in the San Francisco area. Self-administered questionnaires were responded to by a total of 337 unmarried females, 17 years old or younger, 210 of which were never-pregnant new contraceptors, 100 were abortion patients, and 67 were pregnant girls residing in maternity homes. Each group contained girls of diverse ethnic and SES backgrounds, but was predominantly Caucasian and lower to middle
class. One-fourth to one-third of all the respondents had previously taken a sex education course in school. Another one-third of the respondents had discussed sexual topics in other school classes. Sixty-five percent of the respondents reported having discussed birth control in school. No relationship was found, however, between a girl's sexual knowledge and her exposure to sex education in school classes or discussion with her parents. Knowledge was found to be directly related to age. Comparisons between the three sample groups showed slightly higher scores on birth control knowledge questions in the contraception group than in the abortion group or maternity group, but the difference lacked statistical significance.

Knowledge of Birth Control and Its Availability and Birth Control Use

Three research studies have attempted to identify the extent to which adolescent girls are knowledgeable about birth control and its availability. This research focuses primarily on the extent of awareness about birth control and the degree of accuracy in adolescent's knowledge with very little information focusing on adolescent's awareness of the availability of birth control. The available data offer descriptive information which imply a link between knowledge and use but do not confirm any correlational relationship.
In a pilot study to a later longitudinal study, Furstenberg, Gordis, and Markowitz (1969) obtained profile information on birth control knowledge from a sample of 169 pregnant adolescents receiving prenatal care through a hospital clinic. The sample was almost entirely black, between 15 and 17 years of age, and from lower-class families. Results from this survey showed that most of the girls had some knowledge or awareness of birth control but few knew a great deal. Only seven percent were unable to define birth control or identify some type of contraception. However, less than half of the sample was able to identify at least three methods of birth control. Furstenberg cautioned that knowledge of birth control was not equivalent to knowledge of how and where to get it. These girls tended to be most aware of the forms of birth control that they have least access to (pills, IUD) and which they have least control over (condoms). Fifty-nine percent of the sample had never used birth control methods at any time and nearly one-third of the non-users reported that they had not realized that they could use birth control.

Shah, Zelnik, and Kantner (1975) reported data from a survey conducted in 1971 with a national probability sample of 15 to 19 year old females. Four-fifths of the sexually-active girls in the survey reported that they had had sexual intercourse without using contraception. These
girls were asked to check off from a list of possible reasons for not using birth control all those that applied to them. Results showed that seven out of ten did not use contraception because they did not think they could become pregnant. Reasons for thinking pregnancy would not occur included thinking that it was the wrong time of the month for them to conceive, that they were too young, that they had sex too infrequently, or that they didn't think they could get pregnant. The second most frequent response, checked by three out of ten respondents, involved problems in obtaining contraception, such as not knowing where to get contraception, thinking that they were too expensive, not having contraception available at the time, or not knowing about contraception. Other responses checked for not using birth control by smaller percentages of the teenagers included moral or medical objections, feeling that birth control interfered with the spontaneity of sex, or that they were trying to become pregnant.

Kravetz, Smith, and Russell (1973) administered a questionnaire assessing adolescent's knowledge on contraception to 32 females under 20 years of age attending prenatal clinics and to 49 single never-pregnant high school girls. Findings showed that although some of the girls had heard about the various methods of contraception, their knowledge was incorrect. Most of the girls knew that they have to
see a doctor to get pills and that condoms could be obtained from a drugstore. Of these 81 girls, 41 had been sexually-active. Only 13 had used some type of contraception, seven of these reported rhythm or withdrawal as their method of birth control.

**Formal Birth Control Education and Birth Control Use**

Dicksen, Mudd, Hartshorne, and Huggins (1975) reported on a longitudinal study designed to measure the impact of an educational program on contraceptive use among high school students. The program, which included educational sessions, group discussions, and referral services, was provided to 170 students during the 1973-74 school year. Seventy-four of the 170 students attended the referral clinic, 61 of which became contraceptors. One and a half year follow-up data showed that 22 of the 61 contraceptors dropped out of the clinic program after varying periods of time which Dicksen et al. (1975) reported to be comparable to the annual drop-out rates in family planning programs for women of all ages. Of the remaining 39 continuing contraceptors, two had experienced a pregnancy. This study provided no control group data or information concerning the percentage of those sexually-active who attended the birth control clinic which limit the conclusions which may be drawn.
Morgenthau and Rao (1976) reported the results of a family life education program newly established as an integral part of the adolescent health center at Mt. Sinai Hospital in New York. The family life education program was designed specifically for the needs of teenagers and provided a comprehensive program of sex education, contraception, gynecological care, and counseling. Almost half of the total sample of 334 were teenagers. The sample was followed for an 11-month period and the authors reported a 70 percent rate of successful pregnancy interruption during this time (Morgenthau, Rao, Thornton, and Cameron, 1977).

Summary

More of the research in this area focuses on sources of sex and birth control information received by adolescents with less attention paid to actual knowledge or use. Clearly, the peer group is cited more often as the primary source of information, with literature cited second, school cited third, and parents cited fourth when the results of all the studies are combined.

Although research is sketchy concerning the relationship between source of information and accuracy of knowledge, it does suggest that school or clinic sources of information may increase knowledge, but this was not conclusively supported. Adolescents' knowledge of birth control and
its availability is without doubt inadequate for their needs.

The studies examining the relationship between formal birth control education and birth control use review a high school program as well as a program provided through a birth control clinic. Both studies suggest that birth control use may be increased and pregnancy rates reduced with exposure to formal birth control education programs.
CHAPTER 3

METHOD

The present study was conducted as a secondary analysis of data gathered in a comprehensive longitudinal study of correlates of adolescent sexual behavior and contraceptive use, as indicators of pregnancy-risk. The original study was undertaken as an attempt to extend and strengthen the current state of knowledge about adolescent pregnancy by using a more comprehensive design and more powerful analyses than had previously been used. The original study was designed to obtain cross-sectional survey information from adolescent females on psychological, dyadic, social-network, and social-structural variables. These variables would then be analyzed in relation to the adolescents' sexual behavior and contraceptive use through correlation and multiple regression techniques to determine the relative influence of each group of variables on pregnancy-risk. In addition, one-year longitudinal comparisons of these variables would be correlated with fertility status to identify significant determinants of pregnancy.

The cross-sectional phase of the original study is currently in progress with a total of 195 subjects surveyed to date, with 167 reporting some sexual activity.
The present analysis will be conducted on data provided by the sexually-active portion of the sample, and will focus only upon the cross-sectional data of the study and only upon the specific variables relating to birth control education, knowledge, and use.

Sample Selection and Description

The population from which the sample was selected includes all unmarried adolescent females attending birth control clinics in rural and urban Arizona. The actual sample was determined by multi-stage cluster sampling techniques.

A random selection of Planned Parenthood and county health clinics in Arizona was made and the clinics were contacted in the fall of 1977. The administrators were given a detailed description of the research project and were asked for approval and cooperation in conducting the study. Two of the 14 clinics chose not to cooperate in the study, one due to low teenage attendance rates and one due to their concern for minimizing complications and involvements for clinic patients. A total of eight county health clinics and four Planned Parenthood clinics initially offered cooperation. However, one of the county health clinics was dropped after the pilot-test phase due to a low rate of teenage patients and complications of time and distance. Thus, a total of 11 clinics participated in the study.
Within each cooperating clinic, the sample was determined by the number of adolescent patients attending the clinics on those days that the clinics were visited by research staff members. The sample was further determined by the proportion of those adolescent patients attending the clinics on research days and who consented to participate in the study. The response rate represented approximately 95 percent of those adolescent patients approached for participation.

A total of 167 sexually-active, unmarried adolescent females, ages 13-19, participated in the study between May, 1978 and March, 1979. This sample is a self-selected representation of adolescent females attending birth control clinics in rural and urban Arizona and cannot be generalized to the entire population of sexually-active adolescents. The sample consists of a broad range of demographic characteristics including age, social class, residence, ethnicity, religion, and education level (see Table 1).

Research Instrument

The instrument used for data collection was a self-administered, structured questionnaire consisting of 163 items. The questionnaire was designed to obtain data on psychological, dyadic, social network, and social structural variables, as well as on the subjects' history of sexual behavior, contraceptive use, and possible
Table 1. Demographic Characteristics of the Sample.  
N=167.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>Mean (X)</th>
<th>Standard Deviation (S.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>13-19</td>
<td>16.96</td>
<td>.96</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>5-92</td>
<td>45.21</td>
<td>20.79</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-urban</td>
<td>74</td>
<td>44.6</td>
</tr>
<tr>
<td>-small town</td>
<td>74</td>
<td>44.6</td>
</tr>
<tr>
<td>-rural</td>
<td>18</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>166</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Black</td>
<td>9</td>
<td>5.4</td>
</tr>
<tr>
<td>-White</td>
<td>137</td>
<td>82.5</td>
</tr>
<tr>
<td>-Native American</td>
<td>4</td>
<td>2.4</td>
</tr>
<tr>
<td>-Chicano</td>
<td>12</td>
<td>7.2</td>
</tr>
<tr>
<td>-Oriental</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>-other</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>166</td>
<td>99.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Religion</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Catholic</td>
<td>45</td>
<td>26.9</td>
</tr>
<tr>
<td>-Protestant</td>
<td>72</td>
<td>43.1</td>
</tr>
<tr>
<td>-Jewish</td>
<td>3</td>
<td>1.8</td>
</tr>
<tr>
<td>-non-member</td>
<td>46</td>
<td>28.1</td>
</tr>
<tr>
<td></td>
<td>166</td>
<td>99.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-9th grade</td>
<td>5</td>
<td>3.0</td>
</tr>
<tr>
<td>-10th grade</td>
<td>14</td>
<td>8.5</td>
</tr>
<tr>
<td>-11th grade</td>
<td>32</td>
<td>19.4</td>
</tr>
<tr>
<td>-12th grade</td>
<td>64</td>
<td>38.8</td>
</tr>
<tr>
<td>-graduated</td>
<td>29</td>
<td>17.6</td>
</tr>
<tr>
<td>-dropped out</td>
<td>21</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>165</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: Numbers may not total 167 due to missing data. Percentages may not total 100.0 due to rounding error.
pregnancies. Considering the nature of the topic being studied, a self-administered questionnaire has the advantage of maintaining confidentiality, thus contributing to the likelihood of accurate responses (Babbie, 1975).

Prior to the administration of the questionnaire, a preliminary draft was constructed, pilot-tested, and revised into its final form. This analysis will focus only upon nine of the 163 questionnaire items. Only the process of questionnaire construction relevant to the variables focused upon in this analysis will be discussed in this report.

Questionnaire Construction and Pilot-Test

A preliminary draft of the questionnaire was constructed incorporating previously designed and published measures where appropriate. For those variables not measured by previously designed instruments, questionnaire items were designed by the author and the principal investigator of the original study. An attempt was made to phrase each questionnaire item within the reading level and comprehension abilities of even the youngest of the potential subjects. Items varied in form from Likert-scaled statements, to true/false items, to open- and closed-ended questions.

1. The principal investigator of the original study is Dr. Stephen R. Jorgensen, Assistant Professor of Child Development and Family Relations, University of Arizona.
The preliminary draft was pilot-tested to eliminate as much ambiguity and redundancy as possible. A pilot-test sample of 23 subjects was reached through birth-control clinics, college dormitories, and acquaintances of the research staff. The 23 subjects ranged in age from 14 to 19 years old. Pilot-test subjects were encouraged to write comments and questions in the margins as well as provide additional response categories if necessary while completing the questionnaire.

Modifications of the preliminary draft were made based on the comments of the pilot-test subjects and on the response distributions within each item. Most of the comments, questions, and additional response categories that were provided by the subjects were incorporated to maximize face validity. Those items which provided little or no variation in responses were eliminated for future statistical purposes since the statistical techniques to be used assume normal distributions among responses to each item. As a result of these modifications, the questionnaire was constructed in the form used for the actual data collection phase of the study.

**Data Collection**

Members of the research staff traveled weekly to the cooperating clinics to administer the questionnaires. The research staff consisted of four graduate students
attending The University of Arizona or Arizona State University and one undergraduate volunteer. Each member of the research staff was given training in the process to be used in order to standardize the administration procedures.

All unmarried adolescent females, aged 12-19, who attended the cooperating clinics on the days covered by a research staff member were offered the opportunity to voluntarily participate in the study. During the clinic visit, each eligible patient was approached by the researcher and was given details of the study. The researcher explained the purpose of the study, the procedures, the extent of involvement, and the guarantee of confidentiality. In compliance with the Human Subjects Committee regulations, an Informed Consent Form (see Appendix A) was read and signed by each patient consenting to participate as well as by a witness not connected with the research team. Once the consent form was signed, it was taken and filed before the patient was given a copy of the questionnaire to be completed.

The average estimated time involved in completing the questionnaire was 30 minutes. The patient was free to ask the researcher for clarification of any questions she did not understand. Due to the length of the questionnaire and the time involved, approximately 22 percent of all those consenting to participate failed to complete the
entire questionnaire. However, it is assumed that no qualitative differences exist between the responses of those completing the questionnaire and those who did not complete it due to lack of time.

Variable Measurement

The variables focused on in this analysis involve only nine of the 163 items in the questionnaire. Responses to these questions were coded as interval-level data.

Professional Sources of Information

The proportion of birth control information received from professional sources was measured by having the respondent rate each potential source of information as requested in the item below.

For the following list, check the column at right which best describes how much you have learned about birth control from each:

<table>
<thead>
<tr>
<th>Professional Source</th>
<th>Most of what I know</th>
<th>Some of what I know</th>
<th>Little or none of what I know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. girlfriends</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. boyfriends</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. mother</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. father</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. relatives (brothers and sisters)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. books and magazines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. high school class or other course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. doctor or minister</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. clinic or counselor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. other (please state)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Only (g), (h), and (i) were considered professional sources of birth control information, whereas, (a), (b), (c), (d), (e), and (f) were considered non-professional sources. A proportion value was calculated by first assigning the value "3" to the response category "most of what I know," the value "2" to the response category "some of what I know," and the value "1" to the response category "little or none of what I know." The sum score of the professional sources was divided by the sum score of the non-professional sources to obtain a ratio of professional to non-professional sources of information.

Formal Birth Control Education

The respondents' participation in a formal program for birth control education and the perceived quality of that program were measured by the following contingency-type question:

Have you ever had any formal education about birth control (that is, a class, group, or professional person who gave you information about birth control)?

____ a. yes
____ b. no

If yes, please state:

where
what kind of program it was________________________

If you have had any formal education about birth control, do you feel that it gave you as much
information as you needed or wanted to know?

_____ a. yes  
_____ b. no

It was left to the judgment of the respondent to decide whether her experience has been with a formal program as defined within the question. However, the open-ended segment of the question provides verification as to whether the respondents' experience fits within the definition.

With this combination of information, the degree of birth control education through a formal program was coded as no formal education, inadequate formal education, or adequate formal education. Those responding that they had not had any formal education were coded as having no formal education. Those responding that they had had formal education but that it did not provide as much information as they needed or wanted to know were coded as having inadequate formal education. Those responding that they had had formal education and that it did provide as much information as they needed or wanted to know were coded as having adequate formal education.

Knowledge of Birth Control

Knowledge of birth control was determined by responses to two multiple-choice items measuring awareness of the most effective methods and vulnerability to pregnancy:
Which method of birth control, besides the pill, is best for preventing pregnancy?

____ a. intrauterine device (IUD)
____ b. diaphragm
____ c. foams, creams, jellies, or suppositories
____ d. condoms (rubbers)
____ e. withdrawal
____ f. rhythm
____ g. I really don't know

During which of the following times during a girl's menstrual cycle is she most likely to get pregnant?

____ a. during her period
____ b. during the week after her period stops
____ c. about halfway between two periods
____ d. during the week before her period starts
____ e. I really don't know

The responses to these two items were combined and coded into three categories: high knowledgeability, moderate knowledgeability, and low knowledgeability. Response (a) in the first item and response (c) in the second item were the only responses considered accurate. Subjects responding accurately to both items were coded as having high knowledgeability. Those with one accurate response and one inaccurate response were coded as having moderate knowledgeability. Those responding inaccurately to both items were coded as having low knowledgeability.

Knowledge of Birth Control Availability

Knowledge of birth control availability was measured by the following item:
List all the places that you are aware of where you could get birth control pills or other contraceptives.

1. ___________________  4. ___________________
2. ___________________  5. ___________________
3. ___________________  6. ___________________

Credit was given for the number of correct places where birth control could be obtained in the communities surveyed.

Birth Control Use

Birth control use was measured along two dimensions: regularity of using any method and regularity of using effective methods. Each of the two dimensions of birth control use was analyzed separately to provide indication of how the independent variables influence each dimension of birth control use. Regularity of using any method and using effective methods were measured by the following items:

When you have had sexual relations in the past, how often have you used birth control?

____ a. always
____ b. sometimes
____ c. hardly ever
____ d. never
For each of the following birth control methods, indicate whether you have ever tried that method and if so, how often you have used it.

<table>
<thead>
<tr>
<th>Method</th>
<th>Never</th>
<th>Once</th>
<th>Occasionally</th>
<th>Regularly</th>
</tr>
</thead>
<tbody>
<tr>
<td>birth control pills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>intrauterine device (IUD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diaphragm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rhythm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>condom (rubber)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>foams, creams, or jellies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>douche</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>withdrawal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>luck or chance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Birth control pills, IUD, diaphragm, and condom were considered to be the more effective methods, whereas foams, creams, or jellies, douche, withdrawal, rhythm, and luck or chance were considered less effective methods. Each response was coded according to the degree of regularity, assigning a numerical value from one to four to response categories "never" to "regularly", respectively. Each method was assigned a weighted value based on its degree of effectiveness. Thus, the regularity of effective use was determined by multiplying the weighted value of each method by the regularity of its use and combining the resulting values of each method into a total score.

**Statistical Analysis**

The hypothesized relationships will be tested using Pearsonian correlation, multiple regression, and
path analysis. Pearsonian correlation and multiple regression provide the capacity to determine the strength of relationships between each pair of variables and to explain the separate and collective contributions of two or more independent variables to the variance of the dependent variable (Kerlinger and Pedhazur, 1973). When variables are structured in a presumed causal order, such as in Figure 1, multiple regression allows the entire structure of causal relationships to be assessed through its application in path analysis (Duncan, 1966).

In addition to requiring additive and recursive relationships, path analysis also assumes that linear relationships exist among variables measured on interval-level scales within a causally-closed system (Duncan, 1966; Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975). All of the variables used in this analysis were coded as interval data and linearity will be verified during the analysis procedures. The model can be causally closed by including outside factors potentially explaining variance in the dependent variables in such a way that the residual factors influence the dependent variables only and not the relationships between variables (Duncan, 1966; Nie et al., 1975). Figure 2 shows the untrimmed version of the path model indicating all relationships, hypothesized (1-6) and non-hypothesized, to be entered into the regression equations, as well as all residual factors (R;).
Numbered paths (1-6) correspond with numbered hypotheses (1-6).

Figure 2. Untrimmed Path Model: Hypothesized and Non-Hypothesized Relationships
This system can also be described by the following structural equations:

\[
C = P_{ca}A + P_{cb}B + P_{cr}R_1
\]

\[
D = P_{da}A + P_{db}B + P_{dc}C + P_{dr}R_2
\]

\[
E = P_{ec}C + P_{ed}D + P_{eb}B + P_{ea}A + P_{er}R_3
\]

Path coefficients will be obtained through multiple regression analysis and the final path model trimmed to show only those more significant relationships.
CHAPTER 4

RESULTS

The statistical analyses of the variables in this study were conducted using the Statistical Package for the Social Sciences (Nie et al., 1975). The relationships and relative contributions of the variables and their hypothesized causal structure were analyzed by means of bivariate Pearsonian correlation, multiple regression, and path analysis.

Pearsonian Correlation Analysis

As a preliminary step to multiple regression, a Pearsonian correlation matrix was calculated to determine the direction and magnitude of association between all pairs of variables in the untrimmed path model. This matrix is shown in Table 2. For the original hypothesized relationships, all are correlated in the predicted direction, but only Hypotheses 2, 3, 4, and 6 reached statistical significance. For those relationships included in the original untrimmed path model other than those hypothesized relationships, all are correlated significantly and in the expected direction.

Hypothesis 1, which predicted a relationship between proportion of information received from professional
Table 2. Pearsonian Correlation Matrix of All Relationships in the Untrimmed Path Model.  N=167.

<table>
<thead>
<tr>
<th></th>
<th>Formal Birth Control Education</th>
<th>Knowledge of Birth Control</th>
<th>Knowledge of Birth Control Availability</th>
<th>Regularity of Any Birth Control Use</th>
<th>Regularity of Effective Birth Control Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Source Ratio</td>
<td>0.32***</td>
<td>0.12</td>
<td>0.15*</td>
<td>0.14*</td>
<td>0.14*</td>
</tr>
<tr>
<td></td>
<td>(Hypothesis 1)</td>
<td></td>
<td>(Hypothesis 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal Birth Control Education</td>
<td>0.18**</td>
<td>0.30***</td>
<td>0.26***</td>
<td>0.17*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Hypothesis 3)</td>
<td></td>
<td>(Hypothesis 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of Birth Control</td>
<td></td>
<td></td>
<td>0.14*</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(Hypothesis 5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of Birth Control Availability</td>
<td></td>
<td></td>
<td></td>
<td>0.07</td>
<td>0.24***</td>
</tr>
<tr>
<td></td>
<td>(Hypothesis 6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regularity of Any Birth Control Use</td>
<td></td>
<td></td>
<td></td>
<td>0.51***</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05  
** p < .01  
*** p < .001
sources and knowledge of birth control, did not attain statistical significance. However, the relationship between proportion of information received from professional sources and knowledge of birth control availability is positive and statistically significant, in support of Hypothesis 2. In addition to the hypothesized relationships, the proportion of information received from professional sources showed a moderate, but significant ($p < .05$) direct relationship to both measures of birth control use.

As predicted by Hypothesis 3, formal birth control education is positively and significantly ($p < .001$) correlated with knowledge of birth control. Hypothesis 4, which predicted a positive relationship between formal birth control education and knowledge of birth control availability, is also supported by the positive and significant correlation coefficient ($p < .001$). The non-hypothesized direct relationships between formal birth control education and both measures of birth control use reached significance, although the relationship with regularity of any birth control use correlated more strongly than did regularity of effective birth control use.

Hypothesis 5, which predicted a positive relationship between knowledge of birth control and regular and effective birth control use, was not supported. Knowledge
of birth control did show a low but significant (p < .05) relationship to knowledge of birth control availability.

Hypothesis 6, which predicted a positive relationship between knowledge of birth control availability and regular and effective birth control use was only partially supported. Knowledge of availability was not related to regularity of any birth control use, but its relationship to regularity of effective birth control use is positive and statistically significant (p < .001).

**Multiple Regression Analysis**

A multiple regression analysis was conducted for each combination of independent-dependent variable relationships in a hierarchical order. Table 3 reports the standardized regression coefficients (BETA's) for the regression of both measures of birth control use (E) (see Figure 2, Chapter 3) on all the independent variables (A-D).

Referring to Table 3, the independent variable formal birth control education is the only variable to maintain a significant relationship with regularity of any birth control use when the influence of the other independent variables is controlled. In relationship to the regularity of effective birth control use, knowledge of birth control availability is the only variable to maintain significance when other independent variables
Table 3. Multiple Regression Analysis: Birth Control Use by All Independent Variables. N=167.

<table>
<thead>
<tr>
<th></th>
<th>(E) Regularity of Any Birth Control Use</th>
<th>(E) Regularity of Effective Birth Control Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Unstandardized Regression Coefficient (b)</td>
<td>(2) Standard Error</td>
</tr>
<tr>
<td>(A) Information Source Ratio</td>
<td>.37</td>
<td>.46</td>
</tr>
<tr>
<td>(B) Formal Birth Control Education</td>
<td>.33</td>
<td>.12</td>
</tr>
<tr>
<td>(C) Knowledge of Birth Control</td>
<td>-.50</td>
<td>.13</td>
</tr>
<tr>
<td>(D) Knowledge of Birth Control Availability</td>
<td>-.96</td>
<td>.90</td>
</tr>
</tbody>
</table>

R = .28
R^2 = .08

*p < .05
**p < .01
are controlled. The \( R^2 \) value, indicating the amount of variance in birth control use explained by the independent variables, show that only 8 percent of the variance is related to those variables examined in this study.

Path Analysis

The BETA values from the regression analysis were used to represent the path coefficients for path analysis. The hierarchical regression of (C) by (A) and (B), (D) by (A), (B), and (C), and separate regressions for each measure of (E) by (A), (B), (C), and (D) provide the path coefficients for all paths in the untrimmed path model. Figures 3 and 4 show the untrimmed path models for each measure of birth control use separately. These models include path coefficients for all relationships and all residual values (\( R_j \)).

In Figure 3, only the relationships between formal birth control education and knowledge of birth control, knowledge of availability, and regularity of any birth control use maintained significance. Only these relationships remain in the trimmed path model (Figure -5).

In Figure 4, only the relationships between formal birth control education and knowledge of birth control and knowledge of availability, and the relationship between knowledge of availability and regularity of effective use
Figure 3. Untrimmed Path Model: Regularity of Any Birth Control Use. N=167.

Numbered paths (1-6) correspond with numbered hypotheses (1-6).
Numbered paths (1-6) correspond with numbered hypotheses (1-6).

Figure 4. Untrimmed Path Model: Regularity of Effective Birth Control Use. N=167.
Figure 5. Trimmed Path Model: Regularity of Any Birth Control Use. --N=167.
maintained significance. Only these relationships remain in the trimmed path model (Figure 6).

The trimmed path models shown in Figures 5 and 6 illustrate the relationships remaining in the path analysis after the non-significant relationships have been removed. When the relationships in these models are compared to the original hypotheses, it appears that only Hypotheses 3, 4, and 6 are supported. In addition to the hypothesized relationships, the non-hypothesized relationship directly between formal birth control education and regularity of any birth control use also maintained support.

In comparison to the results of the bivariate Pearsonian correlations, which yielded support for Hypotheses 2, 3, 4, and 6, the multivariate analyses produced similar findings. Hypothesis 2 received only weak support in the correlation analysis, only reaching significance at the p < .05 level. Thus it is not surprising that Hypothesis 2 did not remain supported through the regression analysis.

From the final trimmed path models (Figures 5 and 6), it appears that formal birth control education is significantly related to both knowledge of birth control and knowledge of its availability. In addition, formal birth control education is directly related to regularity of any birth control use and indirectly related to regularity of effective birth control use through the intervening variable knowledge of birth control availability.
Numbered paths (3, 4, and 6) correspond with numbered Hypotheses 3, 4, and 6.

Figure 6. Trimmed Path Model: Regularity of Effective Birth Control Use. --N=167.
CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this analysis was to determine the role that birth control education and knowledge have in maximizing birth control use among sexually-active adolescent females. Specifically, it was hypothesized that professional sources of birth control information and formal birth control education would lead to more knowledge of birth control and its availability which, in turn, would lead to more regular and effective use of birth control. Both Pearsonian correlation analysis and path analysis through multiple regression yielded consistent findings, particularly among the hypothesized relationships.

Discussion and Conclusions

Hypothesis 1, which predicted a positive relationship between professional sources of birth control information relative to non-professional sources and knowledge of birth control, was not supported. This finding is consistent with that of Juhasz (1969) who reported no relationship between source of information and accuracy of sex knowledge. Others have reported that the level of objective knowledge of sex and birth control is not
particularly high regardless of source of information (Juhasz, 1969; Miller, 1973; Thornburg, 1978). The lack of relationship between source of information and level of knowledge may suggest that there is a gap between information being provided and what is actually being understood and integrated, or cognitively assimilated, by the teenager.

Hypothesis 2, which predicted a positive relationship between professional information sources relative to non-professional sources and knowledge of birth control availability, received moderate support in the correlation analysis but not from the multiple regression analysis. This weak but significant relationship, in combination with the unsupported relationship in Hypothesis 1, suggests that professional sources such as high school courses, doctors, ministers, health clinics, or counselors seem to be more effectively providing information about birth control availability than about factual birth control information, but this difference is only slight.

The non-hypothesized relationship directly between professional information sources and both measures of birth control use showed a moderate but significant relation in the correlation analysis. Thus, it appears that regardless of the level of knowledge internalized by adolescents, exposure to professional sources of information does
increase the regular and effective use of birth control. However, this relationship did not hold in the regression analysis, and thus this conclusion may be somewhat tenuous.

Hypothesis 3, which predicted a positive relationship between formal birth control education and level of birth control knowledge, was strongly supported in both analyses. In comparison to professional information sources in general (school class or other course, doctor, minister, health clinics, or counselor), the specific source of a formalized birth control education program appears to be more effective than professional sources in facilitating accurate birth control knowledge. This could possibly be due to formalized education programs being designed more specifically to meet the needs and cognitive abilities of adolescents than less formalized professional information sources. This finding is consistent with the findings of Bardis (1963) and Furstenberg (1971), both having found significant increases in knowledge among their experimental groups which received a formal education program. However, this is in contrast to Goldsmith et al. (1972) study which found no relationship between knowledge and exposure to sex education. The lack of relationship in Goldsmith's study is not entirely comparable, however, since half of those described as having been exposed to sex education in her study had simply discussed sex and
birth control in school in contrast to having taken a formal sex education course.

Hypothesis 4 predicted a positive relationship between formal birth control education and knowledge of birth control availability. This hypothesis was strongly supported in both analyses, indicating that formal birth control education increases awareness of birth control availability in addition to knowledge of birth control.

The non-hypothesized relationships between formal education and both measures of birth control use showed significant correlations. The relationship between formal education and regularity of using any form of birth control received much more support, especially in the regression analysis, than did the relationship between formal education and effective birth control use. Dicksen et al. (1975) and Morgenthau and Rao (1976) also concluded from their data that formal birth control education increased birth control use, although their measures did not distinguish between use of any birth control method and use of effective methods.

Clearly, formal birth control education is more effective than professional sources of information in general in its influence on each of the intervening and dependent variables in this study. That is, formal birth control education is more significantly related to knowledge of birth control, knowledge of birth control
availability, and to birth control use than is professional sources of information in general.

Hypothesis 5, which predicted a positive relationship between knowledge of birth control and regular and effective use of birth control, was not supported. As Furstenberg et al. (1969) suggested, knowledge of birth control is not equivalent to knowledge of how and where to get it. The intervening factor of knowledge of availability could certainly limit birth control use regardless of one's level of knowledge. Although a moderate but significant correlation was found between knowledge of birth control and knowledge of its availability, this relationship was not maintained in the regression analysis. Thus, knowledge of birth control alone is not sufficient to insure birth control use.

Hypothesis 6, which predicted a positive relationship between knowledge of birth control availability and birth control use, was partially supported in both analyses. Knowledge of availability is strongly related to regularity of effective birth control use but not to regularity of using any method of birth control. This suggests that the more aware a teenager is of birth control availability, the more likely she presumably will visit those places which facilitate the use of the more effective birth control methods.
Formal birth control education was the only significant factor among those examined to maintain a relationship with knowledge of birth control availability. In turn, knowledge of availability seems to be the only significant factor in determining regular use of effective birth control. In addition, formal education was the only variable related to use of any method of birth control. Overall, formal birth control education appears to be the only direct influence on regularity of any birth control use and an indirect influence on effective birth control use.

Although these variables are highly correlated and significant, the $R^2$ values in the regression analysis indicated that only 8 percent of the variance in birth control use was explained by the combination of independent variables examined in this study. It appears that the variance in birth control use is spread thinly across a wide range of independent variables, only a few of which have been identified in this study. It can only be concluded, therefore, that formal birth control education is a necessary but not sufficient factor in maximizing birth control use among adolescent females.

**Summary of Conclusions**

In summary, four major conclusions may be drawn from the results of this analysis:
1. Formal birth control education has a more significant influence on birth control knowledge, knowledge of availability, and birth control use than do professional information sources in general. Simply providing information through professional sources does not insure that adolescents cognitively accommodate this information in terms of accurate knowledge or its effective application.

2. Knowledge of birth control availability facilitates effective use of birth control more so than does factual knowledge of birth control.

3. Formal birth control education facilitates the regular use of any method of birth control, whereas formal birth control education combined with knowledge of birth control availability facilitates the regular use of effective birth control.

4. Formal birth control education is a necessary but not sufficient factor in maximizing birth control use among sexually-active adolescents.

**Recommendations**

Certain limitations of this study must be kept in mind before drawing implications for educational program design and future research. Since the sample included
only sexually-active adolescent females, it cannot be generalized that birth control education would necessarily affect non-sexually-active adolescents to the same extent since their motivation for utilizing this information would not be as great. Nor can this influence be assumed to have the same impact on male adolescents. In addition, since this analysis only focused upon birth control education as distinguished from sex education, it cannot be generalized that formal sex education programs would necessarily influence adolescents' birth control use to the same extent as formal birth control education programs appear to do.

Assuming that the objective of reducing the rate of adolescent pregnancy is accepted, formal birth control education certainly has an appropriate role in achieving this goal. Although formal education did not account for a major part of the variance in birth control use in this particular study, formal education still remains the most viable means, among the alternatives, for maximizing birth control use, and the means through which society has the most direct control. If, in future research, it is found that other factors, such as personality variables, attitudes, cognitive development, family, or other social structural variables play a stronger role in determining birth control use, the most that can be done is to incorporate this information into educational program designs.
Based on the findings of this study, it is recommended for the purpose of reducing adolescent pregnancy that the specific topics of birth control and its availability be included in all family life and/or sex education programs currently being offered to adolescents in schools and elsewhere, as well as those programs designed in the future. Providing adequate birth control information to adolescents should not be left to professional sources or non-professional sources without taking into account the special needs and cognitive abilities of adolescent development. It should not be assumed that simply providing factual information about birth control will necessarily influence an adolescent's knowledge or effective birth control use. As Cvetkovich, Grote, Bjorseth, and Sarkissian (1975) and Coblinger (1974) have recommended, the adolescents' level of cognitive development must be taken into account.

Future research is recommended to further measure the long range impact of specific program designs on birth control use and pregnancy prevention. Better designed and experimentally controlled studies than those few already conducted will be necessary to determine the most effective types of educational programs. In addition to studying the impact of program designs, other variables which limit the adolescent's ability to effectively learn and apply
the information provided should be examined so that the maximum benefit of education can be utilized.
APPENDIX A

INFORMED CONSENT FORM

I understand that the purpose of this research project is to find out some of the factors that might be related to sexual behavior and use of birth control among teenagers in Arizona. I also understand that my participation in this research project will involve my answering questions about myself, my attitudes and beliefs, my sexual behavior, and use of contraception. The researchers have also made clear that:

1) my answers will help the researchers and other concerned people to understand why more and more teenagers in our country are having babies;

2) the approximate amount of my time required for this questionnaire is less than one hour;

3) I might be asked to answer a shorter, follow-up questionnaire when I return to the clinic in the future;

4) I can stop participating in this study whenever I want to without having to worry that the researchers will try to force me to continue participating;

5) I can refuse to answer any questions at any time during the project;

6) all of my answers are confidential, and my name will never appear on the questionnaire that I will be answering. Only the researchers themselves will be able to see the information that
I give, and that my parents, teachers, and friends will not be allowed to hear or see any of my answers;

7) I can ask questions about the researcher's procedures at any point, and receive answers to them.

I have read the above points, and I understand them completely. The nature of the study has been explained to me by the researchers. I give my consent to participate in this study.

I also understand that this consent form will be filed in an area designated by the Human Subjects Committee with access restricted to the principal investigators or authorized representatives of the particular department and will not be connected with my answers on the questionnaire.

Participant's Signature ___________________________ Date ______

Witness's Signature ___________________________ Date ______
REFERENCES


Libby, R. W., Acock, A. C., and Payne, D. C., "Configurations of Parental Preferences Concerning Sources of Sex-Education for Adolescents," Adolescence, 1974, 9, 73.


