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# Promotion of Healthy Humor Cancer Education Messages for the Deaf Community

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## Abstract

The Deaf community members of this community-campus partnership identified the lack of health information in American Sign Language (ASL) as a significant barrier to increasing the Deaf community's health knowledge. Studies have shown that the delivery of health messages in ASL increased Deaf study participants' cancer knowledge. Once health messages are available on the Internet, strategies are needed to attract viewers to the website and to make repeat visits in order to promote widespread knowledge gains. This feasibility study used the entertainment-education strategy of coupling cancer information with jokes in ASL to increase the appeal and impact of the health messages. ASL-delivered cancer control messages coupled with Deaf-friendly jokes were shown to 62 Deaf participants. Participants completed knowledge questionnaires before, immediately after, and 1 week after viewing the paired videos. Participants' health knowledge statistically significantly increased after viewing the paired videos and the gain was retained 1 week later. Participants also reported sharing the newly acquired information with others. Statistically significant results were demonstrated across nearly all measures, including a sustained increase in cancer-information-seeking behavior and intent to improve health habits. Most participants reported that they would be motivated to return to such a website and refer others to it, provided that it was regularly updated with new jokes.

**Keywords** Cancer · Deaf community · Dissemination · Education · Health disparities · Prevention · Humor · Entertainment-education · Edutainment

## Introduction

American Sign Language (ASL), the language most commonly used among members of the United States' Deaf community, is a visually conveyed language. ASL has no written form, a circumstance that has historically limited communications among Deaf people and between Deaf and hearing people.

Advances in technology have made the Internet transmission of visual images possible, a development that has significantly expanded communication options for members of the Deaf community. These technological advances have made face-to-face signed communication possible among Deaf people, while the creation of the Video Relay Service has improved communication between Deaf people who sign and hearing people who do not sign. For those members of the Deaf community who are English language proficient, other technological advances have included SMS (short message service), email, and IM (instant messaging), all of which allow users to transmit textual information instantaneously [1]. Further, Internet-based technology has expanded to include

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the dissemination of information in sign language via video files, while voice recognition software has made the simultaneous captioning of television broadcasts and the rapid conversion of conversation into text possible. Such advances have all served to increase the Deaf community's access to information. The majority of Deaf individuals report preferences for communication methods that include a signing component and prefer using websites that include ASL, pictures, and/or text [1].

While examples of ASL-accessible health promotion websites that use these components to communicate health messages to the Deaf community [1, 2] are available, they are still relatively scarce. However, for those who are creating ASL-accessible health promotion websites, an additional concern has become how to attract members of the desired audience to them, as well as how to encourage desired audience members to make repeated visits to those websites to help increase the community's health literacy.

Capitalizing on these technological advances and communication preferences identified by Deaf individuals, a multi-site community-campus partnership was launched in 1997 to improve the Deaf community's access to health information and cancer care. The partnership included Deaf Community Services of San Diego, Inc., the National Association for the Deaf, Gallaudet University, the UC San Diego Moores Cancer Center, Bovee Productions, and the Registry of Interpreters for the Deaf. The Partnership created video programs in ASL for breast, cervical, colorectal, ovarian, prostate, testicular, skin, and uterine cancers, as well as videos to promote smoking cessation, better nutrition, and increased physical activity [3–8]. These videos were disseminated nationally through Deaf-friendly churches, Deaf-affinity organizations, at-large gatherings of the Deaf community, and Internet websites [9].

While these dissemination strategies were effective, the Partnership thought additional strategies were needed to expedite the community's discovery of, and repeated engagement with these and the expanding array of Internet health resources. The Partnership asked ResearchWorks, a research-based, health marketing company with expertise in entertainment-education and health promotion, to help it accomplish those goals.

In collaboration with ResearchWorks, the Partnership recruited Deaf community leaders and members to help it develop innovative strategies that could accomplish those goals. Of the various ideas put forth, the most promising was to package the health messages with Deaf humor (i.e., "Healthy Humor") as a strategy that could attract first-time and repeat visitors to an educational website, retain visitors' interest in exploring the website, and encourage sharing of the website with other members of the Deaf community.

The growing field of entertainment-education has shown, across many forms of entertainment and many health topics, the positive impact of combining entertaining messages with

health content [10]. In particular, the inclusion of humor with the teaching of health information has been shown to increase attention, literacy skills, and concept learning [11]. Folk wisdom throughout the ages has touted the positive health effects of humor and laughter, a belief that has prompted investigation by the scientific community [12]. For example, the addition of humor can enhance the memory of educational cartoons, lectures, sentences, and course materials [13]. Humor has been shown to be an effective tool for teachers in developing a positive rapport between teacher and student, as well as enhancing academic and clinical instruction in high-stress, high-demand environments [14]. Dean and Major concluded that health care providers' inclusion of humor can help relieve tension and "humanize" the medical experience for health care providers and recipients [15]. While there is ample support in the scientific literature that merging health and humor could be an effective strategy, there has been little application of the entertainment-education strategy to promote health education in the Deaf community.

Thus, the Partnership hypothesized that combining Deaf humor with health messages could facilitate:

1. Increases in cancer knowledge
2. Retention of that newly acquired knowledge
3. Person-to-person promotion of the Deaf-friendly educational website
4. Repeat visits to the website

The aim of this pilot study was to evaluate the degree to which the pairing of health messages with humor could impact these goals.

## Methods

### The Intervention

The Partnership initiated the project by sending diverse members of the Deaf community emails that invited the recipients to send back good examples of Deaf humor. Recipients were also asked to share the invitation with other members of the community.

Meanwhile, the research team selected 12 succinct cancer messages from the various cancer educational videos the team had previously developed and tested using the Health Belief Model as the grounding theoretical framework. Most of the specific messages and questions used in this study had previously been used to evaluate related knowledge gains and knowledge retention over time. The Partnership had previously created and proven the videos to be Deaf-friendly and effective in increasing deaf participants' cancer knowledge.

For this study, each health message was paired with a joke selected from those submitted by the Deaf community. There

was no effort to match the content of the message with the joke. The health content included messages about testicular cancer, cervical cancer, breast cancer, cancer prevention, general health, and ovarian cancer, plus two messages about colorectal cancer, prostate cancer, and skin cancer. There were Internet links with the messages to give viewers easy access to more explanatory information in American Sign Language.

**SAMPLE MESSAGE:** There are some Human Papilloma Viruses (HPV) that increase women’s risk of developing cervical cancer. Practicing safe sex can reduce a woman’s risk of catching HPV.

**SAMPLE JOKE:** (paraphrased for brevity)

The doctor asks a 75-year-old patient the reason for her visit.

Patient: “I want birth control pills, so that I can sleep better.”

Doctor: “Why do you need birth control pills? Your 75 years old! What would you use them for?”

Patient: “I’ll put them in my 16-year-old granddaughter’s orange juice which will help me sleep better at night.”

The health and humor pairings were pilot tested to assure the clarity of the educational content conveyed by the video clips and the smooth transitions to and from the additional information links. Each message included a health message and then a joke signed in ASL, with English subtitles, because the Deaf community uses all available sources of information offered to achieve optimal comprehension of information. Pilot testing also evaluated how to pair the humor and health messages and had shown that the best order was to receive the health message first and then be rewarded with a joke.

### Participant Eligibility Criteria, Recruitment Methods, and Consenting Process

Participants were eligible if they were at least 18 years of age, deaf, lived in southern California, and used ASL as their preferred mode of communication. With the goal of achieving homogeneity of the participants’ basic computer and Internet skills, participants also had to use the Internet daily and have an email address.

Recruitment strategies were selected to assure the recruitment of participants with diverse sociodemographic characteristics. Sample recruitment was conducted via flyers, emails, and public and private presentations in such diverse venues such as Deaf bowling meet-ups, Deaf pizza nights, and various events hosted by Deaf Community Services of San Diego, Inc.

Study participants signed an IRB-approved written consent document that explained the research study. The document was also explained in ASL by a research team member and participants could discuss any project-related issues in ASL.

They were offered light refreshments and received \$75 as a thank you for participating in the study.

### Data Collection

Participants completed a baseline survey to gather basic sociodemographic data, as well as descriptive data about their audiologic characteristics and communication preferences. The survey also included questions to assess participants’ baseline knowledge of, and attitudes towards, the topics addressed in the video clips. Immediately following the video, participants completed the same cancer knowledge and attitude survey, along with additional questions about their future information-seeking intent. A comparable follow-up survey was mailed 1 week later to assess longer-term effects of the videos. The use of a validated and normed survey was not an option in this study because the questions were specifically linked to the unique health messages of the video clips. Assistance completing this third written survey was offered in ASL.

## Results

### Sample Description

The sample ( $n = 62$ ) was 52% ( $n = 32$ ) women and 48% ( $n = 30$ ) men. Ages ranged from 18 to 57 years; the average age was 31 ( $SD = 9.0$ ) years. Of the participants, 56.5% ( $n = 35$ ) were Caucasian, 23% ( $n = 14$ ) were Hispanic, 8.1% ( $n = 5$ ) were Asian, 4.8% ( $n = 3$ ) were Native American or Alaska Native, 3.2% ( $n = 2$ ) were African American, 1.6% ( $n = 1$ ) were Pacific Islander, and 3.2% ( $n = 2$ ) were unknown. All of the participants had at least a high school diploma, 79% ( $n = 49$ ) had at least some college education, and 21% ( $n = 13$ ) had attended a Deaf educational institution. Sixty-six percent ( $n = 41$ ) reported that they were raised in a signing home. All participants used the Internet on a daily basis, and 90% ( $n = 56$ ) reported using the Internet as a source of health information (Table 1).

### Examination of Study Aims

This study evaluated the impact of the healthy humor messaging strategy on four domains. The first was immediate changes in cancer knowledge. Participants’ knowledge significantly increased from baseline ( $M = 6.63$ ,  $SD = 2.16$ ) to immediately post-test ( $M = 8.84$ ,  $SD = 2.39$ ),  $t(61) = -8.695$ ,  $p < .001$ .

The second domain was whether the participants would demonstrate retention of any newly acquired knowledge. There was no significant difference between the post-test and 1-week follow-up scores ( $M = 8.63$ ,  $SD = 2.35$ ),  $t(61) =$

**Table 1** Sample characteristics ( $n = 62$ )

Characteristic	Percent ( $n$ )
Gender	
Female	52.0 (32)
Race	
Caucasian	56.5 (35)
Hispanic	23.0 (14)
Asian	8.1 (5)
Native American or Alaska Native	4.8 (3)
African American	3.2 (2)
Pacific Islander	1.6 (1)
Unknown	3.2 (2)
Education	
At least a high school diploma	100.0 (62)
Some college	79.0 (49)
Attended a Deaf educational institution	21.0 (13)
ASL in Home	
Raised in a signing home	66.0 (41)
Internet Use	
Daily Internet use	100.0 (62)
Internet use for health information	90.0 (56)
Age	
$M, SD$	31.0, 9.0

1.01,  $p = .312$ . Thus, participants retained their significant increase in knowledge from baseline to the 1-week follow-up,  $t(61) = -6.854, p < .001$ .

Table 2 displays the data for the individual statements on the survey and shows that there were overall improvements in knowledge immediately post-intervention for each question and that the improvement remained above the baseline scores 1 week later. The table uses an asterisk to show the individual scores that were significant between baseline and immediate post-test. Individual scores that were significant from baseline to 1-week post-test are marked with a caret.

The third domain was whether participants would be likely to tell others about the Deaf-friendly educational website and what they learned (i.e., person-to-person promotion). Of the participants, 58% reported that they were inspired to share their newly acquired knowledge and the website with other Deaf people and loved ones.

Finally, the study evaluated whether the healthy humor messaging strategy would be likely to trigger revisits to the website. Overall, 77% of the participants reported that they felt motivated to seek additional cancer information after watching the healthy humor messages. Seventy-six percent of participants also reported that they would regularly visit a healthy humor website if it were routinely updated with new jokes.

**Table 2** Percentage of correct responses on the healthy humor cancer messages at pre-test, post-test, and 1-week follow-up

Item	Baseline test (%)	Post-test (%)	1 week follow-up (%)
1. If a man feels a lump or other changes in his testicles that last more than 1 day, he should see his doctor right away. (false) [Testicular]	8.1	41.9*	38.7^
2. Men should talk to their doctor about screening for prostate cancer when they turn 30. (false) [Prostate]	29.0	51.6*	43.5
3. PSA is a blood test that is used to detect prostate cancer. (true) [Prostate]	22.6	87.1*	82.3^
4. Moles cannot turn into skin cancer. (false) [Skin]	75.8	79.0	83.9
5. You always need to wear sunscreen outdoors, even on cloudy days. (true) [Skin]	83.9	90.3	91.9
6. Seventy percent of cervical cancers can be prevented with the HPV vaccine. (true) [Cervical]	41.9	80.6*	75.8^
7. Women should have annual mammograms and clinical breast exams (CBE) beginning at age 25. (false) [Breast]	40.3	46.8	43.5
8. Sharing your family's medical history with your doctor is not important for screening and prevention of cancers. (false) [General]	83.9	82.3	85.5
9. If you want to prevent cancer and other diseases, you should establish a relationship with your doctor. (true) [Prevention]	85.5	98.4*	91.9
10. Colon cancer can only occur at the end of the colon where the bowel movement comes out. (false) [Colon]	62.9	67.7	72.6
11. Having a family member with colon cancer does not increase your risk of getting colon cancer. (false) [Colon]	72.6	85.5*	79.0
12. Your doctor has many ways to diagnose ovarian cancer. (true) [Ovarian]	56.5	72.6*	74.2^

\*Significant increase in knowledge between baseline and post-test using McNemar chi-square,  $p < 0.05$

^Significant increase in knowledge maintained between baseline and 1-week follow-up, using McNemar chi-square test,  $p < 0.05$

Calculation of % = no. correct answers / 62

McNemar test comparing the frequencies of concordant (Y/Y, N/N) and discordant (Y/N, N/Y) paired observations. Useful for detecting changes in responses due to experimental intervention in "before-and after" designs. Tests for changes in responses using the chi-square distribution

## Discussion

As with other medically underserved minority groups, Deaf community members face considerable barriers to accessing health information and care [16]. These barriers are exacerbated by the absence of a written form of ASL.

Increasing awareness of cancer and where to find accessible, credible sources of information should assist with reducing the Deaf community's barriers to accessing cancer information and care. This pilot test of the healthy humor messages showed the strategy's capacity to raise the Deaf community participants' awareness of, and knowledge about cancer and to sustain those knowledge gains. The paired healthy humor messages were created to entertain, as well as educate viewers about cancer. Merging humor with cancer control messages was thus anticipated to help ease the process of learning about cancer, while serving as an entry point to accessing cancer information online. Study participants reported that the healthy humor messages would prompt them to return to the website and to share it with others, facilitating the spread of information about the website and promotion of increased visits to it, a strategy that Malcolm Gladwell has shown to be effective in triggering social epidemics [17].

Funding was awarded to support a feasibility study which necessitated the small sample size and recruitment of participants from a single geographic area. It also prevented longer-term evaluation of participants' retention of knowledge gained and ultimately, whether the desired health-promoting behavioral change was promoted.

Another limitation of this study was that the requirement for strong ASL skills most likely resulted in a greater representation of Deaf adults who had been born into Deaf families, where ASL was learned as the first language and/or had been given better educational opportunities which resulted in better ASL skills. These characteristics, plus the participants' willingness to volunteer to participate in a research study, underscore the need to use caution when making generalizations from this feasibility study.

In spite of these limitations, this pilot study's encouraging results suggest that this entertainment-education strategy is worthy of further study using a larger and more geographically diverse sample and longer follow-up to determine whether participants are subsequently motivated to make the behavioral changes recommended. If effectiveness continues to be found, it may also warrant evaluation as a strategy to help address the Deaf community's disparities in areas of health and welfare beyond cancer. Finally, it may also be a strategy worthy of testing with other communities that experience barriers to accessing health information and care similar to those experienced by the Deaf community.

## Conclusion

Health promotion efforts rarely address the unique learning and access needs of the Deaf community. The participants in this healthy humor messaging study had significant improvements in their health knowledge, both immediately post-intervention, and 1-week later in nearly all topics tested. Besides improvement in knowledge, participants reported that combining the health and humor messages increased their motivation to seek more information and to share it with others. Thus, the interweaving of humor and health messages appears to have the potential to raise cancer control knowledge, while also contributing to the retention of that knowledge and promoting repeat visits to a credible cancer website.

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