



Interactive Media in Skin Cancer Control

Grant Number: R44CA63898-03

Abbreviated Abstract

A randomized clinical trial will be conducted to test the effectiveness of a web-based interactive health education program in promoting skin cancer prevention and regular skin examination behaviors in middle-aged and elderly populations. The program will be evaluated with high-risk skin cancer patients, medium-risk internal medicine patients, and low-risk wellness program participants. The study will take place in a tertiary care medical center, a primary care office practice, and in a corporate wellness program.

Program content includes information about skin cancer rates, skin examination methods, assistance in identifying problem lesions, instruction in how to rejuvenate sun-damaged skin, and advice about preventive strategies, as well as linkages to Internet-based health education sites. Behavior change and behavioral self management methods are included in the program. Social marketing principles have also been used to promote, enable, and maintain skin protective and skin screening behaviors.

Primary Investigator

Martin McCarthy, Jr., PhD.

EduMedia, Inc.

2848 1/2 Sheridan Place

Evanston, IL 60201

P: (847) 475-1988

mmcc@northwestern.edu

Company URL: www.edumedia.us.com and www.skinsense.info

Martin McCarthy is a health psychologist, a health services researcher, and a health educator. He is Research Associate Professor in the Department of Preventive Medicine at Northwestern University Medical School, and President of EduMedia, Inc., a health education company specializing in online disease prevention and health promotion applications. Dr. McCarthy holds an M.A. in Experimental Psychology from Columbia University, a Ph.D. in Community Psychology from New York University and he completed a Post-Doctoral Fellowship in Health Psychology at Northwestern. He is registered as a Clinical Psychologist in New York State and in Illinois.

These roles and areas of expertise have served well in his work as a designer and developer of health education programs. EduMedia products focus on promoting initiation of healthy behaviors and enabling the continuing practice of health promotion, disease prevention, and early detection activities. Evidence-based behavioral interventions are interwoven with effective and compelling content material; content materials are tailored to the user's demographic and psychographic profile and presented within an interactive media framework. The multi-layered programs are evaluated in real world settings with well-defined target audiences. Dr. McCarthy is working with colleagues at the Kellogg Graduate School of Management at Northwestern and with e-health and marketing consultants on the commercialization of the EduMedia product portfolio.

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Research Team & Affiliations

Martin McCarthy, Jr., Ph.D.: principal investigator & lead designer for the educational program

Sara Murphey, from EduMedia, Inc.: project administrator

June K. Robinson, M.D.: editor, Archives of Dermatology & clinical professor, Department of Dermatology, Northwestern Medical School was the dermatology consultant and site investigator

Carlo DiClemente, Ph.D., University of Maryland, co-developer of the Trans-Theoretical Model of Change, was the primary behavioral consultant.

Thomas Schnitzer, M.D., Ph.D.: director, Northwestern Center for Clinical Trials, managed the follow-up surveys for patients and the corporate wellness program participants.

Frederick Rademaker, Ph.D.: director, Biostatistics Program, Lurie Cancer Center at Northwestern, conducted the analyses of project data. Aaron Michelfelder, M.D., F.A.A.M.: vice-chair of the Dept of Family Medicine, Loyola University Medical Center, completed the review of diagnostic information and services data for the skin cancer and primary care patients.

Total Budget

\$878,912.00

Research Objectives

Aim 1: The content of the interactive media health education program was revised and the format was improved in response to feedback obtained during the Phase I research project.

Aim 2: The scope of the prototype program was extended to include digital video interviews and reframed content material targeted to both middle-aged and elderly audiences.

Aim 3: New communication features provided access to Internet information sources, remote diagnostic services, email reminders containing skin examination and skin protection messages, and electronic ordering for sunscreens, skin protective clothing, and skin care products.

Aim 4: A kit containing materials to promote and enable skin cancer early detection behaviors was provided to users of the interactive media program. The kit included a lighted magnifying lens, a ruler, a pencil eraser, body maps to record locations of lesions, samples of sunscreens, and similar items.

Aim 5: The effectiveness, costs, and benefits of the new Skin Sense program were evaluated in a randomized clinical trial comparing the interactive media approach with videotape and print based educational interventions. The trial took place in a tertiary care cancer center, a primary care office practice network, and an intranet based corporate wellness program.

Theory/Hypothesis

This web-based educational intervention was designed using elements of Bandura's self-efficacy theory and Prochaska and DiClemente's trans -theoretical model of behavior change; motivational interviewing concepts were also employed in creating the tailored feedback messages for users of the online program. These intentional behavior change approaches were embedded within an interactive multimedia program.

The main hypothesis evaluated in the clinical trial was that the interactive media educated program users would demonstrate larger increments on the knowledge, attitudinal, and behavioral change measures than the subjects receiving the video and print-based education interventions, at both short-term and intermediate-term end-points.

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Experimental Design

The experimental design included three groups of subjects (skin cancer patients, primary care patients, and corporate wellness subjects) each randomized to one of three interventions (web-based education, video education, and print-only education). Pre-Post data were obtained immediately before and after subjects were provided with the educational content; Follow-Up data were collected at one to two years post-enrollment. The attached graphic summarizes the study design:

Final Sample Size & Study Demographics

A total of 526 subjects participated in the randomized clinical trial; 326 or 67.8% of the participants completed the Follow-Up Survey. Of the full sample 56.6% (296) were women and (43.4% (227) were men; the mean age was 49.2 years with a standard error of 1.1 years. Some 10.8 % of the 526 subjects had a High School or Less level of educational attainment, 61.4% had attended or completed College, and 27.8 % had earned a Graduate or Professional degree.

Data Collection Methods

All Pre-Post data were collected over the skinsense.info web site. A small proportion (5%) of the persons completing the Follow-Up Survey completed a paper version of the questionnaire. All other Follow-Up data were collected online.

Outcome Measures

Outcome measures included changes in knowledge of skin cancer and skin care topics; importance ratings and self-efficacy ratings for skin examinations and skin protection activities; stage of change categorizations for skin related behaviors; self-reported participation in continuing skin examination and skin protection behaviors; costs for diagnosing and treating skin cancers and sun-damaged skin.

Evaluation Methods

Randomized clinical trial comparing three media-based interventions; online collection of pre-post data; email follow-up survey.

Research Results

In the Pre-Post analyses all three intervention groups showed statistically significant increases on the Knowledge, Attitudinal, and Behavioral outcome variables. At Post-Test the Web-Based Education group had the highest levels on the tests of skin cancer information, lesion-matching, and importance and confidence ratings. The Interactive Media, Video, and Print educated groups also showed significant increases in the proportion of persons proceeding from Not Considering to Considering Reducing Time in the Sun and Using Clothing to Protect Skin from Ultraviolet Exposure.

There were no significant improvements on the Stage of Change questions for Skin Examinations and Use of Sunscreens. High proportions of all subjects were already Considering or Participating in these activities at Pre-Test and they were not able to perform these behaviors while taking part in the educational session. The Program Evaluation ratings were also markedly higher for the interactive multimedia materials. All of the attractiveness, understandability, credibility, and usefulness Post-Test Only ratings were higher for the web-based subjects with highly significant p – values relative to the

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other teaching interventions. Follow-Up Survey and Use of Services data have not yet been analyzed. Additional multivariate analyses are also planned.

Barriers & Solutions

No major problems encountered.

Product(s) Developed from This Research

Skinsense.info: educates users about how to identify skin cancers, how to prevent sun-damage to skin, and how best to provide continuing care for damaged and healthy skin. Content includes compelling images, graphics, and animations as well as video interviews with middle-aged and elderly persons who have sun-damaged skin, pre-cancerous and cancerous skin lesions and persons who have been careful to protect and preserve their skin. The online program is organized like a book with individual chapters addressing these topics. Usability testing has established that the navigation controls are simple and functional and easy for persons with limited computer experience to understand and use. A front-end assessment generates tailored feedback, which guides users through the program segments and motivates them to attempt and continue health promoting behaviors. An Enabling Kit and product samples are available to promote regularly scheduled skin examinations and to encourage continuing appropriate skin care.