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Cervical Cancer Control: Deaf and Hearing Women's Response to an Educational Video

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Introduction

The Deaf community is reported to experience communication barriers that hamper access to health information and care, putting its members at increased risk for not knowing about potentially life-saving prevention and early detection strategies. For example, in one sample of Deaf women, 37% reported that they had no knowledge of cervical cancer [1]. Lack of knowledge has been associated with decreased screening and early detection rates, suggesting that Deaf women may be at a higher risk of discovering late stage cervical cancer and hence, at higher risk for needing more aggressive treatments and having higher rates of mortality [2–4].

Our community-campus partnership (Moores University of California San Diego Cancer Center, Deaf Community Services of San Diego Inc., Bovee Productions, and Gallaudet University) began creating cancer education videos in American Sign Language (ASL) with open captioning and easy-to-understand graphics to facilitate the acquisition of cancer knowledge within the Deaf community [5–10]. A study conducted by Choe and colleagues concluded that cervical cancer knowledge was increased among Deaf women who viewed the partnership's ASL cervical cancer educational video [5]. The video also included an English voiceover track of the back translation of the video's ASL script. The voiceover track was intentionally laid without background music to assure that hearing, as well as hard-of-hearing people could watch the video with their Deaf loved ones. This was deemed of particular importance since 90% of the Deaf community is born into hearing families.

The purpose of this study was to evaluate the impact of the same cervical cancer educational video with a sample of hearing women and then comparing those findings with the findings from Choe's sample of Deaf women. Three hypotheses were proposed for testing: (1) Deaf women would have lower baseline knowledge in both domains, (2) both Deaf and hearing women would increase their general, cervical, and total cancer knowledge, and (3) these knowledge increases would be equivalent across groups.

Methods

Development of the Educational Intervention

The community-campus partnership worked closely with regional Deaf community agencies and their members to create cancer education videos in ASL. Through consensus building, the 46-minute, graphically enriched video (*Cervical Cancer: Catch It Early and Save Your Life*) was created that features native ASL signers explaining how cervical cancer develops, who is at risk, how it can be diagnosed and treated, and the importance of early detection and clinical trials participation.

Development of the Knowledge Questionnaire

Given that there is no validated cervical cancer knowledge questionnaire, an instrument to evaluate the video needed to be designed. Phase one concerned the initial item development. The original instrument was designed over six months by a medical advisory committee consisting of oncology nurses and doctors, public health and medical students, and the Deaf research team at Moores UCSD Cancer. The questions were written based on content from the educational video. The goals of this phase were to (1) match the questions to the video's content in an organized manner, so that it would cater to learning style preferences of the Deaf community, and (2) to write items at a literacy level that would be accessible to all members of the community. All members from the multidisciplinary team wrote potential questions pertaining to the video; the questions were subsequently merged together for testing. From this larger list, two sets of questions emerged, one focused on general cancer knowledge, and the other on cervical cancer knowledge. The questions were further refined and edited to ensure that members of the Deaf community understood the questions in both ASL and English; for example, the word "assist" would be replaced with "help," because there is a widely used sign for that word. Phase two included administering the survey to Deaf and hearing volunteers, who made comments on any confusing questions. After deleting questions that were considered confusing or too easy (i.e., those which were answered correctly by almost all individuals before viewing the video), the final survey was constructed and administered to members of the Deaf community.

Procedure

The UCSD Institutional Review Board approved this prospective cohort study in which adult, hearing women, age 18 and older, from southern California and central Wisconsin, who use English as their preferred mode of communication, were invited to participate in a "health education study." After completing the consent process, participants completed a pre-test survey and then viewed the cervical cancer education video. Participants then completed the post-test survey. Both surveys included seven general cancer knowledge and five cervical cancer knowledge questions (Table 1.) The pre-test survey also contained demographic questions. The post-test survey contained questions that gathered opinions on the video. Participants received a complimentary meal during the educational session. These data were collected in the same manner as the study conducted by Choe and colleagues, who tested Deaf women who used ASL as their preferred mode of communication [5].

Data Analysis

The data were analyzed using SPSS version 17.0 (SPSS Inc, Chicago, IL). General and cervical cancer knowledge scores were calculated by summing the correct number of responses for each respective category; total cancer knowledge was calculated by summing all correct responses. One-way, between subjects ANOVAs were conducted to examine pre-test differences in general, cervical, and total knowledge scores between the Deaf and hearing groups. Paired samples t-tests were conducted to examine pre- and post-test

differences for each survey question and the general cancer, cervical cancer, and total cancer knowledge scores for both groups. Repeated measures ANOVAs were conducted to determine whether knowledge increases differed between the Deaf and hearing groups.

Sample

Deaf participants were 127 women with ages ranging from 19 to 93 ($M = 41.23$, $SD = 16.20$). Respondents self-identified as Caucasian (57.9%), African American (5.6%), Asian/Pacific Islander (9.5%), Hispanic (15.9%), mixed race (4.8%), and other (6.3%). Education levels varied widely: 1.6% did not complete high school, 35.4% completed high school, 29.1% completed some college, 18.1% completed college, and 15.0% completed more than college.

Hearing participants were 106 women with ages ranging from 18 to 85 ($M = 36.26$, $SD = 19.08$). Respondents self-identified as Caucasian (31.1%), African American (16.0%), Asian/Pacific Islander (33.0%), Hispanic (11.3%), mixed race (5.7%), and other (2.8%). Among this group, 14.2% completed high school, 37.7% completed some college, 32.1% completed college, and 16.0% completed more than college.

Results

Pre-test Knowledge

Potential differences in general, cervical, and total cancer knowledge at pre-test were evaluated using one-way between subjects ANOVAs. For general cancer knowledge, there was a significant difference between Deaf ($M = 5.05$, $SD = 1.09$) and hearing ($M = 5.54$, $SD = .68$) groups, $F(1, 231) = 15.78$, $p < .001$. For cervical cancer knowledge, there was a significant difference between Deaf ($M = 3.57$, $SD = .90$) and hearing ($M = 4.43$, $SD = .72$) groups, $F(1, 231) = 63.82$, $p < .001$. For total cancer knowledge there was a significant difference between Deaf ($M = 8.62$, $SD = 1.55$) and hearing ($M = 9.97$, $SD = .94$) groups, $F(1, 231) = 61.27$, $p < .001$. This supported our first hypothesis that Deaf women would have lower baseline knowledge in the cancer knowledge domains.

Changes in Knowledge

Knowledge gains between pre-test and post-test were evaluated separately for the Deaf and hearing groups by using paired samples t-tests. There was a general pattern of item-level knowledge increases before and after the intervention for both groups (Table 1). Composite scores for general, cervical, and total cancer knowledge were significantly higher after the intervention for both groups (Table 1). This supported our second hypothesis that both Deaf and hearing women would increase their general, cervical, and total cancer knowledge upon viewing the intervention video.

Differences in the magnitude of knowledge change were evaluated by looking at the interaction of group (Deaf or hearing) and time-point (pre- or post-intervention) using repeated measures ANOVA. For general cancer knowledge there was a significant interaction between time-point and hearing status, $F(1, 230) = 8.63$, $p = .004$, Partial $\eta^2 = .036$, indicating that Deaf participants yielded a greater mean change in knowledge (M difference = .66) compared to hearing participants (M difference = .26). For cervical cancer knowledge there was a significant interaction between time-point and hearing status, $F(1, 230) = 30.83$, $p < .001$, Partial $\eta^2 = .118$, indicating that Deaf participants yielded a greater mean change in knowledge (M difference = 1.09) compared to hearing participants (M difference = .46). For total cancer knowledge there was a significant interaction between time-point and hearing status $F(1, 230) = 32.21$, $p < .001$, Partial $\eta^2 = .123$, indicating that Deaf participants yielded a greater mean change in knowledge (M difference = 1.77).

compared to hearing participants (M difference = .72). These findings do not support our third hypothesis, in that knowledge gains were larger for Deaf women, compared to hearing women.

Subjective Evaluations of the Video

Data on the participants' subjective assessments of the educational video were also collected. The majority of Deaf and hearing women found the information on the video "very easy to somewhat easy" to understand (94.5%, and 98.1%, respectively). Both groups were also "very willing" to share the video with others (Deaf = 97.6%, hearing = 84.6%). This suggests that, aside from actual knowledge gains, both groups felt positively about the educational video.

Discussion

Since the 1950s, cervical cancer has become an increasingly controllable disease due to advances in prevention, screening, early detection, and treatment [11]. However, these improvements in cervical cancer healthcare require knowledge of cervical cancer and screening. Deaf women face greater barriers to accessing health information and healthcare than hearing women, which places them at higher risk of decreased screening, later detection, and increased morbidity and mortality [2–4].

The results of this study show that this graphically enriched cervical cancer education video in ASL with English open captioning and voice overlay is an effective strategy for improving cervical cancer knowledge for both Deaf and hearing women. Deaf women had lower levels of general and cervical cancer knowledge before the intervention. However both Deaf and hearing women demonstrated increased knowledge in both domains after the intervention. Moreover, Deaf women saw greater gains in their general and cervical cancer knowledge than did hearing women, rendering the post-test knowledge of both groups nearly equal. This suggests that although there may be a disparity in cervical cancer knowledge for the Deaf, there is a large benefit in disseminating linguistically accessible information to the Deaf. Taken together, these findings verify the efficacy of this cervical cancer education video and the importance of presenting healthcare information in a linguistically and culturally appropriate format to the Deaf community. Both the Deaf and hearing groups reported that the video was easily understandable and a willingness to share the video with others. Deaf women were particularly excited to share the video, calling attention to the tight-knit nature of the Deaf community and the eagerness of its members to gain and spread reliable health information. Finally, the efficacy of the video with both hearing and Deaf women underscores the value of sharing the video with audiences with diverse audiological characteristics, such as religious groups and college campus groups.

Limitations and Future Directions

There were several limitations of the sample used in this study. First, the Deaf group was generally less educated than the hearing group. This is an expected finding given the limited opportunities for members of the Deaf community to gain equal access to education. However, this may explain some of the differences in pre-test cancer knowledge. Although formal education and informal exposure to health information likely covaries with baseline knowledge, this may reflect a true difference in education between Deaf and hearing populations. Second, the ethnic breakdown between the two groups was imbalanced, with more Asian/Pacific Islanders in the hearing group, and more Caucasians in the Deaf group. Third, all participants were from the San Diego area, limiting generalizability.

Future research should address cancer knowledge over time and cervical cancer-related prevention and screening behaviors. Because both groups reported willingness to share this video with others, public health efforts should involve dissemination of this video in the Deaf community, as well as to their hearing and hard-of-hearing social networks. This video, and several others focused on ASL-based cancer education can be found at <http://cancer.ucsd.edu/deafinfo>.

Conclusion

This cervical cancer education video offers an evidence-based education strategy for audiences of Deaf women and their hearing loved ones.

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References

1. Basu P, Sarkar S, Mukjerjee S, Ghoshal M, Mittal S, Biswas S, Mandal R, Sankaranarayanan R. Women's perceptions and social barriers determine compliance to cervical screening: results from a population based study in India. *Cancer Detection and Prevention Journal*. 2006; 30(4):369–374.
2. Choe S, Lim RS, Clark K, Wang R, Branz P, Sadler GR. The impact of cervical cancer education for deaf women using a video educational tool employing American Sign Language, open captioning, and graphics. *Journal of Cancer Education*. 2009; 24(1):10–15. [PubMed: 19259859]
3. Folkins A, Sadler GR, Ko C, Branz P, Marsh S, Bovee M. Improving the Deaf community's access to prostate and testicular cancer information: a survey study. *BMC Public Health*. 2005; 5:63. [PubMed: 15938751]
4. Kaskowitz SR, Nakaji MC, Clark KL, Gunsauls DC, Sadler GR. Bringing prostate cancer education to deaf men. *Cancer Detection and Prevention Journal*. 2006; 30(5):439–448.
5. Lyttle NL, Stadelman K. Assessing awareness and knowledge of breast and cervical cancer among Appalachian women. *Preventing Chronic Disease*. 2006; 3(4):A125. [PubMed: 16978500]
6. Sadler GR, Gunsauls DC, Huang J, Padden C, Elion L, Galey T, Bruaer B, Ko CM. Bringing breast cancer education to deaf women. *Journal of Cancer Education*. 2001; 16(4):225–228. [PubMed: 11848672]
7. Shabaik S, LaHousse SF, Branz P, Gandhi V, Khan AM, Sadler GR. Colorectal cancer video for the Deaf community: a randomized control trial. *Journal of Cancer Education*. 2010; 25(4):518–523. [PubMed: 20393824]
8. Wang R, Aldridge AA, Malcarne VL, Choe S, Branz P, Sadler GR. Health locus of control and assimilation of cervical cancer information in deaf women. *Journal of Cancer Education*. 2010; 25(3):354–359. [PubMed: 20229077]
9. What are the key statistics about cervical cancer?. American Cancer Society; 2009. from <http://www.cancer.org/cancer/cervicalcancer/detailedguide/cervical-cancer-key-statistics>

10. Wollin J, Elder R. Mammograms and Pap smears for Australian deaf women. *Cancer Nursing*. 2003; 26(5):405–409. [PubMed: 14710803]

Table 1
Pre- and post-test knowledge and t-test comparisons for Deaf and hearing women

Survey question (correct answer)		Total correct responses(%)					
		Deaf (n = 127)			Hearing (n = 106)		
General Cancer Knowledge		Pre-	Post-	p	Pre-	Post-	p
1	What is cancer? (A disease where there is uncontrolled growth of abnormal cells in the body that can result in death)	117 (92%)	118 (93%)	NS	106 (100%)	104 (98%)	NS
2	Which cancer occurs the most often in women? (Breast cancer)	94 (74%)	75 (59%)	NS	68 (64%)	67 (63%)	NS
3	Which cancer kills the most number of women? (Lung cancer)	14 (11%)	60 (47%)	<.001	11 (10%)	26 (25%)	.002
4	Which tumor can spread throughout the body and kill a person? (Malignant tumor)	105 (83%)	121 (95%)	<.001	105 (99%)	104 (98%)	NS
5	Metastasis is a medical term that means cells breaking away from a malignant tumor and spreading to other parts of the body. (True)	99 (78%)	122 (96%)	<.001	93 (88%)	102 (96%)	.006
6	Early detection of a cancer means that you find the tumor before it has already spread to other parts of the body. (True)	99 (78%)	109 (86%)	.041	98 (92%)	102 (96%)	.008
7	Even a young woman can develop cancer. (True)	114 (90%)	122 (96%)	.011	106 (100%)	104 (98%)	NS
Cervical Cancer Knowledge							
1	Which of the following is a risk factor for getting cervical cancer? (Having a history of more than 2 sexual partners because it increases your risk of being infected with the human papilloma virus [HPV])	114 (90%)	124 (98%)	.012	101 (95%)	104 (98%)	NS
2	Every woman should have a pelvic exam and a Pap smear test every year beginning 3 years after having sexual intercourse or no later than age 21 (True)	58 (46%)	116 (91%)	<.001	80 (75%)	103 (97%)	<.001
3	Finding cervical cancer early allows most women to have children. (True)	63 (50%)	111 (87%)	<.001	88 (83%)	103 (97%)	<.001
4	Human papilloma virus or HPV is the virus that causes most cases of cervical cancer. (True)	94 (74%)	118 (93%)	<.001	98 (92%)	100 (94%)	NS
5	A regular Pap smear is a very good way to find cervical cancer early. (True)	124 (98%)	123 (97%)	NS	103 (97%)	104 (98%)	NS
Total Cervical (out of 5) [/]		3.57 (71.4%)	4.66 (93.2%)	<.001	4.43 (88.6%)	4.89 (97.8%)	<.001
Total Cancer Knowledge (out of 12) [/]		8.62 (71.8%)	10.39 (94.4%)	<.001	9.97 (83.1%)	10.69 (89.1%)	<.001

Note.

$I_M(\%)$