



Interactive Multimedia to Promote Breast Cancer

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Abbreviated Abstract

Thinkhealth is a risk assessment tool and Website to promote screening and early detection of breast cancer among the general population. Interactive features include a personalized risk assessment based on the Gail model and a screening plan based on the user's health history. Direct links to screening facilities connect patients with providers, and online scheduling simplifies appointments. An "Ask the Doctor" feature facilitates patient-physician communication. Website design was based on the principles of cognitive learning in the Human Dynamics model, and the user's online experience is tailored to specific cognitive styles. This enables us to communicate with the user in the style most appropriate to her personality and learning style. We measured the effectiveness of this Website in motivating screening intentions and behaviors among 750 women and found that *thinkhealth.com* was more effective than printed material in educating women on screening techniques, reducing anxiety about mammograms, and strengthening intentions to maintain a screening regimen. Funding for development was provided by the National Cancer Institute.

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Total Budget

\$845,018

Research Objectives

Studies of motivational factors and attributions of responsibility and persuasion related to mammography use have shown that internal attributions (those that attribute responsibility to the self) motivate the greatest change in women's attitudes and behaviors toward breast cancer and mammography. In order to measure such changes as a result of a health communication program, we developed an experimental plan derived from the work of Rakowski in determining the relationship between the stages of adoption and decisional balance. This work uses two



central constructs from the transtheoretical model of behavior change: *stage of adoption* (the premise that people proceed through a sequence of stages of behavior change in adopting new health-related behaviors) and *decisional balance* (a summary index derived from two variables, pro and con, that denote perceived positive and negative features of the target behavior).

The study had four broad goals:

1. Examine and understand the barriers and motivational factors related to breast cancer screening,
2. Develop an informational Website designed with these barriers and factors in mind,
3. Increase intentions of the Website's users to engage in screening behaviors, and
4. Compare changes in attitudes, intentions, and knowledge for participants who used the Website vs. those who read conventional printed materials.

The experimental plan included six specific aims:

AIMS

1. Develop an interactive Website as a breast cancer control intervention to increase motivation, knowledge, and attitudes favorable to screening and early detection. The program should reach women on a personal level and should be easy to use.
2. Assess the persuasiveness of the medium and message using focus groups.
3. Assess the efficacy of the medium and message in a range of settings.
4. Assess the characteristics of users in a range of settings.
5. Evaluate changes in knowledge, attitudes, and behaviors following program use.
6. Explore user characteristics associated with changes in knowledge, attitudes, intentions, and behaviors.

Theory/Hypothesis

Our two hypotheses for this evaluation were (1) that women who used the program will show an increase in knowledge, attitudes, and intentions favorable to breast cancer screening and early detection following program use and (2) that women who used the program will show an increase in screening behaviors following program use.

Experimental Design

The experimental design consisted of four components:

1. Pretest survey, which participants completed before the intervention.
2. Intervention; test participants reviewed the Website, while control participants read printed materials.
3. Posttest survey, which participants completed immediately after the intervention.
4. Follow-up survey, which participants completed approximately 6 months after the intervention.

Participants came to scheduled appointments at one of the test sites, which included three hospitals, three medical offices, two pharmacies, and one community college "commons" area. Some participants who could not come to a test site at one of the scheduled times were sent survey packages in the mail, with instructions for completing the surveys and the intervention.

Final Sample Size & Study Demographics

The sample included 749 women, 361 in the control condition and 388 in the test condition. Fifty-six women reported having had breast cancer in the past. Since the intervention is designed for breast cancer screening, these women were excluded from the sample; this left 693 participants, 332 in the control condition and 361 in the test condition. Their mean age was 47 years, with a



range from 21 to 81 years old. The sample was predominantly White (81.1%), but also included Black (12.4%), Latina (4.0%), Asian (1.2%), and American Indian (0.1%) women.

Data Collection Methods

Surveys

Outcome Measures

Intentions, attitude, prompts and social pressure to take precautions, perception of risk, future screening plans, perceived vulnerability, and knowledge.

Evaluation Methods

To assess the effect of the intervention, repeated measures analysis of covariance (ANCOVA) was conducted. For those dependent measures that were correlated with age (subjective norm), education (attitude, knowledge), or income (attitude, perceived behavioral control, knowledge), variables on which the control and test conditions differed, the analyses also controlled for the relevant variable(s).

For each analysis, previous behavior was controlled for. The intervention was designed to promote breast cancer-screening behavior; statistically controlling for previous screening behavior removes the influence of previous behavior on outcomes. Thus, any differences from pretest to posttest can reasonably be assumed to be due to the intervention, rather than previous behavior. Measures of past behavior were frequency of breast self-exam, recency of mammogram, and recency of clinical exam.

Research Results

- The intervention was effective, but seemed to be no more effective than the standard treatment. Access to information is probably helpful regardless of mode of dissemination.
- Only 11% of breast self-exam intention and 4% of intention to have a mammogram and/or clinical exam were accounted for by the Theory of Planned Behavior variables. These percentages suggest that other variables may be important in predicting breast cancer screening intentions. Additional research should focus on other constructs that may improve this prediction.
- The results that were contradictory to predictions may be explained from an information processing perspective. It may be that participants were less able to process information from a kiosk or computer than from the written materials. Additionally, our knowledge measure may have been more parallel with the written materials than with the kiosk materials.
- More work needs to be done with the measures to determine a method for measuring some of these constructs that avoids a ceiling effect. We also need a better way to measure adherence to breast cancer screening guidelines.

Barriers & Solutions

Comments regarding kiosk usage:

- Elderly women may feel intimidated by the computer.
- Women are concerned about the confidentiality of the information they enter into the computer.
- Some women may experience language barriers.
- People are naturally skeptical of advertisements and may be hesitant to sign up for the study.

Solutions to kiosk usage barriers:

- A bilingual application may be created for the Spanish-speaking population.
- Volunteers should be trained to help patients with any questions.
- If the study is linked to a hospital, the response may be better.



- Information should be updated as news or research dictates.
- Having the option to print information would be very useful.
- Emphasis should be placed on the fact that the kiosk is “as easy to use as a microwave.”
- A sign should be placed on the kiosk mentioning women’s healthcare or the availability of free information or making it look like a slot machine.
- Emphasis should be placed on the fact that the application was funded by NIH.

Product(s) Developed from This Research

Thinkhealth.com: Web-based application or kiosk equipped with hardware and software, including Internet access, links to mammography facilities for automated appointment scheduling, online survey capability, printer, and online appointment scheduling