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SUMMARY

Problem

As part of the Department of the Navy's health promotion efforts, the Navy has developed six educational videotapes that focus on six primary areas: (a) smoking cessation and prevention, (b) physical fitness, (c) stress management, (d) drug and alcohol abuse prevention, (e) nutrition education and weight control, and (f) back injury prevention. The videotapes were developed by the Navy in 1988 and were widely distributed to all Navy commands by March 1989. However, no formal evaluation of the effectiveness of these videotapes, primarily in terms of knowledge acquisition and behavior change, has been conducted.

Objective

The objectives of this study were (a) to evaluate the Navy's six health promotion videotapes in terms of changes in knowledge, self-efficacy, behavioral intentions, and self-report of behavior, (b) to determine the effects of a pre- and postviewing discussion, and (c) to report subjective viewer ratings for each of the six videotapes. The purpose of this research was to determine if viewing a videotape could be an effective method to promote healthful knowledge and behaviors among Navy personnel.

Approach

A repeated-measures, split-plot factorial design was employed to evaluate the six videotapes. A pre- and posttest questionnaire was used to assess changes in knowledge, self-efficacy, behavioral intent, and self-report of behavior in 299 active duty, Navy personnel from four shore commands and three ships. In addition, a short survey was administered after the viewing of each videotape to obtain viewer ratings and comments.

Results

Analyses of the knowledge scores indicated no significant differences between groups (experimental, control) across time (pretest, posttest) for five of the six videotapes. The one videotape that produced significant knowledge effects was the back injury prevention videotape. Separate analyses of the self-efficacy measures,

behavioral intentions, self-report of behavior, and of the pre- and postviewing discussion did not reveal any significant results. Additional analyses on high-risk subgroups were also reported. Among the viewer ratings, the back injury prevention videotape was rated higher than all of the other videotapes on all seven of the rating items.

Conclusions

Overall, the videotapes had no significant effects on knowledge and behavior with the one exception of the back injury prevention videotape (knowledge effect only). However, the viewer ratings results suggested that videotape was a well-received medium by the Navy sample. These findings suggest that the videotapes were not an effective means of promoting healthful knowledge and behaviors among the sample of Navy personnel; however, when the videotapes are combined with other educational, behavioral, regulatory, and technological interventions, their overall effect on knowledge acquisition and behavior change should be assessed.

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There has been much emphasis on prevention, reducing risk factors, and the concept of personal responsibility in health care today. As a part of this movement to change unhealthy life styles, health promotion efforts have included a combination of approaches to enhance awareness, change behavior, and create environments that support healthy practices. One major component of any integrated health promotion effort is education. Recently, several investigators have noted a dramatic increase in public and professional demand for an innovative educational medium that reflects current technological progress (Cull, 1988; Broadhurst, 1988; Clarke, 1988). This demand has prompted the use of videotape as a rapidly growing medium in health education. The value of videotape in terms of promoting healthful knowledge and behaviors among a general population is the focus of this paper.

There are several reasons why the use of videotape in health education has increased in recent years. First, videotape is rapidly becoming a very familiar medium among the public because more and more people own video recorders. Consequently, videotape production is an expanding and profitable industry. From exercise videos to videos on parenting, videotape producers are selling their products to a wide variety of markets. Another reason is that the process of acquiring information has become increasingly more oriented toward viewing rather than reading (Gagliano, 1988).

In a recent review, Gagliano (1988) identified several potential advantages that videotape offers in health education. First, the use of videotape ensures that the information presented is consistent and unalterable, as is possible with individual instructors (Gagliano, 1988; Biglan, 1988). Second, videotape is a practical method of education, one that incurs low costs beyond an initial investment for equipment and production (Holm, 1983; Gagliano, 1988). Other researchers suggest that videotape saves time and work for health professionals (Rowley, Fisher, & Lipkin, 1979; Fisher, Rowley, & Lipkin, 1981). Cull (1988) explains that a videotape can replace the time it takes for a health professional to explain a disease and its management to a patient while the health professional can still meet individual patient needs by answering

questions after the videotape. Other advantages of videotape include an uncomplicated operation and a sense of immediacy in that videotapes can be instantly replayed for further clarification (Holm, 1983). Videotaped materials also make it possible to depict models that can demonstrate behaviors more effectively than if they were described in written or verbal form (Biglan, 1988). These potential advantages: constancy, practicality, time-saving ability, immediacy, and ability to depict models, with the ability to communicate information, have been investigated by researchers in the health education field.

The Use of Videotape in Health Education

Studies Documenting Knowledge Gain

Most of the research in health education videotapes has been conducted with patient populations, the majority of which have successfully increased their knowledge. Significant increases in knowledge in depression and cancer were reported, respectively, by Cohen (1983) in a sample of volunteers in a general medical waiting room and by Cassileth and associates (1982) with cancer patients and their families. In a study conducted at a sexually transmitted disease clinic, Solomon and Dejong (1988) found that male patients who viewed a videotape on gonorrhea scored significantly higher on an oral knowledge test than those who did not. Similar studies using educational videotapes have increased knowledge among specific patient populations in such areas as chronic obstructive pulmonary disease (Black & Mitchell, 1977), insulin therapy (Ward, Garlant, Paterson, Bone, & Hicks, 1984), and proper diet for renal patients (Lawson, Traylor, & Gram, 1976).

Comparative Studies

In several studies, the use of videotape has been compared with other educational modalities. In a study that compared prolonged individual counseling to a videotape followed by brief individual counseling, the two groups had an equivalent increase in knowledge (Fisher et al., 1981). Results of a study conducted by Moldofsky and colleagues (1979) showed that patients who viewed a videotape on asthma had a higher knowledge gain than those who received the usual outpatient instruction. In a study designed to teach psychiatric patients about taking their medications, Osguthorpe and colleagues (1983) reported no differences in knowledge gain among four educational

methods: a videotape, videotape plus written materials, written materials alone, and the usual inpatient instruction. Thus, such results suggest that videotape can be just as effective as more traditional, and often more costly, methods of education.

The Use of Modeling in Videotape and Studies Documenting Behavior Change

In addition to increasing knowledge, an educational program should ultimately affect behavior. A strong force in behavioral techniques is the concept of modeling, particularly symbolic modeling in which an individual learns behavior patterns by observing another person. According to Social Learning Theory, modeling is an important feature that can raise a person's concept of self-efficacy or one's degree of certainty about performing a specific behavior (Bandura, 1977). As outlined by Hargie and Morrow (1986), critical features of effective modeling are: (a) similarity of the model to the targeted population in terms of age, sex, culture, class, and experience; (b) realistic mastery of the behavior by the model, rather than being perfect from the beginning; and (c) the model receiving a reward for successfully performing the behavior. The presence of these features is more likely to influence a person's self-efficacy, and potentially their behavior, than if they were absent or ambiguous.

Through the use of videotape modeling, several studies have demonstrated behavioral change in adults. Gatchel (1986) studied the impact of a videotaped dental fear-reduction program on moderately and highly fearful people who avoided dental treatment. All subjects who viewed the modeling videotape decreased their anxiety, and moderately fearful patients also changed their behavior by increasing their dental visitation and appointment-making behaviors. Nay (1975) used a modeling videotape to teach parenting skills and compared this to written materials and a lecture-style videotape. Both video groups did significantly better than the written materials group in implementing the parenting skills in a laboratory simulation. Under the same topic, O'Dell and colleagues (1979) found that subjects who saw a modeling videotape learned more parenting skills than a group that received one-on-one training. In a study on educating men with gonorrhea, Solomon and Dejong (1988) reported that a significantly higher percentage of subjects who viewed the modeling videotape returned for their test-of-cure examination (an essential part of the treatment) than those who did not see the videotape. These studies with videotape modeling have been successful in influencing specific behaviors in limited situations.

Factors That May Enhance the Effectiveness of Videotape

While most of the research has shown that videotapes can increase knowledge, and a few studies have shown behavioral change, several investigators have asked what additional factors may further enhance the effectiveness of videotapes. Activities and reinforcers given before and after viewing, such as discussion groups, interviews, testing, and repeated viewings, have all been posed as methods for enhancing the effectiveness of videotapes.

Theoretical Basis for Pre- and Postviewing Activities

Salomon (1979) has described a complex theory of the interaction among media, cognition, and learning. Within this theory, Salomon proposes how various presentations of media are related to different internal representations, and how this relates to the acquisition of knowledge. With regard to the significance of previewing activities, Salomon explains that one's anticipatory scheme, or one's past experiences and knowledge, will determine how a presentation is to be perceived. If a learner can anticipate information that he will be receiving, the meanings of those messages will be more easily extracted. Regarding postviewing activities, termed postrecoding elaboration, Salomon states that the amount of elaboration is positively related to learning. He explains that the more one elaborates on already learned, or recoded, material, the more contact this material will make with other mental schemata, thereby leaving more memory traces as well as enriching the meanings accrued.

In more practical terms of what types of activities might serve to carry out these effects, Motta (1988) suggested that pre- and postviewing activities should include questions requiring an immediate response, decisions requiring selection or judgment, and written activity or skill performance if possible. These types of pre- and postviewing activities can facilitate learning by stimulating active participation, according to Motta.

Studies with Pre- and Postviewing Discussions

The addition of a pre- and postviewing discussion period has been suggested by a few authors, and the discussions have been included in a few videotape studies. In a study on depression education, viewing the videotape resulted in an increase in knowledge, but did not influence attitudes toward depression. The author suggested

that a discussion after the videotape may have been a useful tool to affect attitudes because the videotape was strictly informational, and it was not specifically designed to influence attitudes (Cohen, 1983). Hence, a discussion may serve to address attitudes as well as enhance learning. In a study designed to teach bladder management to patients with spinal cord injuries, two videotapes were shown, each followed by a discussion period. The discussions were included mainly to answer questions; however, the effectiveness of these discussions was not measured (Minton, 1983). Rhodes and Wolitski (1989) included an unstructured question and answer discussion period after the subjects had viewed one of four videotapes on AIDS education. It was found that the postviewing discussion did not result in greater knowledge gain. However, the authors noted that if the discussion had been explicitly structured to reinforce, elaborate upon, and increase the personal relevance of the material, it might have demonstrated measurable benefits (Rhodes & Wolitski, 1989).

In summary, although pre- and postviewing activities should theoretically enhance the educational effects of a videotape, this has yet to be demonstrated clearly in the literature. Some researchers have suggested and/or included pre- and postviewing activities in their studies, but the activities were not specifically designed to enhance the learning effects, or their effectiveness was not adequately measured.

The Use of Videotaped Health Promotion Materials with Lay Populations

Currently, the use of videotape in health education has mainly occurred in hospitals, clinics, and patient education centers. However, as noted by Holm (1983), the broader intent of the patient education movement is to make health information as available as possible to the general public. This expansion of the use of videotape health interventions with the general public and lay populations is evident in only a few studies. Schluger and colleagues (1987) showed a videotape designed to teach cardiopulmonary resuscitation skills to previously untrained volunteer members of the lay public. Forty-three percent of the sample could perform CPR adequately enough to save a life, which suggested to the authors that their videotape may be a valuable, inexpensive vehicle for teaching large numbers of the lay public. In a repeated-measures design, college students significantly increased their knowledge on AIDS information after they viewed one of four videotapes. It was concluded that the videotapes could be useful tools in providing AIDS information to college

students, a nonpatient population (Rhodes & Wolitski, 1989). Greenberg and colleagues developed a stress management program for college students which used two educational videotapes (Greenberg, Ramsey, & Hale, 1987). Though the program was field tested, actual program effectiveness results were not reported. However, this research and the previous studies reflect the expansion of the use of videotaped health education materials with the general population.

The Navy's Health Promotion Videotapes

A major example of the use of videotaped health education materials with a nonpatient population is a subprogram of the Navy's Health and Physical Readiness Program (HAPR). The Department of Defense (DOD) has identified health promotion efforts as a method of enhancing military readiness and the quality of life of DOD personnel (Department of Defense, 1986). A major component of the HAPR Program is education. As part of this educational effort, the Navy has developed six health promotion videotapes that focus on six primary areas: (a) smoking cessation and prevention, (b) physical fitness, (c) stress management, (d) drug and alcohol abuse prevention, (e) nutrition education and weight control, and (f) back injury prevention. These six health concerns have been set as top priorities for the Navy's health promotion efforts (Secretary of the Navy, 1986) because they are life-style behaviors that can affect the military readiness and health of the force.

The Present Study and Objectives

The present study differed from most of the previous research with videotaped health education materials in three ways: (a) the population studied was a general, nonpatient population; (b) the contents of the videotape interventions were broad, life style, health promotion topics, not specific clinical topics; and (c) the environment in which the videotapes were shown was a realistic, field setting in which the Navy population works, not an artificial classroom or clinical setting.

The objectives of this study were (a) to evaluate the Navy's six health promotion videotapes in terms of changes in knowledge, self-efficacy, behavioral intentions, and self-report of behavior; (b) to determine the effects of a pre- and postviewing discussion; and (c) to report subjective viewer ratings for each of the six videotapes. The purpose of this research was to determine if viewing a videotape could be an

effective method in promoting healthful knowledge and behaviors among Navy personnel.

METHOD

Sample Selection and Participants

Approximately 60 participants were recruited from each of four shore commands (2 air stations, 1 naval station, and 1 submarine base) and from three ships (a guided missile destroyer, guided missile cruiser, and an amphibious transport dock) in the San Diego area. Selection of these commands was based primarily on their representation of the different types of Navy commands and their availability to participate in the study.

Two hundred and ninety-nine active duty, enlisted Navy personnel participated in the full evaluation. Participants who had reported viewing any one of the videotapes prior to this study were excluded from the analyses (n=63). Table 1 presents a demographic summary of the study sample. Eighty-eight percent of the sample was male, and the mean age of the sample was 26 years. Almost all of the participants (93%) were high school graduates.

Design

A 3 x 2 (group by time) repeated-measures, split-plot factorial design was employed to evaluate the six videotapes. There were three levels of group (video plus pre- and postviewing discussion, video-alone, control group) and two levels of time (pretest, posttest). At each study site, two groups of approximately 30 subjects each were identified. Video group (A and B), along with the pre- and postviewing discussion, was randomly assigned to the two groups. Video group A viewed the tobacco use education, health and physical readiness, and stress management videotapes while video group B viewed the drug and alcohol abuse prevention, nutrition education, and back injury prevention videotapes. The six videotapes were evaluated simultaneously using each subject as both an experimental and a control subject. Each subject was an experimental subject for the videotapes that he or she viewed and a control subject for the videotapes that were not viewed. One advantage of conducting the study this way was that it reduced the number of videotapes that each participant was required

Table 1

Percentage Distribution of Demographic Variables in a Navy Sample

	%
Command Location	
Shore	59.2
Ship	40.8
Sex	
Male	87.9
Female	12.1
Age (mean = 26.4, range: 18-46)	
< 20 years	8.8
20-24	40.2
25-29	22.3
30-34	16.3
35-39	6.8
40-44	4.3
≥45	1.3
Race	
Caucasian	64.9
African-American	15.6
Filipino	10.2
Hispanic	6.9
Other	2.4
Pay Grade	
E1-E3	30.4
E4-E6	64.8
E7-E9	4.8
Education Level	
Less than 12 years	6.8
High school graduate	52.6
Some college	36.5
College degree or higher	4.1

n = 299

to view by half, thus reducing the number of man-hours taken away from other Navy priorities at the study sites.

Intervention

The intervention included six health promotion videotapes developed by the Naval Military Personnel Command in 1988. These videotapes, all part of the "Quality of Life" series, were: (1) Tobacco Use Education and Prevention; "Clearing the Air," 19 minutes; (2) Health and Physical Readiness, 18 minutes; (3) Stress Management/High Blood Pressure, 24 minutes; (4) Drug and Alcohol Abuse Prevention and Control, 33 minutes; (5) Weight and Fat Control/Nutrition Education, 24 minutes; and (6) Back Injury Prevention, 24 minutes. These videotapes were widely distributed to all Navy commands by March 1989.

These educational videotapes employed both a narrative-style format with a presenter explaining facts, policies, and helpful suggestions as well as a story-line format including one or two main characters. These characters were models in the Navy setting, mainly young men, who were followed throughout the tape as they progressed in the particular subject of that videotape. The back injury prevention and exercise videotapes also included instructional information for performing certain exercises. All six videotapes were of professional technical quality.

Procedures

At each of the seven study sites, there was one point of contact who conducted the study sessions for the five weeks. A standardized list of procedures for administering questionnaires and showing the videotapes was given to each point of contact.

All participants completed a pretest questionnaire to assess baseline levels of knowledge on all six videotapes, self-efficacy, behavioral intentions, and self-report of behavior. Beginning one week after the pretest, the participants viewed one videotape each week under normal General Military Training conditions for three weeks. The order of presentation of the videotapes was systematically varied across the study sites to balance possible primacy and recency effects on the posttest assessment.

Immediately after viewing each videotape, the participants completed a subjective viewer ratings survey for that videotape. Half of the participants received a pre- and postviewing discussion before and after viewing each videotape. Immediately prior to viewing the videotape, a standardized brief introduction to the topic, including the

educational objectives for that videotape, was read to the participants. Immediately after the videotape was shown, a standardized brief (generally three to five minutes) discussion script was read to the participants. The discussion script for each videotape included questions that prompted immediate verbal responses from the participants, some written responses, a summary of the general points of the videotape, and an opportunity for comments. These components have been suggested in the literature as a method of enhancing the effectiveness of the use of videotape (Motta, 1988).

One week after the last videotape was shown, all participants completed a posttest questionnaire to assess the changes in knowledge on all six videotapes, self-efficacy, behavioral intentions, and self-report of behavior. Throughout the study, weekly phone calls to the session facilitators and periodic visits to the study sites were made by the researchers to get feedback and collect data.

Measures

Knowledge level, self-efficacy, behavioral intentions, and self-report of behavior were assessed with a pre- and an identical posttest questionnaire. Subjective viewer ratings for each videotape were assessed using a separate questionnaire. Both of these questionnaires were developed by the authors at the Naval Health Research Center. These measures are described below.

Knowledge measure. This section of the questionnaire was composed of 23 objective test questions which included 18 multiple-choice items, 2 true or false items, and 3 fill-in items. The content of the knowledge items was based on the learning objectives set forth by the videotape producers. The questionnaire did not comprehensively cover all of the information provided in the videotapes but addressed three to four of the main objectives from each videotape. Each participant had a pre- and posttest score for each videotape which was computed by dividing the number of correct knowledge items by the total number of knowledge items for each videotape.

Self-efficacy measure. This section of the questionnaire was composed of 11 items that asked how certain the participant was of his or her ability to perform the relevant behaviors targeted in the videotapes. The participants answered on a 5-point scale with the value of 1 = I am certain I cannot, 3 = Maybe I can, and 5 = I am certain I can.

Behavioral intent measure. Behavioral intentions in the six areas were measured by a 7-item section of the questionnaire which read, "Over the next month ... I plan to

... " followed by the targeted behavior. Participants answered on a 7-point scale with the value of 1 = disagree strongly, 4 = neither agree nor disagree, and 7 = strongly agree.

Self-report of behavior measure. Self-report of behavior was assessed and administered as a separate questionnaire, but it was included as part of the pretest and posttest assessment. It was necessary to administer it separately after the knowledge questionnaire because the phrasing of the questions could have influenced responses to the knowledge section items. This measure was composed of 17 items designed to assess the level at which the target behaviors were being performed. This questionnaire covered tobacco use, back injuries or back pain, tolerance level of other's drug or alcohol abuse, stress level, degree to which relaxation techniques were used, exercise level, and several nutrition items.

Viewer ratings measure. After each viewing, the participants were asked to rate each video on a 1-page, 8-item questionnaire. This questionnaire measured ratings of the video's content, visual display, overall rating, usefulness of information, the viewer's similarity to the main character(s), reality of the presented situations, the importance of the topic to the viewer, and viewer comments.

Analyses

The analyses were designed to assess the effect of each health promotion videotape on selected outcome measures. In order to examine the effect of the videotape presentations on each outcome measure, a repeated-measures analysis of variance was used to assess the interaction between group (video plus pre- and postviewing discussion, video-alone, and control) and time (pretest and posttest). Given the relatively large number of tests involved, the alpha level of significance was set at .01. Before conducting these analyses, however, a series of t tests was performed to assess any potential differences between the experimental and control groups on age, sex, pay grade, and level of education. These analyses yielded no significant differences between the groups.

RESULTS

Knowledge

The results of the analyses of the knowledge scores on each of the six videotapes revealed a significant group-by-time interaction effect for the back injury prevention videotape [$F(2,293)=7.40$, $p < .01$]. As shown in Figure 1, this result indicated that the knowledge scores for the groups that viewed the videotape improved significantly more than the scores for the control group. The experimental condition with the pre- and postviewing discussion, however, was no more effective than the video-alone condition. A summary of the pre- and posttest percent correct knowledge scores for the experimental and control groups on each videotape is presented in Table 2. The video plus the pre- and postviewing discussion group significantly increased its percent of correct knowledge scores from 61% to 75%. The video-alone group increased its scores from 55% to 72%. And, the scores for the control group increased slightly from 62% to 64%.

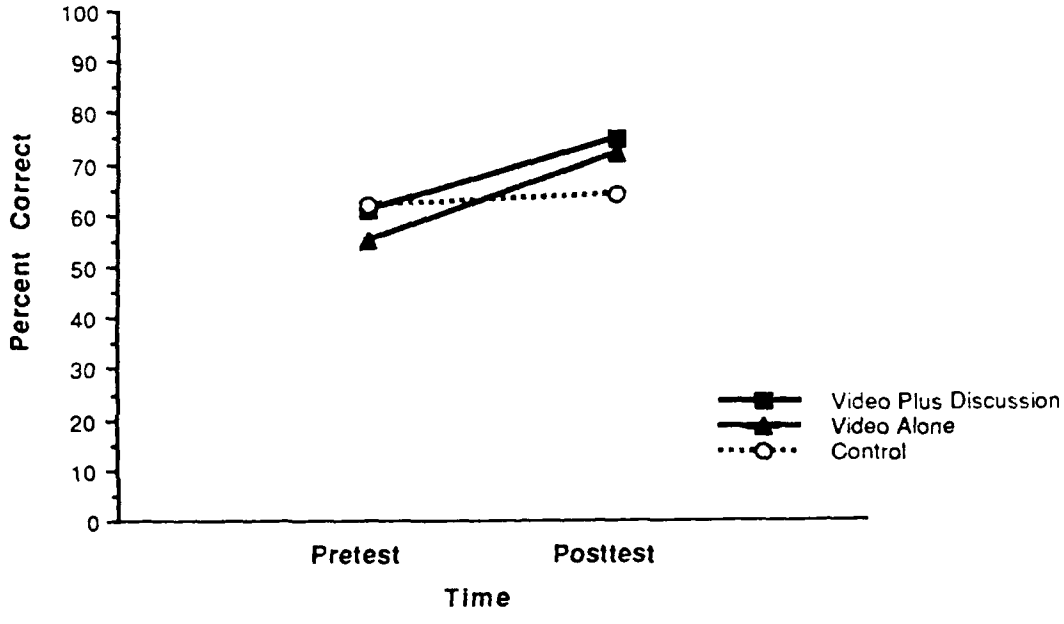

Figure 1. Percent of Correct Knowledge Responses for the Back Injury Prevention Videotape

Using the same analysis procedures as above, the nutrition education, health and physical readiness, and drug and alcohol abuse prevention videotapes produced small

Table 2

Percentage Distribution of Correct Knowledge Scores for Experimental and Control Groups by Videotape and Time

Videotape	n	Percent Correct on Knowledge Items: Pretest	Posttest	Change
Back Injury Prevention				
Video with Discussion	76	60.8	74.7	+13.8*
Video Alone	63	55.1	71.9	+16.7*
Control Group	160	61.9	63.8	+2.8
Drug and Alcohol Abuse Prevention				
Video with Discussion	76	63.2	70.7	+7.6
Video Alone	63	60.6	63.7	+1.2
Control Group	160	65.4	67.3	+1.7
Nutrition Education				
Video with Discussion	76	69.3	75.9	+6.6
Video Alone	63	76.1	74.5	+.5
Control Group	160	75.7	74.9	-1.2
Health and Physical Readiness				
Video with Discussion	73	26.4	30.3	+5.5
Video Alone	87	28.3	31.8	+3.4
Control Group	139	25.4	23.5	-1.7
Smoking Cessation				
Video with Discussion	73	54.9	57.7	+1.6
Video Alone	87	60.1	66.8	+6.9
Control Group	139	55.8	61.8	+6.3
Stress Management				
Video with Discussion	73	76.5	76.1	-1.0
Video Alone	87	80.1	83.9	+3.7
Control Group	139	77.7	82.3	+4.1

* Significantly different from the control group as assessed by a repeated measures ANOVA, $p < .01$.

changes in knowledge scores in the predicted direction in the experimental groups; however, these differences were not statistically significant ($p > .01$). Analyses of the smoking cessation and the stress management videotapes revealed no discernible trends in knowledge scores between groups. The analysis-of-variance summary tables for each videotape are presented in Appendix A. Although there was a significant main effect of time on both the smoking cessation and drug and alcohol abuse prevention videotapes, the lack of a group-by-time interaction suggested the presence of a practice effect. The general improvement in the knowledge scores on these videotapes is consistent with the finding that test performance, even in the absence of any intervention, usually improves from 3-5% between an initial and a follow-up test *(Campbell & Stanley, 1963).*

Self-Efficacy, Behavioral Intentions, and Self-Report of Behavior

Each self-report of behavior, self-efficacy, and behavioral intention item was analyzed using a group- (experimental, control) by-time ANOVA. There were no significant interaction effects found for any of the six videotapes ($p > .01$). The pre- and posttest means for the experimental and control groups for the self-efficacy, behavioral intentions, and self-report of behavior items are presented in Appendix B.

"High-Risk" Group Analysis

Because of the limited findings of the previous analyses, an additional hypothesis was tested. In the present study, internal learning incentives may have been present in individuals engaging in certain behaviors (e.g., smoking, poor eating) or at risk for certain conditions (e.g., previous back injury, stress), and specific videotapes may, therefore, have been more salient for those individuals. Any overall effects within these higher risk subgroups, however, could have been masked as they were embedded in the overall analysis strategy. In order to address this hypothesis, a 2-way group- (experimental, control) by-time ANOVA was recomputed on each of the six videotapes for knowledge, self-efficacy, and behavioral intentions, using only participants in the experimental and control groups who were engaging in the specified behavior prior to viewing the videotape. "High-risk" participants were selected based on their pretest self-report of behavior responses. This analysis yielded no significant group-by-time interaction effects for knowledge scores, self-efficacy, or behavioral intentions for any of the six videotapes ($p > .01$).

Viewer Ratings

Table 3 presents a summary of the viewer ratings for each videotape. The back injury prevention videotape was rated higher than all other videotapes on all seven of the rating items. However, all of the videotapes were generally rated between the "good" and "very good" categories. The item that had the lowest ratings was how similar the participants felt that they were to the main character(s). For all of the videotapes, except the back injury prevention videotape, the participants rated themselves between the "not at all similar" and the "somewhat similar" categories. For the back injury prevention videotape, the participants rated themselves slightly higher than the "somewhat similar" category. When all seven of the rating items were totaled for each videotape, the videotapes ranked in the following order from highest to lowest: back injury prevention, nutrition education and weight control, stress management, health and physical readiness, drug and alcohol abuse prevention, and smoking cessation.

Viewer Comments

Appendix C presents a summary of the narrative viewer comments that were obtained from the viewer ratings questionnaire for each videotape. Overall, there were 391 individual comments that directly pertained to the six videotapes: 242 were positive and 149 were negative. Across all six videotapes, the most common positive comments were nonspecific favorable comments and that the videotape was informative and useful. The most common negative comments were that the videotape was unrealistic and that it should have covered additional information.

Table 3

Mean Viewer Ratings for Each Videotape

Item	Back (n = 131)	Nutrition (n = 132)	Stress (n = 150)	Exercise (n = 151)	Drugs/ Alcohol (n = 133)	Smoking (n = 147)
How would you rate the information in the videotape?[a]	3.76	3.58	3.57	3.41	3.53	3.57
How would you rate the visual display of the videotape?[a]	3.57	3.47	3.37	3.18	3.42	3.16
Overall, how would you rate the videotape?[a]	3.64	3.47	3.48	3.26	3.41	3.46
Did you learn new information from the videotape that you can use to improve your own health?[b]	3.67	3.52	3.39	3.19	3.02	3.02
To what degree did you feel that the main character(s) in the videotape were similar to you?[c]	3.07	2.74	2.29	2.50	2.30	2.09
Do you feel that the scenes portrayed in the videotape represented real situations?[d]	3.92	3.45	3.37	3.22	3.32	3.44
How important to you personally is the topic of today's videotape?[e]	3.60	3.42	3.41	3.56	3.24	3.06
Total	25.23	23.65	22.88	22.32	22.24	21.80

[a] Scale: 1 = poor, 3 = good, 5 = excellent.

[b] Scale: 1 = not useful, 3 = somewhat useful, 5 = very useful.

[c] Scale: 1 = not at all similar, 3 = somewhat similar, 5 = very similar.

[d] Scale: 1 = not very real, 3 = somewhat real, 5 = very real.

[e] Scale: 1 = not at all important, 3 = moderately important, 5 = extremely important.

DISCUSSION

The main findings of this study indicated that the back injury prevention videotape effectively increased knowledge in a sample of Navy personnel. However, the other five health promotion videotapes did not produce significant increases in health knowledge. All of the videotapes generally had no effect on self-efficacy, behavioral intentions, or self-reports of behavior. In addition, the pre- and postviewing discussions did not significantly enhance the effectiveness of the videotapes.

One explanation for the effectiveness of the back injury prevention videotape is related to the videotape's characteristics. Most of the videotapes consisted of general health promotion messages, such as the importance of eating a variety of foods, maintaining a moderate weight, and exercising at least three times per week. The back injury prevention videotape, on the other hand, was more focused and appeared to contain more behavior-specific modeling than the other videotapes. In addition, the risk of back injury may represent a genuine concern among Navy personnel who frequently engage in physical labor, and, therefore, this videotape may have commanded more attention than other areas of health risk which are often routinely regarded as the "menaces of daily life" (Feinstein, 1988).

With regard to the nonsignificant results obtained for the other five videotapes, one factor to consider is the characteristics of the sample. Although there is substantial evidence that videotapes are an effective means through which to increase health knowledge (Cohen, 1983; Cassileth et al., 1982; Solomon & Dejong, 1988; Black & Mitchell, 1977; Ward et al., 1984; Lawson et al., 1976), most of these studies were conducted in clinical populations. For example, some of the previous studies demonstrating knowledge increase were among cancer, sexually transmitted disease clinic, renal dialysis, diabetic, and asthmatic patients. Certain viewer characteristics, such as motivation to learn, may have been present in these populations and not present in our nonpatient sample of Navy personnel.

It was expected that the inclusion of a pre- and postviewing discussion would facilitate knowledge acquisition; but, the data did not reveal significant benefits. It may be that the discussions did not include enough participant activities to increase the significance of the material. If the discussions had included more written activity and skills performance (e.g., relaxation techniques, proper bending, food selection,

etc.) as suggested by Motta (1988), they may have stimulated more mental elaboration, and, thus, they may have demonstrated significant benefits.

On the basis of viewer ratings and comments, videotape appeared to be a medium that was well-received by the Navy sample. The viewers rated all six of the videotapes above "good" for the information, visual display, and for an overall rating for each videotape. These findings corresponded with the literature in that videotape, as an educational medium, has been well-accepted by several different populations (Rhodes & Wolitski, 1989; Cohen, 1983).

When interpreting these results, it is important to consider some limitations present in the experimental conditions and in the survey instruments. Because the study was conducted at seven different sites, each with a different session facilitator, there was a lack of control over the delivery of the intervention. The facilitators may have had a relatively low level of enthusiasm or less than highly effective communication skills. Although standardized procedures and weekly visits to the study sites were made to attempt to ensure that the session facilitators were adhering to the procedures, individual characteristics of the facilitators could have suppressed the learning effects in some way. Another consideration was the number of survey items for each videotape. Ideally, it would have been better to include more items for all four of the dependent measures. However, the length of the survey was an important consideration, and the items that were included were designed to assess only the main objectives for each videotape.

The significant increase in back injury prevention knowledge is an important finding because knowledge gain can allow an individual to a) make informed choices regarding health-related behaviors, b) more effectively utilize preventive health services, and c) become more receptive to other health interventions (Engleman & Forbes, 1986). Hence, knowledge gain appears to be an important goal for a health education program. Yet, the ultimate goal of a health education program is to induce or enable changes in behavior which would ultimately lower morbidity and mortality risks.

In considering the goals of any health promotion intervention, including videotapes, it is important to take into account the complexity of human needs, values, and behaviors. Humans, for example, have always lived with risks and do not necessarily equate risk with personal danger. Given the benefits that people perceive in behavior that also brings risks, we should not assume that the average person will

necessarily view information on risks as a stimulus to change his or her behavior, particularly as broader social forces continue to encourage health risk behaviors (McDowell, 1988). This may be particularly true in a predominantly young, military population in which risk and danger are acknowledged components of the profession, and bravery in the face of personal risk is a valued attribute.

It is now well-accepted in health education that no single intervention strategy is capable of producing long-term changes in important behaviors (Green, 1978). In many instances, for example, the promotion of health is more likely to be successful through technological (e.g., scientific innovation, ergonomic design) or regulatory (e.g., policy change) means than through educational interventions to encourage behavior change (Mechanic, 1985). Therefore, the integration of regulatory and technological interventions with comprehensive health education and health promotion programs oriented toward restructuring the underlying social and cultural context appears the most viable approach to meaningful behavior change.

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Appendix A

Analysis-of-Variance Summary Tables on Knowledge Scores for Each Videotape

Back Injury Prevention Videotape

Source	SS	df	MS	F
Between Subjects				
Group	2516.77	2	1258.39	1.34
Within Cells	274484.55	293	736.81	
Within Subjects				
Time	13768.91	1	13768.91	33.03*
Group X Time	6166.72	2	3083.36	7.40*
Time X Subjects Within Groups	122146.67	293	416.88	

* $p < .01$

Drug and Alcohol Abuse Prevention Videotape

Source	SS	df	MS	F
Between Subjects				
Group	1726.91	2	863.45	1.38
Within Cells	182988.86	293	624.54	
Within Subjects				
Time	2041.37	1	2041.37	7.32*
Group X Time	834.66	2	417.33	1.50
Time X Subjects Within Groups	81695.57	293	278.82	

* $p < .01$

Nutrition Education Videotape

Source	SS	df	MS	F
Between Subjects				
Group	824.46	2	412.23	.50
Within Cells	240253.62	293	819.98	
Within Subjects				
Time	233.12	1	233.12	.72
Group X Time	1594.28	2	797.14	2.47
Time X Subjects Within Groups	94562.21	293	322.74	

Health and Physical Readiness Videotape

Source	SS	df	MS	F
Between Subjects				
Group	3537.57	2	1768.79	1.86
Within Cells	278136.34	293	949.27	
Within Subjects				
Time	432.09	1	432.09	.99
Group X Time	1079.26	2	539.63	1.24
Time X Subjects Within Groups	127581.85	293	135.43	

Smoking Cessation Videotape

Source	SS	df	MS	F
Between Subjects				
Group	4084.08	2	2042.04	2.65
Within Cells	225613.87	293	770.01	
Within Subjects				
Time	3446.10	1	3446.10	12.04*
Group X Time	328.98	2	164.49	.57
Time X Subjects Within Groups	83877.49	293	286.27	

* $p < .01$

Stress Management Videotape

Source	SS	df	MS	F
Between Subjects				
Group	2399.22	2	1199.61	2.03
Within Cells	172866.06	293	589.99	
Within Subjects				
Time	888.78	1	888.78	2.29
Group X Time	541.17	2	270.59	.70
Time X Subjects Within Groups	113592.34	293	387.69	

Appendix B

Self-efficacy, Behavioral Intentions, and Self-report of Behavior Scores by Group and Time

Item	Control				Experimental			
	n	Pretest	Posttest	Change	n	Pretest	Posttest	Change
Self-efficacy								
How certain are you that you can: (1 = I'm certain I cannot, 3 = Maybe I can, 5 = I'm certain I can)								
choose healthy food items, if they were available in the general mess?	155	4.25	4.27	+.02	135	4.07	4.04	-.03
reach and/or maintain a desirable weight?	156	4.12	4.06	-.06	134	4.07	4.03	-.04
properly lift objects without injuring your back?	155	4.21	4.26	+.05	135	4.07	4.13	+.06
routinely perform the proper strengthening and stretching exercises to avoid a back injury?	154	4.03	3.99	-.04	135	3.86	3.96	+.10
cope with stress in a postive way?	131	3.61	3.72	+.11	155	3.81	3.93	+.12
avoid abusing alcohol?	156	4.47	4.46	-.01	135	4.41	4.22	-.19
avoid abusing drugs?	156	4.80	4.74	-.06	131	4.69	4.57	-.12
exercise regularly even in the absence of a gym or health club?	134	3.58	3.60	+.02	155	3.90	3.79	-.11
(if you are a nonsmoker) remain a nonsmoker?	68	4.75	4.89	+.14	75	4.96	4.79	-.17
(if you smoke cigarettes) set a date to quit and prepare yourself to quit smoking?	42	2.69	2.95	+.26	47	3.11	3.25	+.14
(if you smoke cigarettes) quit smoking?	43	3.07	3.02	-.05	46	3.15	3.15	+.00
Behavioral Intentions								
I plan to: (1 = disagree strongly, 4 = neither agree nor disagree, 7 = strongly agree)								
improve my eating habits	155	5.13	5.35	+.22	134	4.73	4.92	+.19
use the proper techniques for lifting	156	6.12	6.09	-.03	133	5.78	5.76	-.02
use relaxation techniques to better cope with stress	134	5.35	5.25	-.10	156	5.63	5.64	+.01
participate in discouraging others from abusing drugs and alcohol	153	5.83	5.85	+.02	131	5.62	5 66	-.04
do aerobic exercise three or more times per week	131	4.36	4.45	+.09	153	4.73	4.97	+.24
do exercises that will improve my muscular strength and flexibility	131	5.36	5.13	-.23	152	5.72	5.53	-.19
(if you smoke cigarettes) quit smoking, or reduce the number of cigarettes I currently smoke	46	4.39	4.30	-.09	49	4.59	4.57	-.02

Item	Control				Experimental			
	n	Pretest	Posttest	Change	n	Pretest	Posttest	Change
Self-report of Behavior								
Do you consider yourself a ... (1 = nonsmoker, 2 = smoker)	139	1.37	1.36	-.01	155	1.33	1.33	+.00
During the past month, how many cigarettes did you usually smoke on a typical day when you smoked cigarettes? (2 = fewer than 1 cigarette a day, 3 = 1-10, 4 = 11-20, 5 = 21-30, 6 = 31-40, 7 = 41-55, 8 = 56 or more)	55	4.49	4.00	-.49	55	4.09	3.67	-.42
To what degree have you experienced back injuries or back pain over the past month? (1 = no pain or injuries, 3 = moderate pain or injuries, 5 = extreme pain or injuries)	157	1.80	1.81	+.01	139	1.86	1.84	-.02
How tolerant are you of others drug or alcohol abuse? (1 = absolutely no tolerance, 3 = somewhat tolerant, 5 = very tolerant)	156	2.25	2.33	+.08	139	2.07	2.23	+.16
To what degree have you experienced stress, or felt under pressure, over the past week? (1 = no stress, 3 = moderate stress, 5 = extreme stress)	138	2.96	2.77	-.19	158	3.19	2.90	-.29
To what degree have you used relaxation techniques to cope with stress over the past month? (e.g., exercise, deep breathing,...) (1 = don't use them at all, 3 = use them sometimes, 5 = use them frequently)	139	2.63	2.47	-.16	158	2.73	2.69	-.04
How often per week do you typically do aerobic exercise? (0 = never, 1 = 1-2 times per week, 2 = 3-4 times per week, 3 = 5-6 times per week, 4 = 7 or more times per week)	136	1.02	1.17	+.15	157	1.11	1.10	-.01
How often per week do you typically do muscle strengthening exercises? (0 = never, 1 = 1-2 times per week, 2 = 3-4 times per week, 3 = 5-6 times per week, 4 = 7 or more times per week)	138	1.07	1.25	+.18	156	1.24	1.33	+.09
How often per week do you typically do flexibility exercises? (0 = never, 1 = 1-2 times per week, 2 = 3-4 times per week, 3 = 5-6 times per week, 4 = 7 or more times per week)	139	1.19	1.29	+.10	155	1.27	1.33	+.06
During the past week, how often did you...? (0 = never, 1 = 1-2 times per week, 2 = 3-4 times per week, 3 = 5-6 times per week, 4 = once everyday this week, 5 = twice everyday this week, 6 = 3 or more everyday this week)								
add salt to food at your table	158	1.94	1.81	-.13	137	2.17	1.87	-.30

Item	Control				Experimental			
	n	Pretest	Posttest	Change	n	Pretest	Posttest	Change
eat high fat meat (hamburger, hotdogs, steak, bacon, bologna, sausage, etc.)	157	2.07	1.95	-.12	138	2.36	2.14	-.22
eat lean meats (chicken or turkey without the skin, etc.)	157	1.90	1.98	-.08	137	2.09	2.00	-.09
eat fried foods (french fries, fried chicken, fried eggs, etc.)	156	1.98	1.95	-.03	139	2.22	2.01	-.21
eat high-fiber grains (whole wheat breads, oatmeal, bran, etc.)	155	2.26	2.21	-.05	138	2.54	2 27	-.27
eat sugary desserts (cakes, cookies, candy, etc.)	156	1.65	1.72	+.07	137	1.75	1.73	-.02
eat fruits (apples, oranges, bananas, melons, raisins, etc.)	157	2.57	2.48	-.09	139	2.65	2.71	+.06
How often do you eat a variety of foods? (0 = never eat a variety, 1 = 25% of the time, 2 = 50% of the time, 3 = 75% of the time, 4 = eat a variety everyday)	155	2.43	2.17	-.26	134	2.37	2.26	-.11

Appendix C

Summary Of Viewer Comments By Videotape

Videotape	No.	%
Tobacco Education and Prevention		
Positive comments:		
General positive comments	24	42
Informative	8	15
Useful	5	9
Miscellaneous	4	7
Negative comments:		
Unrealistic	6	10
Miscellaneous	6	10
Should have covered more (i.e., smokeless tobacco, methods for quitting)	4	7
Total	57	100
Health and Physical Readiness		
Positive comments:		
General positive comments	13	21
Informative	8	13
Miscellaneous	8	13
Negative comments:		
Miscellaneous	11	18
Should have covered more (i.e., proper diet, vitamins, prevention of injuries, target heart rate, warm-ups and cool-downs, number of repetitions for workouts)	9	15
Poor acting	7	12
Unrealistic characters	5	8
Total	61	100
Stress Management		
Positive comments:		
General positive comments	20	28
Useful	9	13
Informative	7	10
Miscellaneous	5	7
Well presented	5	7
All personnel should see it	2	3
Negative comments:		
Unrealistic story	11	15
Miscellaneous	6	8
Should have covered more (i.e., coping techniques, causes of stress)	4	5
General negative comments	3	4
Total	72	100

Videotape	No.	%
Drug and Alcohol Abuse Prevention		
Positive comments:		
General positive comments	15	21
Informative	9	13
Useful	3	4
Miscellaneous	3	4
All personnel should see it	2	3
Negative comments:		
Too long	11	16
Poor acting	7	10
No new information	6	9
Miscellaneous	6	9
Repetitive	5	7
Boring	3	4
Total	70	100
Nutrition Education and Weight Control		
Positive comments:		
Informative	11	25
General positive comments	8	18
Useful	8	18
All personnel should see it	5	11
Miscellaneous	4	9
Negative comments:		
Should have covered more (i.e., cholesterol, exercise, serving sizes)	5	11
General negative comments	2	4
Miscellaneous	2	4
Total	45	100
Back Injury Prevention		
Positive comments:		
Useful	18	21
General positive comments	15	18
Informative	11	13
Miscellaneous	6	7
Well presented	3	3
All personnel should see it	3	3
Negative comments:		
Boring	13	15
Repetitive	7	8
Miscellaneous	5	6
Should have covered more (i.e., back injury prevention in unusual situations such as on stairs and ladders, more back exercises)	5	6
Total	86	100

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19 ABSTRACT (Continue on reverse if necessary and identify by block number)

The objectives of this study were (a) to evaluate the Navy's six health promotion videotapes in terms of changes in knowledge, self-efficacy, behavioral intentions, and self-report of behavior, (b) to determine the effects of a pre- and postviewing discussion, and (c) to report subjective viewer ratings for each of the six videotapes. The purpose of this research was to determine if viewing a videotape could be an effective method to promote healthful knowledge and behaviors among Navy personnel. A repeated measures, split-plot factorial design was employed to evaluate the six videotapes. A pre- and posttest questionnaire was used to assess changes in knowledge, self-efficacy, behavioral intent, and self-report of behavior in 299 active duty, Navy personnel from four shore commands and three ships. In addition, a short survey was administered after the viewing of each videotape to obtain viewer ratings and comments. Analyses of the knowledge scores indicated no significant differences between groups (experimental, control) across time (pretest, posttest) for five of the six videotapes. The one videotape that produced significant knowledge effects was the back injury prevention videotape. Separate analyses of the

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19. (continued) self-efficacy measures, behavioral intentions, self-report of behavior, and of the pre- and postviewing discussion did not reveal any significant results. Additional analyses on high risk subgroups were also reported. Among the viewer ratings, the back injury prevention videotape was rated higher than all of the other videotapes on all seven of the rating items. Overall, these findings suggest that the videotapes alone, were not an effective means of promoting healthful knowledge and behaviors among Navy personnel.