California State University, Northridge

A CANCER EDUCATION PROGRAM
IN AN ALL GIRLS HIGH SCHOOL

A thesis submitted in partial satisfaction of the requirements for the degree of Master of Science in Health Science
by
Emily Ruddy Grushesky

July 1972
The thesis of Emily Ruddy Grushesky is approved:

California State University, Northridge

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DEDICATION

TO

MY MOTHER

AND

TO

MY FATHER
ACKNOWLEDGEMENTS

The author wishes to express her appreciation to the people who contributed freely of their time and for their cooperation and efforts in making this thesis possible.

A special and sincere acknowledgement is due to Dr. Lennin Glass, my advisor and committee chairman; Dr. K. B. Krishnamurthy and Dr. Allan Steckler, my committee members, for their guidance and suggestions.

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To Stan and Stanley, my deepest appreciation for their patience and continued support throughout the preparation of this thesis.
ABSTRACT

A CANCER EDUCATION PROGRAM IN AN ALL GIRLS HIGH SCHOOL

by

Emily Ruddy Grushesky

Master of Health Science

July, 1972

The purpose of this study was to present and evaluate a one-hour cancer education program-assembly to high school students in order to determine if a significant cancer knowledge gain took place.

The population for this study consisted of 516 Caucasian, Roman Catholic female students, age fourteen to seventeen, ninth to twelfth grade.

The hypothesis of this study was that there would be no significant gain in cancer knowledge after a one-hour cancer education program-assembly and pamphlet distribution to the student body.

Data obtained from the pretest and posttest were analyzed using the t-test for the differences in two proportions.

In order to determine if there was a gain in cancer knowledge the results of the pretest and posttest were compared. Analysis of the data consisted of: (1) previous
cancer education, familiarity with selected pamphlets on cancer, whether the pamphlets were taken home; (2) identification of the students' level of cancer knowledge; and (3) determine if there was an increase of cancer knowledge on information presented in the program-assembly by two speakers and two movies.

The objectives of the cancer educational program-assembly were to enable high school students to: (1) identify the seven warning signals of cancer; (2) identify the effective methods of treatment; (3) recognize when to perform the BSE (breast self-examination) with reference to the menstrual cycle; (4) recognize the correct definition of what the Pap Test is; and, (5) identify what cancer quackery is and recognize the reasons for quackery.

Results of the study revealed an increase in the percentage of students exposed to cancer education in progressive grade levels; 2.1 percent at the ninth grade, 6.8 percent at the tenth grade, 15.5 percent at the eleventh grade, and 21.1 percent at the twelfth grade level. Eleven percent of the students had had previous cancer education.

Thirty to forty percent of the students were familiar with the literature from the American Cancer Society.

Sixty-two percent of the students who participated in this study were well-informed on general cancer facts.

The cancer education program-assembly presented
showed a significant knowledge gain at a .05 level of significance with reference to objectives: (1), (2), (3), and (4). Objective (5) was met with reference to identifying what cancer quackery is, but was not met for recognizing the reasons for quackery.

It was concluded from these results that program-assembly presentations are an effective method of reaching a large student population.

The author recommended that cancer education programs be presented to students as early as the ninth grade.
CHAPTER 1

INTRODUCTION

Cancer education programs presented to high school girls is one method of providing accurate information about cancer. High school girls usually have a deep concern about their own personal health problems and providing cancer information carries over an interest in the broader problems of health. Presenting cancer education programs in the high school would provide accurate information that would enable high school girls to adopt sound health habits, attitudes, and behavior about cancer in their developing years (4).

Providing cancer education to the students such as BSE (breast self-examination) emphasizes the facts that about 95 percent of breast cancer patients discover the tumors themselves and that it is most likely to be cured if detected and treated early (3). The educational premise was that young women can be taught to examine themselves regularly and to check with a physician if anything unusual is discovered (1).

The purpose of this cancer education program was to prepare young women for the future with regard to the importance of early detection and how they can help them (2).
Statement of The Problem

The purpose of this study was to present and evaluate a one-hour cancer education program-assembly to high school students, all female, ninth to twelfth grade in a high school in order to determine if a gain in knowledge about cancer took place.

The hypothesis of the study was that there would be no significant gain in cancer knowledge after a one-hour cancer education program-assembly and pamphlet distribution.

Limitations of the Study

This study was limited to the student body in a parochial high school in the Archdiocese of a County in Southern California. The student body consisted of 516 Roman Catholic, Caucasian, female students, ninth to twelfth grade. The study was directed towards measurement of cancer knowledge. Only a few aspects of cancer knowledge were considered and these aspects represent only a small part of the facts related to different forms of cancer.

Definition of Terms Used In This Study

Objective - In this study the term objective refers to a predetermined goal. Formulating objectives in this study was the method used to evaluate the effectiveness of the cancer education program-assembly presented to the high school girls.

Evaluate - In this study the term evaluate was defined as a method of determining the effectiveness of the
cancer education program-assembly. Evaluation of the
effectiveness of the program in this study refers to the
process of determining the amount of success in achieving
the predetermined objective.
CHAPTER 2

REVIEW OF THE LITERATURE

This review of the literature includes: (1) cancer education programs in the high school setting; and (2) surveys concerning cancer education and cancer knowledge among the general public.

The literature presents an array of methods and techniques for gathering, analyzing, and interpreting the data as a step towards designing and evaluating health education programs.

Cancer Education Programs in the High School Setting

Horne described a Smoking Committee that was established in a high school to reduce the risk of lung cancer (19). It was determined that the risk was great. The Committee disseminated information about the relationships between smoking, cancer, and health. The following four methods were used to reach the student body: (1) a school assembly using a guest speaker; (2) posters, visual evidence of smoking results, and statistical evidence of the relationship between smoking and disease were displayed; (3) literature distribution; and (4) committee members gave presentations and held discussions in the classrooms.

Using these methods it was believed that the atmosphere at the high school was changed from "smoking was a thing to do"
to one in which the dangers were recognized. A survey of
the student body, conducted to evaluate the four methods
used in the program, revealed that the most effective means
of communication was the personal contact between the com-
mittee members and students.

Every year, since 1960, at a high school in Walla
Walla, Washington, a Teen-Age Cancer Club presented a can-
cer education program as part of the biology class (7).
The club carried out the objectives of the American Cancer
Society and distributed literature, showed films and gave
lectures. A parent-student group was formed and projects
concerning cancer-smoking were presented.

In 1959, The Mother-Daughter School Program, was
started in Hillsborough County, Florida, by the American
Cancer Society (1). The program consisted of an annual
showing of two films to the girls in the senior class of
every high school - public, private, and parochial. The
mother or female guardian of every girl was invited to
attend. In the program the mothers of the girls were in-
cluded to add two important values to the program; one,
the education of the young student was facilitated and
enhanced by the cooperation of the mother; and two, the
mothers also drew benefits from learning facts about cancer,
which would help them to protect not only their daughters
against the disease, but themselves as well. A physician
was always present and commented on the films and answered
written questions. The project was extended to include
girls in the junior class and covered cancer of the breast and uterus. The purpose of the program was to stimulate interest among women, young and old, in the importance and necessity of an annual health check-up, which included the Pap Smear, and regular breast self-examination. In 1960, the Hillsborough County Unit of the American Cancer Society reported that 1928 adults and 4439 students were reached with the cancer education program. Thirty-eight doctors participated in the Mother-Daughter Education Program.

**Surveys Concerning Cancer Education and Cancer Knowledge Among the General Public**

Often, knowledge, beliefs, attitudes, and opinions are considered together for purposes of program planning and are, indeed, interrelated. Most cancer education programs are presented in the absence of an immediate threat or a present illness. Even though an individual may not feel highly susceptible to cancer, the low subjective probability of this disease does not lessen the epidemiological importance of maintaining high levels of preventive behavior in the populations. For example, a routine check-up visit to the physician when all seems well would involve some motivation other than or in addition to the reduction of an immediate threat of pain or other physical consequences (15).

Liberman conducted a study which probed the public's attitude towards medical check-ups, general knowledge of
the cancer signals, feelings about cancer, the influence of physicians, personal contacts with the disease, opinions about persons who have regular health examinations, and cost and time factors (27). The study was based on a random sample of 2,099 respondents divided between men and women. The respondents were further divided into three behavior groups depending on the kind of physical check-up they had that included cancer tests; goers (went regularly, once a year usually) = 26 percent; past goers (have had such an examination at one time) = 17 percent; non-goers (have never had a physical exam that included cancer tests) = 57 percent. Results showed that in 75 per cent of the cases where the individual thought a symptom might involve cancer, they would go promptly to a physician for help.

Knowledge of the warning signals appeared to be a positive force that brought people to their doctor. It was found that the public was unclear about how doctors felt about cancer check-up; 14 percent said that doctors felt it was not necessary to have a check-up; 43 percent believed that doctors thought they should have a check-up; 43 percent said they did not know how doctors felt about check-ups. Most people in this survey said that they would have a cancer check-up if the doctor told them to.

Results from two Canadian National opinion studies (1954 and 1960) were compared by Phillips and Taylor (30). Both survey samples were composed only of women over twenty years of age, from both urban and rural areas. Major
findings included a significant increase in the percentage of women who thought cancer could be cured and who thought early treatment increased the chances of cure. Although there was an increase in knowledge about cancer of the breast, eighty percent of the women did not examine their breasts regularly. The investigators found that fear was the major reason for delay in seeking treatment in seventy-five percent of the women.

Kutner and Gordon's study was concerned with the problem of "what are the conditions under which individuals will seek medical care for symptoms associated with cancer" (26). The study of the problem of delay in the diagnosis and treatment of cancer was carried out in New York City. The sample population consisted of 808 individuals, age eighteen to seventy. All respondents were interviewed in their homes by trained personnel using a prepared schedule of questions. The questions contained symptoms similar to or identical with the "seven warning signals." Analysis showed the relationships between general education, general medical knowledge, and knowledge regarding the seven warning signals, and their patterns of delay. In this survey, data showed that there were patterns of declining delay with increasing education of cancer symptoms. Those possessing the least knowledge of cancer tended to have the greatest delay in responding to the seven warning signals of cancer. In effect, these results indicated that an individual who was knowledgeable and sophisticated
regarding medical symptoms tended to be less concerned about non-cancer symptoms, while those who were less knowledgeable seemed more concerned about non-cancerous symptoms. On the other hand, when there is a possibility that the symptoms could mean the presence of cancer, those who had the most knowledge were also the most prompt in seeking medical attention, while those who had the least knowledge tended to delay action.

A national study of health beliefs was reported by Kirscht, et al (25). The data was collected by means of personal interviews. Both the sampling and the interviewing was carried out by the University of Michigan's Survey Research Center. Procedures were employed to obtain a stratified, multi-stage probability sample of 1,493 adults, twenty-one years and older. The interview schedule consisted of almost two hundred questions and covered health problems, cancer, tuberculosis, dental disease and tooth decay; and other health issues. Cancer was seen as a very serious disease (98%) and one that was likely to occur (60.4%). Beliefs concerning prevention and the beliefs of early detection showed that forty-four percent of the respondents thought nothing could be done to prevent the disease. Fifty-nine percent of the group thought prevention was possible and mentioned tests and check-ups as a prevention. A major conclusion of the study was that any assessment of beliefs in a survey is necessarily limited to a superficial examination. On the basis of these findings, it was
suggested that health workers should consider planning specific educational programs for specific diseases. In cancer programs, the objective might be to increase simultaneously beliefs in susceptibility and benefits of early detection. Kirscht suggested that when a proposed program required voluntary participation, information about peoples beliefs concerning the issue in question was essential for program planning.

Day describing the history of the development of cancer detection programs summarized the basic technique for cancer screening and detection (11). It was concluded that accumulating evidence can document the importance of cancer detection and screening for cancer control. The advantages of detecting cancer at an early stage not only include substantial improvement in cure rate, but also reduction in: (1) cost of treatment; (2) extent of treatment; (3) trauma—both physical and mental; and (4) duration of treatment.

Sanson's survey brought into focus the need not only to screen women for cervical cancer, but to educate them as well (32). The survey also considered the educational aspect of the family doctor's work. Analyzed were the sources of information from which women learned about the cytotest, how they came to use the test and what they knew about it. The results indicated that the women who participated in the screening program had learned about the test from the mass media, then the doctor, then friends
and relatives.

Davison suggested that for women to make a decision to have a smear taken and to act on that decision required: (1) information on the subject; (2) awareness of her own susceptibility to the threat of disease; and (3) a belief that the action recommended offered the possibility of relief from that threat (10). Davison's article was replete with suggestions for planning a health education program related to cervical cytologic screening of well-women. Emphasized was the fact that mass media should be regarded as reinforcement for more direct person-to-person approaches.

Burton stated educational programs for cancer can be divided into three classes (8). The classes are based on the persons or groups who need to take preventive action: (1) the person at risk has little or no control over the hazard; (2) individuals and communities share responsibility for coping with the risk; and (3) those at risk are responsible for their own protection. Long-term health education programs for cancer prevention and control was suggested. Voluntary health agencies are one type of health organization that should be recognized as a valuable means of reaching the public outside the medical profession.
CHAPTER 3

METHODS

Purpose of the Study

The purpose of this study was to present and evaluate a one-hour cancer education program-assembly in a high school in order to determine if a gain in knowledge about cancer took place.

The hypothesis of the study was that there would be no significant gain in cancer knowledge after a one-hour cancer education program-assembly and pamphlet distribution among the student body.

Population Studied

The population for this study consisted of the entire student body, 516 Caucasian, Roman Catholic students, ages fourteen to seventeen, ninth to twelfth grades with the exception of those absent on the days the pretest program and posttest, were given. The high school was a parochial high school in the Archdiocese of a County in Southern California.

The student population at the high school consisted of 516 students. Data were collected from 463 students who took the pretest as shown in Table 1. Three hundred and ninety-four students attended the program-assembly and took the posttest. Further divided into different grade levels,
data were collected from 143 freshman; 120 sophomores; 105 juniors, and 95 seniors on the pretest. One hundred forty-six freshmen; 115 sophomores; 103 juniors; and 30 seniors attended the cancer education program-assembly and took the posttest.

Table 1. Total Student Population in Different Grade Levels, Number of Students Who Took the Pretest, Number of Students Who Attended the Program-Assembly and Took the Posttest

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Total Study Population</th>
<th>Number of Students Taking Pretest</th>
<th>Number of Students Attending Program-Assembly &amp; Taking Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (N)</td>
<td>% (N)</td>
<td>% (N)</td>
</tr>
<tr>
<td>Seniors</td>
<td>23.6 (122)</td>
<td>20.5 (95)</td>
<td>7.6 (30)</td>
</tr>
<tr>
<td>Juniors</td>
<td>21.7 (112)</td>
<td>22.7 (105)</td>
<td>26.2 (103)</td>
</tr>
<tr>
<td>Sophomores</td>
<td>24.2 (125)</td>
<td>25.9 (120)</td>
<td>29.1 (115)</td>
</tr>
<tr>
<td>Freshmen</td>
<td>30.5 (157)</td>
<td>30.9 (143)</td>
<td>37.1 (146)</td>
</tr>
<tr>
<td>Total</td>
<td>100% (516)</td>
<td>100% (463)</td>
<td>100% (394)</td>
</tr>
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The Research Design

The following research design was devised and utilized in this study.

Construction of the Test. A cancer knowledge questionnaire was constructed for the study to determine if there was a significant increase in knowledge about cancer. Initially, the questionnaire was devised and finalized at twelve questions, representing areas presented
in the program-assembly. The questionnaire was pretested among five high school students from other high schools for understanding of the questions. The revised instrument was composed of twelve questions; seven true and false statements, three multiple choice, and two listing type questions. Questions 1, 2, 5, 6, 8, and 12 were general cancer knowledge questions which were included in order to determine the students level of knowledge concerning cancer. Questions 3, 4, 7, 9, 10 and 11 were concerned with BSE (breast self-examination), the Pap Test, identification of effective methods of treatment, identification of the seven warning signals of cancer, and quackery. These areas of cancer knowledge were presented in the program and they were included in three pamphlets. Personal information questions related to age; previous cancer education; familiarity with the posters and pamphlets; whether the pamphlets were taken home were also included. Students were not asked to identify themselves on the questionnaire. The pre questionnaires were marked with a number and the

1 What Was Cancer Daddy. Pamphlet #6299, American Cancer Society. Contained information on the seven warning signals of cancer.

2 Every Day That You Live. Pamphlet #2045, American Cancer Society. Contained information on what the Pap Test is and when and how to perform the BSE (breast self-examination) with reference to the menstrual cycle.

3 The Cancer Quacks. Pamphlet #6408. American Cancer Society. Contained information on why and how the quack operates and the reasons for quackery. Tells also what the effective methods of treatment for cancer are.
students were asked to remember the same number and mark
the post questionnaires the following day. Many of the
post questionnaires were not marked or were not marked
correctly (see appendices A & B).

Collection of Data

On Monday, March 27, 1972, two envelopes were dis-
tributed to every teacher at the high school in this study.
Every envelope was marked with the teacher's name, room
number, grade level, number of students and what the con-
tents were. The pretest envelope contained the pre ques-
tionnaire and three pamphlets for every student. The post-
test envelope contained the post questionnaire only. A
letter explaining how the test was to be given, when the
test was to be given, when the pamphlets were to be dis-
tributed, and when the test would be collected was given
to every teacher with the envelopes. Every teacher receiv-
ed three pamphlets also (see appendix C).

The pretest was administered to all students attend-
ing school during the homeroom period on Tuesday, March
28, 1972. The test took less than ten minutes. After the
pretest, three pamphlets were given to each student. The
pamphlets contained information presented in the program-
assembley and covered in the questionnaire.

The cancer educational program-assembley was pre-
sented on Wednesday morning, 9:30 A.M. to 10:30 A.M.,
March 29, 1972. Following the program-assembley the
students returned to their homerooms to take the posttest. The posttest was administered to freshmen, sophomores, and juniors. Thirty members of the senior class, who attended the program-assembly, took the posttest on Friday, April 14, 1972, sixteen days later. Following the program-assembly all students, attending school that day, were scheduled to take the posttest at the same time, but due to unforeseeable circumstances this was not possible.

The Development of the Cancer Education Program-Assembly

In October, 1971, several students from the high school in this study visited the local office of the American Cancer Society. The students came into the office to discuss the possibility of planning a special event that they would participate in to raise funds for the Society. At that time arrangements were made by the American Cancer Society program representative to present a cancer educational program to the student body on Thursday, March 30, 1972. In February, 1972, this author went to the American Cancer Society to fulfill requirements for a supervised field service. This author was asked by the program representative to develop the one-hour cancer educational program and present the program to the high school students as scheduled.

The first step in developing the program was to determine the interests of the students; how to develop a program on those interests; and how to present the program
to the student body within the one-hour given time limit. Telephone conversations were held with the student body president of the high school. A meeting was then arranged with some of the students and their areas of cancer interest were discussed. The students explained that the biological and pathological aspects of cells and cancer were discussed in their biology and related classes. It was agreed to present the program on general knowledge, i.e., aspects of cancer that all high school students should know. Because the student body was all female, it was decided to include the BSE (breast self-examination), the Pap Test and why they are done. The students were interested in the seven warning signals of cancer and effective methods of treatment. The subject of quackery was discussed and since the students were not familiar with cancer quackery it was agreed that this would be an interesting and important area for the students.

The second step in planning the program included developing the format for a program that would be presented in one-hour. The program-assembly approach was selected as the method for presenting the educational program to the students in this study because of pre-existing conditions, which were: (1) previous arrangements for the date were made by the American Cancer Society program representative and the students before this author went to the Society; (2) educational programs presented to the student body in this high school had a given time limit of one hour;
(3) the high school where the program was presented held an assembly every Thursday throughout the school year; and (4) all the students attending school on Thursdays were expected to attend the assembly and classes were arranged to meet this school procedure.

The third step in developing the program included formulating objectives and constructing the questionnaire to evaluate the effectiveness of the program. Knowing the interests of the students, a tentative program was planned. The tentative program included a pretest-program-posttest development as a method of gathering data for this thesis.

The objectives of the cancer educational program—assembly were to enable high school students to: (1) identify the seven warning signals of cancer; (2) identify the effective methods of treatment; (3) know when to perform the BSE (breast self-examination) with reference to the menstrual cycle; (4) recognize the correct definition of the Pap Test; and (5) identify what cancer quackery is and recognize the reasons for quackery.

The fourth step was the construction of a schedule for testing the students and presenting the program in a manner that would interest the students. The method utilized for testing and presenting included the following: (1) have a one day cancer education display by having the students place posters on bulletin boards at the school the day before the program—assembly; (2) identify the students level of cancer knowledge by using a questionnaire the day.
before the program assembly; (3) distribute the pamphlets containing educational material relating to the program to every student following the pretest; (4) present a one hour cancer education program-assembly to the students using speakers and visual aids; (5) identify the level of cancer knowledge gain by repeating the questionnaire following the program-assembly; and (6) evaluate the program.

A meeting was held with the school vice-principal for approval of the program, questionnaire, and test schedule. Approval was secured to proceed with the program (see appendix D).

Changes had occurred during the development of the program. The tentative program planned could not be considered a definite schedule until the week before the program was presented. Changes that had occurred were: (1) the students would determine how to display the posters; (2) every student would be given three pamphlets by the teacher following the pretest instead of letting them take them only if they wanted to; and (3) time changes had occurred. The program would be presented in the morning at 9:30 A.M. The Assembly programs are usually presented on Thursday, 12:55 P.M. to 1:55 P.M. The earlier time change was mainly so the students would not become too restless in wanting to have the program-assembly over. The program was scheduled for the last day of classes for students before the Easter Holidays. The week before the program the date was changed from Thursday, March 30, 1972, to Wednesday, March
29, 1972. School would not be in session the last Thursday before the holidays.

Following these changes the basic content of the program remained unchanged and the program was opened on Wednesday, March 29, 1972, at 9:30 A.M., by the student body president who also introduced the speakers.

The program-assembly objectives were agreed upon by the speakers and these areas of interest were stressed throughout the program. Following the three minute movie, "Signals", stressing the importance of knowing the seven warning signals, a five minute presentation on BSE (breast self-examination) and what the Pap Test is was given by a registered nurse. A ten minute presentation on quackery and the importance of developing good health habits, such as seeking medical care from a reputable physician and being aware of the problem and practices of quacks was presented by an American Cancer Society health education volunteer and was followed by a thirty-minute movie, "Journey into Darkness." The concluding remarks summarized the program and the program-assembly was then concluded

1 Signals (3 minutes, color). Code: 2376. American Cancer Society. Designed to emphasize dramatically, and with unusual photography, the life-saving potential of knowing cancer's warning signals.

2 Journey Into Darkness (30 minutes, color). Code: 2368. American Cancer Society. A film on quackery which was developed for television and education use. It points out the main characteristics of quacks, in comparison with doctors and the various means which cancer patients pick up their information about quackery.
Included in the planning of the program was a method of collecting data and using the data to evaluate the effectiveness of the program. A pretest-postest questionnaire was constructed for gathering the data.

The results of the pretest and posttest were compared and the data were used to evaluate the cancer educational program-assembly in order to determine if a cancer knowledge gain took place. The hypothesis of the study was that there would be no significant gain in cancer knowledge after a one hour cancer education program-assembly and pamphlet distribution.

The pretest and posttest scores were computed as discussed below. The data were analyzed using the t-test for the difference in two proportions, (see appendices E & F for rationale).

In order to determine if there was a gain in cancer knowledge the results of the pretest and posttest were compared. Analysis of the data consisted of: (1) previous cancer education; (2) familiarity with the pamphlets; (3) whether the pamphlets were taken home; and (4) questions 1, 2, 5, 6, 8, and 12 were general cancer knowledge questions and were included in the questionnaire to find out what the students knew, in general, about cancer. These cancer facts were mentioned in the program but not stressed.

In order to determine if there was a cancer knowledge gain the following items were analyzed: (1) questions (see appendix D).
3, 4, 7, 9, 10 and 11 were concerned with BSE (breast self-examination), the Pap Test, identification of effective methods of treatment, identification of the seven warning signals of cancer, and quackery. These questions were emphasized in the following manner: (1) mentioned in the pretest; (2) information was distributed in the pamphlets and displayed on posters; (3) information was stressed in the program-assembly by two speakers and two movies; and (4) posttest administered was the same as the pretest.
CHAPTER 4

RESULTS

The hypothesis suggests that cancer knowledge cannot be increased by one-hour of instruction and pamphlet distribution. The acceptance of the hypothesis was evaluated in terms of observed t-values. If the resultant t-values have a small probability (being greater than a fixed value \( t_1 \)), the hypothesis will be rejected. The probability \( P(t > t_1) \) is called a level of significance. The level of significance selected for this study was five percent (.05). Simply stated, the t-value at a .05 level of significance is \( \geq 1.96 \).

To determine if there was a gain in cancer knowledge the pretest and posttest were compared. The analysis consisted of: (1) identification of a student with previous cancer education; (3) the student's familiarity with the pamphlets;\(^1,2,3\) (3) whether the pamphlets were taken home; (4) identification of the student's previous level of cancer knowledge; and, (5) identification of an increase in cancer knowledge after the presentation of the cancer education program-assembly.

\(^1\)What was Cancer Daddy
\(^2\)Every Day That You Live
\(^3\)The Cancer Quacks
Table 2. Percent of Students in Different Grade Levels Having Previous Cancer Education.

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>%</th>
<th>Number With Previous Cancer Education</th>
<th>Number of Students Taking The Pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>2.1</td>
<td>3</td>
<td>143</td>
</tr>
<tr>
<td>10</td>
<td>6.8</td>
<td>8</td>
<td>120</td>
</tr>
<tr>
<td>11</td>
<td>15.8</td>
<td>17</td>
<td>105</td>
</tr>
<tr>
<td>12</td>
<td>21.1</td>
<td>20</td>
<td>95</td>
</tr>
<tr>
<td>TOTAL</td>
<td>45.8</td>
<td>48</td>
<td>463</td>
</tr>
<tr>
<td>MEAN</td>
<td>11.7</td>
<td>12</td>
<td>116</td>
</tr>
</tbody>
</table>

Table 2 demonstrated that there was a difference in the percentage of students exposed to cancer education in progressive grade levels from grade nine through grade twelve. The number of students with previous cancer education in the tenth grade was 2.6 times greater than the ninth grade level. The eleventh and twelfth grade levels were 5.3 and 6.6 times greater than the ninth grade level, respectively. Although the number of students with previous cancer knowledge increased from grade nine through grade twelve, the rate of student increase declined after the tenth grade. The number of students in the eleventh grade was 2 times greater than the tenth grade level, whereas, the number of students in the twelfth grade was only 1.25 times greater than the eleventh grade level.
Comparisons of previous cancer education between each pair of grade levels is presented in Table 3. The only significant t-value for consecutive grade levels is 2.18, which was obtained when previous cancer education of the eleventh grade was compared with that of the tenth grade.

The above t-values indicate that the awareness of cancer education increases as students progress from grade nine through grade eleven. Significant t-values of 3.89 and 4.77 were obtained when previous cancer education of ninth grade students were compared with eleventh and twelfth grade students respectively. There was no significant difference between grades eleven and twelve.
### Table 4. Comparison of Percent of Students in Different Grade Levels Familiarity With Distributed Pamphlets

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>%</th>
<th>(N)</th>
<th>Grade Level</th>
<th>%</th>
<th>(N)</th>
<th>Grades Compared</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>31.7</td>
<td>(146)</td>
<td>10</td>
<td>38.3</td>
<td>(115)</td>
<td>9-10</td>
<td>1.04</td>
</tr>
<tr>
<td>9</td>
<td>31.7</td>
<td>(146)</td>
<td>11</td>
<td>41.8</td>
<td>(103)</td>
<td>9-11</td>
<td>1.51</td>
</tr>
<tr>
<td>9</td>
<td>31.7</td>
<td>(146)</td>
<td>12</td>
<td>39.1</td>
<td>( 30)</td>
<td>9-12</td>
<td>.70</td>
</tr>
<tr>
<td>10</td>
<td>38.3</td>
<td>(115)</td>
<td>11</td>
<td>41.8</td>
<td>(103)</td>
<td>10-11</td>
<td>.48</td>
</tr>
<tr>
<td>10</td>
<td>38.3</td>
<td>(115)</td>
<td>12</td>
<td>39.1</td>
<td>( 30)</td>
<td>10-12</td>
<td>.06</td>
</tr>
<tr>
<td>11</td>
<td>41.8</td>
<td>(103)</td>
<td>12</td>
<td>39.1</td>
<td>( 30)</td>
<td>11-12</td>
<td>-.24</td>
</tr>
</tbody>
</table>

T-values shown in Table 4 denote that the observed variations in percent of students in different grade levels familiarity with distributed pamphlets were not significant. The percentage of students familiar with the distributed pamphlets (see methodology) varied from a minimum of 31.7 percent in the ninth grade to a maximum of 41.8 percent in the eleventh grade.
Table 5. Comparison of Percent of Students in Different Grade Levels Who Took the Pamphlets Home

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>%</th>
<th>(N)</th>
<th>Grade Level</th>
<th>%</th>
<th>(N)</th>
<th>Grades Compared</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>82.5</td>
<td>(146)</td>
<td>10</td>
<td>88.7</td>
<td>(115)</td>
<td>9-10</td>
<td>1.35</td>
</tr>
<tr>
<td>9</td>
<td>82.5</td>
<td>(146)</td>
<td>11</td>
<td>92.3</td>
<td>(103)</td>
<td>9-11</td>
<td>2.09*</td>
</tr>
<tr>
<td>9</td>
<td>82.5</td>
<td>(146)</td>
<td>12</td>
<td>88.8</td>
<td>(30)</td>
<td>9-12</td>
<td>.81</td>
</tr>
<tr>
<td>10</td>
<td>88.7</td>
<td>(115)</td>
<td>11</td>
<td>92.3</td>
<td>(103)</td>
<td>10-11</td>
<td>.84</td>
</tr>
<tr>
<td>10</td>
<td>88.7</td>
<td>(115)</td>
<td>12</td>
<td>88.8</td>
<td>(30)</td>
<td>10-12</td>
<td>.02</td>
</tr>
<tr>
<td>11</td>
<td>92.3</td>
<td>(103)</td>
<td>12</td>
<td>88.8</td>
<td>(30)</td>
<td>11-12</td>
<td>.56</td>
</tr>
</tbody>
</table>

* Significant at .05 level

A comparison of the percentage of students in different grade levels who took the pamphlets home is presented in Table 5. All of the t-values were non-significant when comparisons were made between consecutive grades. However, a t-value of 2.09 was obtained when the percentage of eleventh grade students were compared with ninth grade students. This indicates that a greater number of eleventh grade students took the pamphlets home than did ninth grade students.
Table 6. Percent of Responses of Students in Different Grade Levels Identifying The Students' Level of General Cancer Knowledge

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>9</th>
<th></th>
<th></th>
<th>10</th>
<th></th>
<th></th>
<th>11</th>
<th></th>
<th></th>
<th>12</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>t-value</td>
<td>Pre</td>
<td>Post</td>
<td>t-value</td>
<td>Pre</td>
<td>Post</td>
<td>t-value</td>
<td>Pre</td>
<td>Post</td>
<td>t-value</td>
</tr>
<tr>
<td>Question 1+</td>
<td>95.8%</td>
<td>98.6%</td>
<td>1.45</td>
<td>92.1%</td>
<td>99.1%</td>
<td>2.59*</td>
<td>95.2%</td>
<td>100.0%</td>
<td>2.24*</td>
<td>90.5%</td>
<td>100.0%</td>
<td>1.75</td>
</tr>
<tr>
<td>2+</td>
<td>69.2%</td>
<td>80.4%</td>
<td>2.16*</td>
<td>77.1%</td>
<td>99.0%</td>
<td>4.88*</td>
<td>93.2%</td>
<td>95.1%</td>
<td>.58</td>
<td>90.5%</td>
<td>93.3%</td>
<td>.47</td>
</tr>
<tr>
<td>5+</td>
<td>99.3%</td>
<td>99.3%</td>
<td>-.01</td>
<td>99.1%</td>
<td>98.2%</td>
<td>-.61</td>
<td>97.1%</td>
<td>98.0%</td>
<td>.44</td>
<td>100.0%</td>
<td>100.0%</td>
<td>.00</td>
</tr>
<tr>
<td>6+</td>
<td>71.3%</td>
<td>70.8%</td>
<td>-.09</td>
<td>65.8%</td>
<td>67.8%</td>
<td>.33</td>
<td>64.3%</td>
<td>76.6%</td>
<td>1.93</td>
<td>62.7%</td>
<td>76.6%</td>
<td>1.40</td>
</tr>
<tr>
<td>8+</td>
<td>99.2%</td>
<td>99.3%</td>
<td>.02</td>
<td>100.0%</td>
<td>100.0%</td>
<td>.00</td>
<td>100.0%</td>
<td>100.0%</td>
<td>.00</td>
<td>100.0%</td>
<td>100.0%</td>
<td>.00</td>
</tr>
<tr>
<td>12+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a+</td>
<td>83.4%</td>
<td>89.6%</td>
<td>1.52</td>
<td>92.3%</td>
<td>96.4%</td>
<td>1.36</td>
<td>85.5%</td>
<td>98.0%</td>
<td>3.27*</td>
<td>94.4%</td>
<td>96.6%</td>
<td>.48</td>
</tr>
<tr>
<td>b+</td>
<td>93.4%</td>
<td>98.6%</td>
<td>2.26*</td>
<td>98.3%</td>
<td>100.0%</td>
<td>1.40</td>
<td>98.0%</td>
<td>100.0%</td>
<td>1.41</td>
<td>100.0%</td>
<td>96.6%</td>
<td>-1.77</td>
</tr>
<tr>
<td>c+</td>
<td>80.7%</td>
<td>100.0%</td>
<td>5.56*</td>
<td>91.3%</td>
<td>100.0%</td>
<td>3.23*</td>
<td>96.0%</td>
<td>100.0%</td>
<td>2.04*</td>
<td>96.7%</td>
<td>96.6%</td>
<td>-.01</td>
</tr>
<tr>
<td>d+</td>
<td>86.3%</td>
<td>100.0%</td>
<td>4.61*</td>
<td>94.8%</td>
<td>100.0%</td>
<td>2.46*</td>
<td>94.1%</td>
<td>99.0%</td>
<td>1.92</td>
<td>97.8%</td>
<td>96.6%</td>
<td>-.35</td>
</tr>
</tbody>
</table>

* Significant at .05 level
+ See Appendix A and B
<table>
<thead>
<tr>
<th>Grade Level</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre test</td>
<td>Post test</td>
<td>t-value</td>
<td>Pre test</td>
</tr>
<tr>
<td>Question e+</td>
<td>56.3</td>
<td>51.8</td>
<td>-.73</td>
<td>77.9</td>
</tr>
<tr>
<td>f+</td>
<td>78.5</td>
<td>51.4</td>
<td>-4.67*</td>
<td>88.9</td>
</tr>
<tr>
<td>g+</td>
<td>94.0</td>
<td>93.9</td>
<td>-.03</td>
<td>98.2</td>
</tr>
<tr>
<td>h+</td>
<td>94.0</td>
<td>97.7</td>
<td>1.49</td>
<td>95.5</td>
</tr>
</tbody>
</table>

* Significant at .05 level
+ See appendix A, B
Table 6 presents a pretest to posttest comparison of the percentage of correct responses to different grade levels to questions pertaining to the students' level of general cancer knowledge. Specifically, the questions were numbers 1, 2, 5, 6, 8 and question 12, part a through h (see appendix A and B for these questions).

This table indicates that the level of general cancer knowledge was relatively high prior to the posttest. This was illustrated by the fact that 42 out of 52 pretest percentage values were greater than 80 percent. The positive significant changes were not a consequence of instruction, as the subject matter was not covered in the education program.

The significant negative t-values were associated with question 12 f, i.e., prevention depends on breaking the smoking habit. Smoking habits (being a non-smoker) as a method of prevention were not covered in this program. The reason for a decrease in the correct response for all four grade levels is unexplainable. One can only speculate that the students guessed at the answer to this question.

In summary, grade levels which demonstrated the greatest significant increase in cancer knowledge for specific questions were: ninth grade concerning questions 12 b, c, and d which are the annual check-up, the Pap Test, and BSE as a means of prevention; the tenth grade
showed an increase concerning question 2, which was the definition of cancer as a disorderly, uncontrolled growth of cells; and the eleventh grade showed an increase in the knowledge that knowing cancer facts is a means of prevention, i.e., question 12 a. The greatest increase in cancer knowledge occurred between pretest and posttest values in the twelfth grade concerning questions 1, 6 and 12 h. These are: most types of cancer are curable in the early stages, before growth spreads to other parts of the body; early detection, accurate diagnosis, and adequate treatment are essential to the control of cancer; and, taking your best friends advice is not considered a means of prevention concerning cancer. No positive significant changes were recorded due to that out of a total twelfth grade student population of 23.6 percent, 20.5 percent took the pretest, whereas, 7.6 percent took the posttest.
Table 7. Percent of Responses of Students in Different Grade Levels Identifying Correctly The Seven Warning Signals of Cancer

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test %</td>
<td>Post-test %</td>
<td>t-value</td>
<td>Pre-test %</td>
</tr>
<tr>
<td>Question 10+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a**</td>
<td>78.4</td>
<td>90.5</td>
<td>2.83*</td>
<td>83.4</td>
</tr>
<tr>
<td>e**</td>
<td>78.8</td>
<td>99.4</td>
<td>5.46*</td>
<td>71.7</td>
</tr>
<tr>
<td>j**</td>
<td>63.0</td>
<td>91.1</td>
<td>5.70*</td>
<td>54.2</td>
</tr>
<tr>
<td>b++</td>
<td>32.9</td>
<td>94.5</td>
<td>10.91*</td>
<td>45.8</td>
</tr>
<tr>
<td>c++</td>
<td>86.7</td>
<td>97.9</td>
<td>3.59*</td>
<td>91.6</td>
</tr>
<tr>
<td>d++</td>
<td>30.7</td>
<td>97.9</td>
<td>11.94*</td>
<td>46.6</td>
</tr>
<tr>
<td>f++</td>
<td>44.0</td>
<td>93.1</td>
<td>9.01*</td>
<td>56.5</td>
</tr>
<tr>
<td>g++</td>
<td>55.2</td>
<td>93.1</td>
<td>7.38*</td>
<td>65.0</td>
</tr>
<tr>
<td>h++</td>
<td>56.6</td>
<td>93.8</td>
<td>7.34*</td>
<td>65.8</td>
</tr>
<tr>
<td>i++</td>
<td>27.9</td>
<td>84.9</td>
<td>9.77*</td>
<td>33.3</td>
</tr>
</tbody>
</table>
Table 7 (continued)

* Significant at .05 level
+ See appendix A, B
++ The seven warning signals of cancer
** Incorrect statements -- these are not warning signals
Table 7 shows the responses of the students in different grade levels to questions related to the seven warning signals of cancer. This table indicates that knowledge of the seven warning signals was significantly increased by the program.

Parts a, e, and j of question 10 are false statements of the warning signals. These are: (a) extreme tiredness-no energy-at onset; (e) pale dry-shallow skin tone and coloring-at onset; and, (j) persistent pain-at the site-at the onset of symptoms. The remaining parts of question 10 are true statements, i.e., the seven warning signals of cancer.

The level of knowledge on the pretest was high only for part c of question 10, i.e., a lump or thickening in the breast or elsewhere is a warning signal of cancer. The tenth grade showed 91.6 percent correct responses, whereas, grades nine, eleven and twelve showed 86.7 percent, 83.8 percent and 84.2 percent respectively. The pretest percentage of correct responses for the remainder of the true statements ranged from a minimum of 27.9 percent for part i, i.e., indigestion or difficulty in swallowing, by grade nine to a maximum of 74.2 percent for part g, i.e., a change in wart or mole, by grade eleven.

The percent of students who knew that parts a, e, and j of question 10 were not warning signals ranged between a minimum of 54.2 percent for part j, i.e., persistent pain-at the site-at the onset of symptoms, by grade
ten to a maximum of 85.3 percent for part a, i.e., extreme tiredness-no energy-at onset, by grade twelve.

Table 7 also shows that a majority of students were able to identify all of the seven warning signals in the posttest. Regarding the parts which properly stated the warning signals, the percentage of correct responses on the posttest ranged from a minimum of 80 percent for the twelfth grade for part i, i.e., indigestion or difficulty in swallowing, to a maximum of 99.1 percent for the tenth grade for parts b and d, i.e., unusual bleeding or discharge and a change in bowel or bladder habits. Of the twenty-eight t-values calculated for the group of true statements, twenty-six were significant and positive. The remaining two were non-significant and these were items c and h, i.e., a lump or thickening in the breast or elsewhere and a sore that does not heal, by the twelfth grade.

The program also enhanced the students' ability to identify the false statements of the warning signals. This was evidenced by the fact that of twelve t-values associated with the false statements, ten were significant. The remaining two were non-significant and these were by the tenth and twelfth grades for part a of question 10, i.e., extreme tiredness-no energy-at onset.
Table 8. Percent of Responses of Students in Different Grade Levels Identifying The Correct Methods of Treatment

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre test</td>
<td>Post test</td>
<td>t-value</td>
<td>Pre test</td>
</tr>
<tr>
<td>9</td>
<td>95.9</td>
<td>100.0</td>
<td>2.50*</td>
<td>94.2</td>
</tr>
<tr>
<td>10</td>
<td>96.6</td>
<td>96.6</td>
<td>.03</td>
<td>92.5</td>
</tr>
<tr>
<td>11</td>
<td>98.0</td>
<td>96.0</td>
<td>-.98</td>
<td>92.5</td>
</tr>
<tr>
<td>12</td>
<td>79.0</td>
<td>99.3</td>
<td>5.57*</td>
<td>86.6</td>
</tr>
<tr>
<td></td>
<td>79.7</td>
<td>99.3</td>
<td>5.46*</td>
<td>92.5</td>
</tr>
<tr>
<td></td>
<td>27.2</td>
<td>54.1</td>
<td>4.64*</td>
<td>34.1</td>
</tr>
</tbody>
</table>

* Significant at .05 level
+ See appendix A, B
++ Effective methods of treatment
** Ineffective methods of treatment
The response of the students in different grade levels to question 9 related to methods of treatment are shown in Table 8. This table indicates that in general, the ability of the students to identify the methods of treatment was enhanced by the program. The percent of students correctly answering item e, i.e., chemotherapy is an effective method of treatment for cancer, was low for all grades and increased significantly after instruction. Even instances when no significant increases were recorded, the posttest indicates that better than 93 percent answered the item correctly.

Positive significant t-values were recorded by grades nine and eleven for all three parts which properly stated effective treatment methods, namely, (a) surgery, (c) radiation, and (e) chemotherapy. Grade ten recorded positive significant t-values for parts a and c, i.e., surgery and radiation. Grade twelve recorded a significant value for part e, i.e., chemotherapy.

Grade ten produced positive significant t-values for all three parts which stated ineffective treatment methods. Grade nine was the only other grade to produce a significant change that was associated with part b, i.e., diet. All other t-values associated with ineffective methods are non-significant. However, it should be noted that the students' knowledge of ineffective treatment methods were high as evidenced by pretest percentage values which ranged between 92.5 percent by grade ten for
parts d and f, i.e., vitamins and self-medication, to 98 percent by grade nine for part f, i.e., self-medication.
Table 9. Comparison of the Percent of Responses of Students in Different Grade Levels Identifying the BSE (breast self-examination) as a Means of Prevention; Identifying a Lump in the Breast as a Warning Signal; and Identifying When to Perform the BSE with Reference to the Menstrual Cycle

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Part I Identifying BSE as a Means of Prevention</th>
<th>Part II Identifying a Lump in The Breast as a Warning Signal</th>
<th>Part III Identifying When to Perform BSE With Reference to The Menstrual Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test %</td>
<td>Post-test %</td>
<td>t-value</td>
</tr>
<tr>
<td>9</td>
<td>86.3</td>
<td>100.0</td>
<td>4.61*</td>
</tr>
<tr>
<td>10</td>
<td>94.8</td>
<td>100.0</td>
<td>2.46*</td>
</tr>
<tr>
<td>11</td>
<td>94.8</td>
<td>99.0</td>
<td>1.92</td>
</tr>
<tr>
<td>12</td>
<td>97.0</td>
<td>96.6</td>
<td>-.35</td>
</tr>
</tbody>
</table>

* Significant at .05 level

+ Only the correct response, after, was used in this table.
Table 9, parts I and II, provides a comparison of the percentage of correct responses of students in different grade levels identifying the BSE (breast self-examination) as a means of cancer prevention, i.e., a lump in the breast as a warning signal, and when to perform the BSE with reference to the menstrual cycle.

On the pretest, 86.3 percent of the ninth grade and 94.8 percent, 94.1 percent and 97 percent of the tenth, eleventh and twelfth grades respectively, correctly identified BSE as a means of prevention. (See Table 9, Part I) On the posttest the correct responses to this question were 100 percent, 100 percent, 99 percent and 96.6 percent for the ninth through twelfth grades consecutively. These figures represent significant increases in the ninth and tenth grade percentages.

On the pretest questionnaire, 86.7 percent of the ninth grade, 91.6 percent of the tenth grade, 83.8 percent of the eleventh grade, and 84.2 percent of the twelfth grade correctly identified a lump in the breast as a warning signal. On the posttest, 97.9 percent of the ninth grade, 98.2 percent of the tenth grade, 98 percent of the eleventh grade, and 90 percent of the twelfth grade responded correctly. This represents significant increases in the ninth, tenth and eleventh grades.

The results of the question designed to measure the ability of the students to recognize when to perform the BSE with reference to the menstrual cycle is shown in
Table 9, Part III. The table indicates that there was a significant gain in knowledge concerning the BSE as a result of the program. Prior to the program, 45 percent of the ninth grade, 37.7 percent of the tenth grade, 46.8 percent of the eleventh grade, and 50.5 percent of the twelfth grade students could properly identify the correct time to perform the BSE. Following the program the percent of students who correctly identified the proper time in the menstrual cycle to perform the BSE were 95.8 percent, 98.2 percent, 98 percent, and 100 percent for the ninth, tenth, eleventh and twelfth grades, respectively. All four t-values associated with Part III of Table 9 were significant.
Table 10. Comparison of The Percent of Responses of Students in Different Grade Levels Identifying the Pap Test as a Means of Prevention; Identifying Unusual Bleeding or Discharge as a Warning Signal; and Identifying The Correct Definition of Pap Test

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Part I</th>
<th>Part II</th>
<th>Part III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Identifying Pap Test as a Means of Prevention</td>
<td>Identifying Unusual Bleeding or Discharge as a Warning Signal</td>
<td>Identifying the Correct Definition of Pap Test</td>
</tr>
<tr>
<td></td>
<td>Pre test</td>
<td>Post test</td>
<td>t-value</td>
</tr>
<tr>
<td>9</td>
<td>80.7</td>
<td>100.0</td>
<td>5.56*</td>
</tr>
<tr>
<td>10</td>
<td>91.3</td>
<td>100.0</td>
<td>3.23*</td>
</tr>
<tr>
<td>11</td>
<td>96.0</td>
<td>100.0</td>
<td>2.04*</td>
</tr>
<tr>
<td>12</td>
<td>96.7</td>
<td>96.6</td>
<td>-.01</td>
</tr>
</tbody>
</table>

* Significant at .05 level
Table 10 indicates that the program produced significant improvement, at all grade levels, in the students' ability to identify (1) the Pap Test as a means of prevention, (2) unusual bleeding or discharge as a warning signal, and (3) the correct definition of the Pap Test. The comparison of the pretest and posttest percentages produced significant t-values in all instances except for the result of the twelfth grade responses to the question identifying the Pap Test as a means of prevention. This pretest percentage value was 96.7 percent. In contrast grade eleven which had a similar pretest value gained significantly on the posttest.

Regarding identification of the Pap Test as a means of prevention, 80.7 percent, 91.3 percent, 96.0 percent and 96.7 percent of the ninth, tenth, eleventh, and twelfth grades respectively, responded correctly on the pretest. On the posttest, 100 percent of grades nine, ten, and eleven, and 96.6 percent of grade twelve correctly identified the Pap Test as a means of prevention.

A comparison of the percentage of students in each grade level able to recognize the correct definition of the Pap Test before and after the program was shown in Table 10, Part III. The program produced a positive, significant t-value in each grade level. The pretest results showed that prior to the program 70.6 percent of the ninth grade recognized the correct definition of the Pap Test, as did 79.3 percent of the tenth grade, 88.1 percent of
the eleventh grade and 79.5 percent of the twelfth grade.
The posttest showed that a higher percentage of students
recognized the correct definition of the Pap Test in each
grade level after the program. The posttest percentages
varied from a minimum of 85.3 percent for the ninth grade
to a maximum of 100 percent for the twelfth grade with the
tenth and eleventh grades indicating percentages of 94.7
percent and 98 percent respectively.

Of the three categories listed in this table the
most dramatic results were obtained with regard to the
identification of unusual bleeding or discharge as a warn-
ing signal. The pretest percentages of correct responses
were low in all grade levels ranging between 32.8 percent
for the ninth grade to 54.2 percent for the eleventh grade.
The tenth and twelfth grade percentages of correct respon-
ses were 45.8 percent and 52.6 percent respectively. The
posttest produced percentages of 90 percent, 94.5 percent,
97 percent and 99.1 percent for the twelfth, ninth, eleven-
th, and tenth grades in that order.

In summary, the greatest increase in knowledge
occurred in the ninth grade for identifying the Pap Test
as a means of prevention and identifying unusual bleeding
or discharge as a warning signal; and the twelfth grade
for identifying the correct definition of the Pap Test.
Table 11. Percent of Responses of Students in Different Grade Levels Identifying The Definition of Quackery and Recognizing The Reasons For Quackery

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Test</td>
<td>Post Test</td>
<td>t-value</td>
<td>Pre Test</td>
</tr>
<tr>
<td>Question 3+</td>
<td>65.4</td>
<td>96.5</td>
<td>6.73*</td>
<td>71.5</td>
</tr>
<tr>
<td>Question 11+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>84.0</td>
<td>75.0</td>
<td>-1.86</td>
<td>86.9</td>
</tr>
<tr>
<td>b</td>
<td>58.1</td>
<td>33.8</td>
<td>-3.97*</td>
<td>91.3</td>
</tr>
<tr>
<td>c</td>
<td>80.5</td>
<td>99.3</td>
<td>5.30*</td>
<td>66.9</td>
</tr>
<tr>
<td>d</td>
<td>36.2</td>
<td>37.5</td>
<td>.21</td>
<td>55.9</td>
</tr>
<tr>
<td>e</td>
<td>42.7</td>
<td>41.6</td>
<td>-.19</td>
<td>55.4</td>
</tr>
<tr>
<td>f</td>
<td>45.7</td>
<td>53.3</td>
<td>1.28</td>
<td>56.2</td>
</tr>
</tbody>
</table>

* Significant at .05 level
+ See Appendix A,B
Table 11 provides a comparison of the students' ability to identify the definition of quackery and recognize the reasons for quackery before and after the program.

Grades nine, ten, eleven demonstrated positive, significant t-values when the pretest and posttest percentages were compared for the definition of quackery as in Question 3. The t-value for grade twelve is non-significant.

Prior to the program the percentage of students correctly identifying quackery ranged from a minimum of 65.4 percent for the ninth grade, to a maximum of 85.2 percent for the twelfth grade. The table shows that the post-test percentages improved to a range between 96.5 percent for the ninth grade to 99.1 percent for the tenth grade.

As for recognizing the reasons for quackery, the tests produced no discernible pattern. The percentage values for the correct responses range between 36.2 percent and 96.6 percent for ninth and twelfth grades respectively on the pretest and between 32.4 percent and 99.3 percent on the posttest for the tenth and ninth grades respectively. It was also noted that there were only 6 significant t-values resulting from these comparisons. Three of these are positive, showing a gain from instruction and three are negative and show a loss because of instruction. All 6 of the significant t-values are in connection with the parts of the question which relate to fear of surgery or radiation, and fear of expense, i.e., parts 11b and 11c.
CHAPTER 5
DISCUSSION

This author went to the American Cancer Society to fulfill requirements for a supervised field service. The author was asked by the American Cancer Society program representative to develop a one-hour cancer educational program and present the program to an all girls high school. The program included a pretest-program-posttest format and the results of the program evaluation were presented in Chapter 4 in detail.

Results of the study revealed that there was a continuous increase in the percentage of students exposed to cancer education in progressive grade levels from nine through twelve. Results of the study revealed that although there was a continuous increase in the percentage of students exposed to cancer education in progressive grade levels from nine through twelve, the rate of student increase declined after the tenth grade. Comparisons between the grade levels showed no significant difference in previous cancer education between the ninth-tenth grade and the eleventh-twelth grade. Comparisons between the ninth-eleventh, ninth-twelfth, tenth-eleventh, and tenth-twelfth grades were significantly different. Progressing through higher grade levels and
age may account for this acquired cancer education. Eleven percent of the students said they had previous cancer education, and 40 percent of the students said the pamphlets were familiar, indicating this literature was read by students.

The pamphlets were taken home by 80 percent of the students in every grade. The pamphlets were distributed to every student in their homeroom after the pretest and no instructions were offered. The students were not encouraged to read or take them home. Handing pamphlets directly to the student was an effective method of distributing literature according to this study.

The students in this study were well informed with respect to general cancer facts. Ninety percent of the students knew that most types of cancer were curable in the early stage. Sixty-nine percent of the students recognized the definition of cancer. Ninety-seven percent of the students knew that early detection, accurate diagnosis, and adequate treatment is essential to the control of cancer. Sixty-two percent of the students recognized the fact that early cancer may not show symptoms that often can be detected only by a physician. Ninety-nine percent of the students recognized the fact that their age group was susceptible to cancer. The ninth-tenth grades had significantly less previous cancer education than the eleventh-twelfth grades, however, they did as
well as the higher grades when compared with each other suggesting the possibility that an interest in cancer education may begin as low as the ninth grade.

The results computed by the pretest-posttest revealed a significant knowledge gain at .05 level of significance for cancer education presented in the program for all grades ninth through twelfth.

Two interesting observations were: (1) most students were unfamiliar with the term, chemotherapy; and (2) the reasons for quackery were not reinforced by the program-assembly method. Chemotherapy was the least known effective method of treatment, giving rise to the possibility that the students were not familiar with the word Chemotherapy. Chemotherapy was used in the questionnaire and program to acquaint the students with the terms used in the literature distributed to the general public. The reasons for quackery were not reinforced by the program-assembly method. This may be a reflection of the distance from which this population is viewing the quackery problem. Students, probably, have not had to go out and actively seek medical care for themselves and thus may not realize what motivates people to seek medical care.

Comparison of data revealed that the students, in fact, knew the warning signal for breast cancer, knew that the BSE was a means of prevention, but were not aware of
when to perform the BSE. Even though the students had knowledge about the BSE, they were not in a position to most effectively use this knowledge. They lacked the essential tool of when to do the BSE with reference to the menstrual cycle. Programs presenting full range of the concepts would be a useful method for optimizing cancer knowledge.

Concerning the Pap Test on the pretest, the students knew that the Pap Test was an important diagnostic tool. Only 32 percent to 54 percent of the students knew the symptoms of uterine cancer, however, it appears that they did not know when it is appropriate to have the Pap Test. This indicates that in an education program concerning uterine cancer, it is important to inform the female high school student when and how the Pap Test should be performed.

Conclusions. The following conclusions were made based on the results of this study. They are:

1. The hypothesis of the study, i.e., there would be no significant gain in cancer knowledge after a one-hour cancer education program-assembly and pamphlet distribution to the student body was rejected;

2. The high school students in this study were receptive to the program-assembly and the cancer information presented in this study; and,

3. The efficacy of a program-assembly presentation
method as used in this study, to disseminate cancer information to female high school students was demonstrated.

Recommendations. On the basis of this study the following recommendations are made:

1. Cancer education programs should be presented to students as early as the ninth grade as shown by the interest of the students in this study;

2. Small group discussion, where exchange of ideas can be employed, is recommended as a method for dealing with cancer quackery;

3. This author suggests that correct technical terminology concerning cancer should be used when presenting a program to students; and,

4. Additional studies involving co-educational schools concerning cancer knowledge is suggested.
The purpose of this study was to present and evaluate a one-hour cancer education program-assembly to high school students in order to determine if a significant cancer knowledge gain took place.

The population for this study consisted of 516 Caucasian, Roman Catholic female students, age fourteen to seventeen, ninth to twelfth grade.

The hypothesis of the study was that there would be no significant gain in cancer knowledge after a one-hour cancer education program-assembly and pamphlet distribution to the student body.

The objectives of the cancer education program-assembly were to: (1) identify the seven warning signals of cancer; (2) identify the effective methods of treatment; (3) recognize when to perform the BSE (breast self-examination) with reference to the menstrual cycle; (4) recognize the correct definition of what the Pap Test is; and (5) identify what cancer quackery is and recognize the reasons for quackery.

Development of the cancer education program-assembly included: (1) planning a one-day cancer education display by placing posters on bulletin boards at the school;
(2) identifying the students' level of cancer knowledge by using a questionnaire the day before the assembly; (3) distributing pamphlets with educational materials relating to the program after the pretest; (4) presenting a one-hour cancer education program-assembly to the students using speakers and visual aides; (5) identifying the level of cancer knowledge gain by repeating the questionnaire following the program-assembly; and, (6) evaluating the program presented.

The survey instrument used in this study was devised to include information presented in the program-assembly. The test was composed of twelve questions; seven true and false statements, three multiple choice, and two listing type questions.

The pretest was administered to 463 students attending school during the homeroom period the day before the program. The test took less than ten minutes. After the pretest, three pamphlets were given to every student. The pamphlets contained information presented in the program-assembly and covered in the questionnaire.

The following program-assembly was presented to the students. Following the three minute movie, "Signals," stressing the importance of knowing the seven warning signals, a five minute presentation on BSE (breast self-examination) and what the Pap Test is was given by a registered nurse. A ten minute presentation on quackery and the importance of developing good health habits, such
as seeking medical care from a reputable physician and being aware of the problem and practices of quacks were presented by an American Cancer Society health education volunteer and was followed by a thirty-minute movie, "Journey into Darkness".

Three hundred and ninety-four students attended the program-assembly and the posttest was administered to the 146 freshmen, 115 sophomores, and 103 juniors attending the assembly. Thirty attending seniors took the posttest two weeks later.

Data obtained from the pretest and posttest were analyzed using the t-test for the difference in two proportions.

In order to determine if there was a gain in cancer knowledge the results of the pretest and posttest were compared. Analysis of the data consisted of: (1) previous cancer education, familiarity of the pamphlets, whether the pamphlets were taken home; (2) identification of the students' level of cancer knowledge; and (3) determine if there was an increase of cancer knowledge on information presented in the program-assembly by two speakers and two movies.

Results of the study revealed an increase in the percentage of students exposed to cancer education in progressive grade levels; 2.1 percent at the ninth grade, 6.8 percent at the tenth grade, 15.8 percent at the eleventh grade, and 21.1 percent at the twelfth grade
level. Eleven point seven percent of the students had previous cancer education. Comparison between the grade levels were significant between the ninth-eleventh grade, ninth-twelfth grade, tenth-eleventh grade, and tenth-twelfth grade. The comparison between the ninth-tenth grade and the eleventh-twelfth grade were not significant.

Thirty to forty percent of the students were familiar with the American Cancer Society literature and eighty percent of the students took the pamphlets home. Sixty-two percent of the students who participated in this study were well-informed on general cancer facts and ninety-nine percent of the students knew that their age group was susceptible to the cancer threat.

The cancer education program-assembly was evaluated using results of the pretest-posttest. The objectives were considered met if there was a significant knowledge gain at the .05 level of significance. Results showed a significant knowledge gain at the .05 level of significance with reference to objective: (1); (2); (3), and (4). Objective (5) was met with reference to identifying what cancer quackery is, but was not met for recognizing the reasons for quackery.

It was concluded from these results that:

1. Program-assembly presentations are an effective method of reaching a large student population.

2. Program-assembly presentations are effective when presenting cancer facts as shown in this study.
3. Program-assembly presentations are ineffective as a method for dealing with cancer quackery.

4. Cancer education programs be presented to students as early as the ninth grade.
BIBLIOGRAPHY


APPENDIX A

PRE QUESTIONNAIRE FOR CANCER KNOWLEDGE
Pre Questionnaire for Cancer Knowledge

DO NOT SIGN YOUR NAME

The following grade number and number will be your identification for the pre and post questionnaire. You will be asked to mark the post questionnaire with the same number.

Example: grade 9 number 8

grade ______ number ______ age ______

Have you had any cancer education previously? yes no

QUESTIONNAIRE

1. Most of the types of cancer are curable in the early stages, before growth spreads to other parts of the body. true x false

2. Cancer is disorderly, uncontrolled growth of cells. true x false

3. "Quackery" means untested and unproven ways of treating cancer. true x false

4. "Pap" Test is examination of cells that have been sloughed off or scraped off the cervix for diagnostic purposes. true x false

5. Early detection, accurate diagnosis, and adequate treatment are essential to the control of cancer. true x false

6. Cancer, in its early most curable stage, usually causes no symptoms. But cancer at this stage often can be detected by a physician. true x false

7. Breast Self-Examination (BSE) should be done (___before) (x after) or (___during) the menstrual cycle. (check one)

8. High school students do not get cancer because cancer is a condition of the elderly. true x false

9. There are ___ effective methods of treatment for cancer. (Mark an x in front of an effective method of treatment.)

   x a. Surgery
   _ b. Diet
   x c. Radiation
   _ d. Vitamins
   _ e. Chemotherapy
   f. Self-medication
10. There are ___7___ Warning Signals for Cancer
(Mark an ___x___ in front of a Warning Signal)

___a. Extreme tiredness -no energy - at onset
___b. Unusual bleeding or discharge
___c. A lump or thickening in the breast or elsewhere
___d. Change in bowel or bladder habits
___e. Pale dry -shallow skin tone and coloring - at onset
___f. Horseness or cough, persistent
___g. Change in wart or mole
___h. A sore that does not heal
___i. Indigestion or difficulty in swallowing
___j. Persistent pain-at the site-at the onset of symptoms

11. Quackery flourishes because:
(Mark an ___x___ in the true or false)

true___false___ a. People are fearful that cancer is incurable
true___false___ b. The fear of surgery or radiation
true___false___ c. The fear of expense
true___false___ d. The fear of social stigma
true___false___ e. The fear that the doctor has given up hope
true___false___ f. There are no effective methods of treatment

12. Prevention depends upon:
(Mark an ___x___ in the true or false)

true___false___ a. Cancer facts
true___false___ b. Annual check-up
true___false___ c. Pap test
true___false___ d. BSE (breast self-examination)
true___false___ e. Identifying health habits that predispose
true___false___ f. Breaking the smoking habit
true___false___ g. Waiting for a lump to get larger, so that it can be seen better
true___false___ h. Taking your best friends advice
APPENDIX B

POST QUESTIONNAIRE FOR CANCER KNOWLEDGE
Post Questionnaire for Cancer Knowledge

DO NOT SIGN YOUR NAME

You were asked to remember the grade number and your number to mark on the post questionnaire. Please mark in the same number.

Example: grade 9 number 8

grade ____ number ____ age ____

Were the posters that were on display and the pamphlets familiar? yes no (check one)

Did you take any of the pamphlets home? yes no (check one)

QUESTIIONNAIRE

1. Most of the types of cancer are curable in the early stages, before growth spreads to other parts of the body. true x false____

2. Cancer is disorderly, uncontrolled growth of cells. true x false____

3. "Quackery" means untested and unproven ways of treating cancer. true x false____

4. "Pap" Test is examination of cells that have been sloughed off or scraped off the cervix for diagnostic purposes. true x false____

5. Early detection, accurate diagnosis, and adequate treatment are essential to the control of cancer. true x false____

6. Cancer, in its early most curable stage, usually causes no symptoms. But cancer at this stage often can be detected by a physician. true ____ false____

7. Breast Self-Examination (BSE) should be done (before) (x after) or (during) the menstrual cycle. (check one)

8. High school students do not get cancer because cancer is a condition of the elderly. true ____ false x

9. There are 3 effective methods of treatment of cancer. (Mark an x in front of an effective method)
   x a. Surgery ______ d. Vitamins
   x b. Diet ______ e. Chemotherapy
   x c. Radiation ______ f. Self-medication

---
10. There are ___7___ Warning Signals for Cancer. (Mark an __x__ in front of a Warning Signal.)

___  a. Extreme tiredness - no energy - at onset
___  b. Unusual bleeding or discharge
___  c. A lump or thickening in the breast or elsewhere
___  d. Change in bowel or bladder habits
___  e. Pale-dry-shallow skin tone and coloring-at onset
___  f. Horseness or cough, persistant
___  g. Change in wart or mole
___  h. A sore that does not heal
___  i. Indigestion or difficulty in swallowing
___  j. Persistent pain-at the site- at the onset of symp-toms

11. Quackery flourishes because: (Mark an __x__ in the true or false)

true__x__false__ a. People are fearful that cancer is incur-able
true__x__false__ b. The fear of surgery or radiation
true__x__false__ c. The fear of expense
true__x__false__ d. The fear of social stigma
true__x__false__ e. The fear that the doctor has given up hope
true__x__false__ x  f. There are no effective methods of treat-ment

12. Prevention depends upon: (Mark an __x__ in the true or false)

true__x__false__ a. Cancer facts
true__x__false__ b. Annual check-up
true__x__false__ c. Pap test
true__x__false__ d. BSE (breast self-examination)
true__x__false__ e. Identifying health habits that predis-pose
true__x__false__ f. Breaking the smoking habit
true__false__ x  g. Waiting for a lump to get larger, so that it can be seen better
true__false__ x  h. Taking your best friends advice
APPENDIX C

INSTRUCTIONS TO THE HOMEROOM TEACHER

REGARDING ADMINISTRATION OF THE PRETEST,

PAMPHLET DISTRIBUTION, AND POSTTEST
Monday, March 27, 1972

To The Teacher

1. There are two envelopes for each classroom.
2. There is no time limit.

Tuesday, March 28, 1972

1. Use envelope marked pre questionnaire and pamphlets.
2. During homeroom the students will answer all questions on the questionnaire.
3. The pre questionnaire has been numbered for convenience number ______
4. Please ask the students to remember that number so they will be able to mark the post-questionnaire themselves.
5. There are three pamphlets— for each student—to keep.
6. Return questionnaire to envelope - and hold.

Wednesday, March 29, 1972

1. There will be a cancer education program— assembly for all students.
2. After the program— assembly, the student will return to the homeroom to take the post questionnaire.
3. Please ask the students to write in the same number that was on the pre questionnaire.
4. Return questionnaire to envelope - and return both envelopes to the office where they will be picked-up.

The pre and post questionnaire is our means of evaluating our program and subject material for a masters thesis in Community Health Education.

Thank you,
APPENDIX D

LETTER TO THE VICE-PRINCIPAL WITH
TENTATIVE FORMAT OF THE PRETEST,
PROGRAM, POSTTEST DEVELOPMENT OF
THE PROGRAM-ASSEMBLY
Tuesday, February 29, 1972

Dear (Vice-Principal),

The following is an outline of the program to be presented Thursday, March 30, 1972, following your approval.

Wednesday, March 29, 1972. Some cancer displays will be set-up after school hours: (1) posters and (2) pamphlets for students to take.

Thursday, March 30, 1972. The following is an outline for the one hour program-assembly, 12:55 P.M. to 1:55 P.M.

3 minutes. (1) Film, "Signals" will be shown. The movie will show the life-saving potential of cancer's seven warning signals.

5 minutes. (2) A presentation by a nurse on the Pap Test and BSE (breast self-examination).

10 minutes. (3) A presentation by an American Cancer Society health education volunteer leading into the problem of quackery.

30 minutes. (4) Film, "Journey into Darkness" will be shown. The film on quackery was developed for television and educational use. It points out the main characteristics of quacks, in comparison with doctors and the various means which quackery patients pick-up their information about quackery.

5 minutes. (5) Concluding remarks.

Permission is also being asked for a pre and post questionnaire to be filled out by students and possibly teachers. The pre questionnaire to be done before (morning, 10 minute homeroom period) the program-assembly and the post questionnaire immediately after the presentation. The questionnaires will be placed in the rooms Wednesday after the school session to be ready for Thursday. The questionnaire is being done: (1) to evaluate the presentation; (2) to satisfy requirements for a masters thesis in health education; and (3) to use the data to plan future programs.

Thank you,

Emily R. Grushesky
APPENDIX E

FORMULA USED FOR ANALYZING

TABLES 2, 3, 4, and 5
The formula used for analyzing the data collected for Tables 2, 3, 4, and 5 was outlined by Armitage (17) as:

\[
t = \frac{d}{\sqrt{pq\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}
\]

Calculation of the table included comparisons between all grade levels: ninth-tenth, ninth-eleventh, ninth-twelfth, tenth-eleventh, Tenth-twelfth, and eleventh-twelfth.

The acceptability of the hypothesis is evaluated in terms of the t-values observed. If the resultant t-values have a small probability, in the sense of being greater than a fixed value, say \( t_1 \), then the hypothesis is rejected. The probability \( p(t \geq t_1) \) is called a level of significance. The level of significance selected for this study is five percent and the corresponding value is 1.96. Simply stated, the t-value at a .05 level of significance is \( \geq 1.96 \).
APPENDIX F
FORMULA USED FOR ANALYZING TABLES 6, 7, 8, 9, 10
AND 11
The formula used for analyzing the data collected to evaluate the cancer education program-assembly, Tables 6, 7, 8, 9, 10 and 11 was outlined by Armitage (17) as:

\[
t = \frac{P_1 - P_2}{\sqrt{pq \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}
\]

Where:
- \(P_1\) = Proportion of event in population A
- \(P_2\) = Proportion of event in population B
- \(n_1\) = Total of population A
- \(n_2\) = Total of population B
- \(p\) = Pooled population proportion = \(\left( \frac{P_1 n_1 + P_2 n_2}{n_1 + n_2} \right)\)
- \(q\) = \((1 - p)\)

The reasons this technique was used rather than a statistic for paired comparisons is outlined as follows:

1. Due to the way the data was collected the pre and post questionnaires could not be paired.
2. The unpaired statistic overestimates the t-value and thus ensures that a significant result would be obtained if the paired comparison was made.
3. Only students who received the program were included in the posttest. It is assumed, therefore, that the pretest was an unbiased estimate of the pretest population's proportions.
4. The unit of analysis of the "class" and not the individual, therefore, pairing is not mandatory but would have been useful.