JOURNAL OF WOMEN'S HEALTH
Volume 28, Number 9, 2019

DOI: 10.1089/jwh.2019.7968

Using Inside Knowledge Campaign Materials to Improve Gynecologic Cancer Knowledge in Underserved Women

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Abstract

Purpose: About 30,000 U.S. women die each year from gynecologic cancer, which disproportionately affects underserved and minority populations. This project aimed at increasing and assessing awareness of risk, symptoms, and recommended screenings and prevention activities in underserved women, through unique collaboration between the Centers for Disease Control and Prevention's (CDC) *Inside Knowledge* (IK) campaign, which was designed to educate women about gynecologic cancer, and the CDC's national network of organizations to reduce cancer-related disparities.
Methods: CDC's national network and the IK campaign partnered to deliver tailored educational sessions about gynecologic cancer to three populations of women served by the participant organizations. Participant organizations included the National Behavioral Health Network (NBHN), Nuestras Voces (NV), and SelfMade. Pre- and post-session questionnaires were administered to assess knowledge changes.
Results: Knowledge changes for risk factors, screening, and HPV vaccination varied by network organization, but all sessions increased correct identification of some symptoms. Baseline knowledge also varied among organization participants.
Conclusions: Sessions were effective in increasing awareness of gynecologic cancer among underserved women; however, organizational information uptake differed. Additional resources containing specific interventions appropriate to particular underserved populations may be beneficial in increasing healthy behaviors, leading to a reduction in gynecologic cancer disparities.

Keywords: gynecologic cancer, comprehensive cancer control, underserved populations, health disparities

Introduction

More than 90,000 women are diagnosed each year in the United States with gynecologic cancer, including cervical, uterine, ovarian, vaginal, and vulvar cancer, with almost 30,000 women dying annually.[1,2] These cancers disproportionately affect women from underserved populations. African American women have a higher mortality rate than white women, and women with a lower socioeconomic status have higher mortality and poorer survival rates for ovarian, cervical, and uterine cancers.[3–5] Low socioeconomic status has also been associated with increased rates of invasive vaginal and vulvar cancers.[6] This highlights the need for more outreach and culturally specific interventions with underserved women related to prevention, symptom recognition, and seeking of medical care for gynecologic cancer when appropriate.

To improve awareness of the five main types of gynecologic cancer and in support of the Gynecologic Cancer Education and Awareness Act of 2005 (Johanna's Law), the Centers for Disease Control and Prevention (CDC) and the Department of Health and Human Services' Office on Women's Health developed the *Inside Knowledge* (IK)*: Get the Facts about Gynecologic Cancer* campaign.[7] The campaign is designed to educate women about risk factors, symptoms, recommended screening, and prevention strategies for the five main types of gynecologic cancer.[7] The IK campaign incorporates a variety of messaging strategies, including print educational materials, and broadcast and digital public service announcements, as well as continuing education modules for providers.

For this project, educational sessions using IK materials were arranged through members of the CDC's Consortium of

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National Networks to Impact Populations Experiencing Tobacco-Related and Cancer Health Disparities.[8] The consortium includes eight organizations that help address cancer-related health disparities in underserved populations.

These networks understand the needs of their specific populations, and the organizations that participated in this project included SelfMade, which supports low socioeconomic status populations, National Behavioral Health Network (NHBN), which supports those with mental or substance abuse disorders, and Nuestras Voces (NV), which supports Hispanic populations.[8] The purpose of the study was to assess changes in awareness, knowledge, self-confidence, and behavioral intentions related to gynecologic cancer among participants served by these networks attending the educational sessions.

Materials and Methods

The development of IK campaign materials and their use in educational sessions has been previously described in detail.[9] Briefly, these educational sessions were designed to increase knowledge of gynecologic cancer symptoms, self-confidence related to gynecologic cancer prevention, and medical care-seeking by utilizing the health belief model, social cognitive theory, and the theory of planned behavior.[10–12]

Three CDC-funded National Networks, including SelfMade, NHBN, and NV, recruited female participants from the general public aged 18 years and older. SelfMade recruited university students through a social medial flyer and via radio advertisements on the university's radio station. They also specifically recruited participants from a program for under-represented and disadvantaged students. NHBN recruited women already receiving treatment at two behavioral health centers. NV worked with community-based organizations in Philadelphia and San Diego to promote the sessions and recruit participants from these communities.

Educational sessions used IK materials and followed a similar format, but facilitators tailored the approach used in each session to the population (*e.g.*, use of survivor stories, icebreaker activities, provider-led question and answer sessions). SelfMade and NHBN conducted sessions in English with English IK materials, whereas NV held sessions exclusively in Spanish and used Spanish IK materials.[7]

Participants completed pre- and post-session questionnaires to assess changes in knowledge, awareness, and self-confidence with information and behavioral intentions related to the five main types of gynecologic cancer. Questionnaires included five-point Likert-scale responses and closed-ended single and multiple response options. No personal identifying information was collected from participants, and questionnaires were not linked. CDC determined that this study constituted public health practice and did not require Institutional Review Board (IRB) review, but informed consent was obtained.

Questionnaires and other aspects of data collection were reviewed and approved by OMB, and all questionnaires contained the OMB approval number 0920-0800. All questionnaires were filled out manually by participants and then scanned and entered into a database by using Snap Survey software. Each questionnaire was also reviewed by a member of the research team to ensure accuracy of the database.

Demographic characteristics of participants were assessed, including age, race/ethnicity, and education level. Knowledge of risk factors, human papillomavirus (HPV) vaccination, testing, and diagnostics for the five main types of gynecologic cancer were also assessed pre- and post-session. Categories of Likert-scale responses to questions were collapsed to dichotomous responses of ''extremely confident/somewhat confident'' versus all other categories, and ''extremely likely/somewhat likely'' versus all other categories due to infrequent responses. Denominators excluded missing responses and respondents who selected ''does not apply.''

Descriptive statistics were calculated for participant demographic characteristics, knowledge, intentions, and awareness. Pre- and post-session knowledge and intentions were also compared by using chi-square tests ($p < 0.05$). SAS version 9.3 (SAS Incorporated, Cary, NC) was used to conduct all analyses.

Results

Demographics

Table 1 presents the demographic characteristics of participants and their level of cancer awareness. The number of session participants ranged from 35 to 51 women across all sessions. For NHBN, more than half of the participants (58.7%) were 55 years or older, a majority were African American (78.6%), and 45.8% had some college or more education. The majority of participants were aware pre-session of cervical cancer (73.2%), ovarian cancer (85.4%), vaginal cancer (63.4%), and uterine cancer (56.1%). The majority of participants from NV were between 35 and 54 years of age (63.7%), and 97.1% were Hispanic.

More than half of the participants attended some high school or less (51.5%), and most were aware pre-session of cervical (91.4%), ovarian (77.1%), and uterine (80.0%) cancers. For participants from SelfMade, more than two thirds were less than 35 years of age (80.7%) and were African American (77.4%). A total of 43.3% of SelfMade participants reported having a college degree or higher. The majority of participants were also aware pre-session of cervical (97.0%), ovarian (97.0%), uterine (75.8%), and vaginal (66.7%) cancers (Table 1).

Knowledge about risk factors

Changes in knowledge about risk factors for gynecologic cancer are presented in Table 2. For NHBN participants, no statistically significant differences were seen in risk factors for ovarian and uterine cancers, with 50% or less of participants correctly identifying any of the risk factors for ovarian or uterine cancer post-session. For HPV-related cancers, the only statistically significant increase in knowledge was seen in awareness that smoking increases risk for cervical cancer (78.1% pre-session vs. 94.6% post-session). Awareness that vaginal and vulvar cancers are associated with HPV decreased post-session.

Most NV participants correctly identified family history as a risk factor for ovarian cancer both pre- and post-session (93.3% pre-session vs. 92.1% post-session), and participants significantly increased their awareness of never having given birth/infertility as a risk factor for ovarian cancer (16.7% pre-session vs. 42.1% post-session). Awareness that menopausal/post-menopausal status/advanced age is the greatest risk factor for uterine cancer remained low post-session. After sessions,

Table 1. Demographics

	National networks		
	National behavioral health network, n = *51*	*Nuestras voces,* n = *39*	*SelfMade,* n = *35*
	N *(%)*	N *(%)*	N *(%)*
Age			
<35 years	5 (10.9)	7 (21.2)	25 (80.7)
35–44 years	2 (4.4)	9 (27.3)	6 (19.4)
45–54 years	12 (26.1)	12 (36.4)	0 (0.0)
55+ years	27 (58.7)	5 (15.2)	0 (0.0)
Race/Ethnicity			
Hispanic/Latina	2 (4.8)	33 (97.1)	3 (9.7)
African American	33 (78.6)	0 (0.0)	24 (77.4)
Other	7 (16.7)	1 (2.9)	4 (12.9)
Education Level			
Some high school or less	13 (27.1)	17 (51.5)	0 (0.0)
High school graduate/GED	13 (27.1)	5 (15.2)	8 (26.7)
Some college	18 (37.5)	5 (15.2)	9 (30.0)
College graduate or higher	4 (8.3)	6 (18.2)	13 (43.3)
Awareness of IK campaign[a]	11 (22.0)	8 (22.9)	4 (12.5)
Awareness of cervical cancer[a]	30 (73.2)	32 (91.4)	32 (97.0)
Awareness of ovarian cancer[a]	35 (85.4)	27 (77.1)	32 (97.0)
Awareness of uterine cancer[a]	23 (56.1)	28 (80.0)	25 (75.8)
Awareness of vaginal cancer[a]	26 (63.4)	14 (40.0)	22 (66.7)
Awareness of vulvar cancer[a]	13 (31.7)	7 (20.0)	14 (42.4)

Participants with missing responses are excluded from the denominator. Therefore, cell counts may not add to the total sample size.
[a]Pre-session awareness.
N/A, not applicable.

significantly more participants correctly identified that HPV is associated with vulvar cancer (16.7% pre-session vs. 42.9% post-session).

For SelfMade participants, 100% correctly identified that family history is a risk factor for ovarian cancer, and significantly more participants correctly identified Ashkenazi Jewish background as an ovarian cancer risk factor (18.2% pre-session vs. 79.4% post-session). Knowledge that never giving birth/infertility is a risk factor of ovarian cancer and that menopausal/post-menopausal status/advanced age is the greatest risk factor for uterine cancer decreased post-session. All (100%) of the SelfMade participants correctly identified that HPV can cause cervical cancer post-session, and they significantly more correctly identified that HPV can cause vaginal and vulvar cancers post-session (28.1% pre-session vs. 61.8% post-session and 18.8% pre-session vs. 55.9% post-session, respectively) (Table 2).

Knowledge about prevention, testing, and diagnostics

Table 3 describes changes in knowledge of vaccination, testing, and diagnostics. After sessions, awareness of HPV vaccination and cervical cancer screening recommendations remained low for participants from NHBN (<45%). In addition, no significant differences were seen in knowledge of genetic testing post-session. The percentage of participants in NV sessions that correctly identified that the HPV vaccine is recommended for 11- and 12-year-old girls (54.6% pre-session vs. 82.1% post-session) and that it is recommended for girls and women ages 13–26 who did not get any or all of the shots when they were younger (15.2% pre-session vs. 76.9% post-session) increased post-session.

No significant differences were seen for cervical cancer screening, but significant increases were seen in awareness that genetic testing is available for uterine cancer risk (29.2% pre-session vs. 59.0% post-session). For SelfMade participants, significant increases were seen in awareness that the HPV vaccine is recommended for 11- and 12-year-old girls. For questions related to cervical cancer screening, no significant increases were seen in correct identification that only cervical cancer has an effective screening test, and the number of participants correctly identifying that the Pap test only screens for cervical cancer decreased post-session. No significant changes were seen in participant answers to questions related to genetic testing (Table 3).

Knowledge and awareness of symptoms and health care seeking intentions

Gynecologic cancer awareness, symptom knowledge, and intentions are shown in Table 4. The percentage of women agreeing/strongly agreeing that gynecologic cancer is an important health issue and that women should be aware of gynecologic cancer signs and symptoms was high pre-session and remained high post-session for participants from all National Networks (>87%). No significant changes were seen for the number of participants stating that gynecologic cancer was a problem for them or their families after any of the National Network sessions.

Correct identification of all gynecologic cancer symptoms assessed remained low (<9%) for participants from all

Table 2. Risk Factors for Gynecologic Cancer

Question	*National behavioral health network,* n = *51*		*Nuestras voces,* n = *39*		*SelfMade,* n = *35*	
	Pre-session knowledge N *(%)*	*Post-session knowledge* N *(%)*	*Pre-session knowledge* N *(%)*	*Post-session knowledge* N *(%)*	*Pre-session knowledge* N *(%)*	*Post-session knowledge* N *(%)*
Ovarian cancer						
Family history	24 (60.0)	20 (50.0)	28 (93.3)	35 (92.1)	30 (90.9)	34 (100)
Never giving birth/infertility	13 (32.5)	18 (45.0)	5 (16.7)	16 (42.1)[a]	18 (54.6)	14 (41.2)
Ashkenazi Jewish background	6 (15.0)	5 (12.5)	1 (3.3)	8 (21.1)	6 (18.2)	27 (79.4)[a]
All correct responses	0 (0.0)	1 (2.5)	0 (0.0)	4 (10.5)	1 (3.0)	2 (5.9)
Uterine cancer						
Menopausal or postmenopausal status/advanced age is the greatest risk factor[b]	11 (27.5)	7 (17.1)	2 (7.4)	2 (5.7)	8 (25.0)	3 (9.1)
HPV-associated cancers						
HPV can cause cervical cancer	22 (59.5)	28 (73.7)	22 (73.3)	26 (74.3)	29 (90.6)	34 (100)
Vaginal	17 (46.0)	16 (42.1)	10 (33.3)	20 (57.1)	9 (28.1)	21 (61.8)[a]
Vulvar	12 (32.4)	12 (31.6)	5 (16.7)	15 (42.9)[a]	6 (18.8)	19 (55.9)[a]
All correct responses	1 (2.7)	1 (2.6)	1 (3.3)	2 (5.7)	1 (3.1)	3 (8.8)
Smoking increases risk for cervical cancer	32 (78.1)	35 (94.6)[a]	16 (61.5)	30 (79.0)	29 (90.6)	31 (91.2)

Participants with missing responses are excluded from the denominator. Therefore, cell counts may not add to the total sample size.
[a]*p* values from chi-square tests ($p < 0.05$).
[b]Correctly identified this item alone.

Table 3. Vaccination, Testing, and Diagnostics for Gynecologic Cancer

Question	*National behavioral health network,* n = *51*		*Nuestras voces,* n = *39*		*SelfMade,* n = *35*	
	Pre-session knowledge N *(%)*	*Post-session knowledge* N *(%)*	*Pre-session knowledge* N *(%)*	*Post-session knowledge* N *(%)*	*Pre-session knowledge* N *(%)*	*Post-session knowledge* N *(%)*
HPV vaccine						
Recommended for 11- and 12-year-old girls	13 (28.9)	10 (24.4)	18 (54.6)	32 (82.1)[a]	10 (30.3)	30 (85.7)[a]
Recommended for girls and women ages 13–26 who did not get any or all of the shots when they were younger	16 (35.6)	13 (31.7)	5 (15.2)	30 (76.9)[a]	24 (72.7)	30 (85.7)
Correctly answered HPV vaccine question	2 (4.4)	0 (0.0)	1 (3.0)	16 (41.0)[a]	5 (15.2)	11 (31.4)
Cervical cancer screening						
Only cervical cancer has an effective screening test	14 (38.9)	17 (44.7)	11 (44.0)	20 (55.6)	20 (64.5)	22 (66.7)
The Pap test only screens for cervical cancer	9 (20.9)	9 (23.1)	15 (50.0)	21 (60.0)	13 (39.4)	9 (27.3)
Genetic testing						
Available for uterine cancer	19 (52.8)	19 (54.3)	7 (29.2)	23 (59.0)[a]	21 (63.6)	20 (62.5)
Ovarian cancer	23 (63.9)	22 (62.9)	9 (37.5)	22 (56.4)	27 (81.8)	29 (90.6)
All correct responses	3 (8.3)	0 (0.0)	1 (4.2)	3 (7.7)	2 (6.1)	0 (0.0)

Participants with missing responses are excluded from the denominator. Therefore, cell counts may not add to the total sample size.
[a]*p* values from chi-square tests ($p < 0.05$).
N/A, not applicable.

Table 4. Gynecologic Cancer Awareness, Symptom Knowledge, and Intentions Among Women Attending the Public Inside Knowledge Educational Sessions

Question	*National behavioral health network,* n = *51*		*Nuestras voces,* n = *39*		*SelfMade,* n = *35*	
	Pre-session knowledge N *(%)*	*Post-session knowledge* N *(%)*	*Pre-session knowledge* N *(%)*	*Post-session knowledge* N *(%)*	*Pre-session knowledge* N *(%)*	*Post-session knowledge* N *(%)*
Awareness of gynecologic cancer[b]						
Gynecologic cancer is an important health issue	43 (87.8)	36 (87.8)	33 (97.1)	39 (100)	32 (100)	35 (100)
Women should be aware of gynecologic cancer signs and symptoms	44 (89.8)	32 (84.2)	33 (97.1)	38 (97.4)	33 (100)	35 (100)
Gynecologic cancer is a problem for me	15 (32.6)	11 (28.2)	19 (55.9)	23 (65.7)	9 (27.3)	11 (32.4)
Gynecologic cancer is a problem in my family	13 (27.1)	9 (23.1)	21 (63.6)	25 (67.6)	3 (9.1)	9 (26.5)
Knowledge of symptoms						
Pelvic pain/pressure	18 (54.6)	24 (66.7)	12 (37.5)	26 (70.3)[a]	25 (78.1)	32 (91.4)
Abnormal bleeding or discharge	24 (72.7)	33 (91.7)[a]	27 (84.4)	36 (97.3)	31 (96.9)	35 (100)
Abdominal or back pain	11 (33.3)	26 (72.2)[a]	9 (28.1)	23 (62.2)[a]	23 (71.9)	34 (97.1)[a]
Bloating	7 (21.2)	21 (58.3)[a]	7 (21.9)	21 (56.8)[a]	16 (50.0)	34 (97.1)[a]
Change in bathroom habits	8 (24.2)	21 (58.3)[a]	2 (6.3)	12 (32.4)[a]	15 (46.9)	30 (85.7)[a]
Itching or burning of the vulva	12 (36.4)	20 (55.6)	7 (21.9)	29 (78.4)[a]	22 (68.8)	29 (82.9)
Changes in vulva color or skin	8 (24.2)	16 (44.4)	6 (18.8)	13 (35.1)	19 (59.4)	32 (91.4)[a]
All correct	1 (3.0)	2 (5.6)	1 (3.1)	0 (0.0)	4 (12.5)	7 (20.0)
Seek medical care if signs or symptoms of gynecologic cancer last for 2 weeks or more	2 (5.3)	7 (18.0)	2 (5.9)	6 (16.2)	14 (43.8)	26 (74.3)[a]
See a doctor immediately for abnormal bleeding or discharge	41 (95.4)	34 (94.4)	33 (100)	34 (94.4)	28 (87.5)	33 (100)[a]
Confidence with information[c]						
Talk to my doctor about gynecologic cancer.	29 (65.9)	31 (79.5)	26 (81.3)	35 (97.2)[a]	18 (58.1)	33 (97.1)[a]
Talk to my doctor about symptoms I may be having.	27 (64.3)	28 (77.8)	29 (90.6)	32 (97.0)	17 (58.6)	33 (97.1)[a]
Intentions[d]						
Quit smoking	20 (76.9)	19 (73.1)	5 (100)	10 (83.3)	4 (66.7)	4 (80.0)
Get the HPV vaccine[e]	NR	NR	NR	NR	9 (75.0)	13 (100)
Get regular Pap tests	32 (82.1)	26 (74.3)	25 (89.3)	29 (93.6)	26 (83.9)	31 (93.9)
Talk to my doctor about genetic testing.	26 (70.3)	23 (65.7)	20 (76.9)	25 (89.3)	18 (56.3)	26 (81.3)[a]
Talk about gynecologic cancer with my family.	20 (50.0)	26 (72.2)[a]	22 (75.9)	26 (86.7)	27 (84.4)	32 (94.1)
Talk about gynecologic cancer with my friends.	22 (57.9)	29 (78.4)	23 (79.3)	23 (76.7)	27 (84.4)	32 (94.1)
Bring up gynecologic cancer the next time I visit my health care provider.	31 (77.5)	30 (79.0)	23 (85.2)	29 (90.6)	25 (78.1)	32 (94.1)
Look for more information on gynecologic cancer.	30 (76.9)	32 (84.2)	25 (89.3)	29 (87.9)	29 (87.9)	34 (100)

[a] *p* values from chi square tests ($p < 0.05$).
[b] Percentages represent women who responded agree or strongly agree.
[c] % Somewhat Confident, Extremely Confident.
[d] % Somewhat Likely, Extremely Likely.
[e] Among age-eligible women (24 years and younger based on pre-defined age categories used in the questionnaire); $n = 14$.
NR, not reported due to small cell counts or zero age-eligible women. Therefore, cell counts may not add to the total sample size.

networks after educational sessions, but significant changes were seen for some individual symptoms. NHBN participants correctly identifying gynecologic cancer symptoms of abnormal bleeding/discharge (72.7% pre-session vs. 91.7% post-session), abdominal or back pain (33.3% pre-session vs. 72.2% post-session), bloating (21.2% pre-session vs. 58.3% post-session), and change in bathroom habits (24.2% pre-session vs. 58.3% post-session) significantly increased post-session.

The number of participants correctly identifying that they should seek medical care if signs or symptoms lasted for 2 weeks or more remained low post-session. Although there were no statistically significant changes in their confidence with gynecologic cancer information, there were statistically significant pre–post session increases in their intention to talk to their families about gynecologic cancer (50.0% pre-session vs. 72.2% post-session).

NV participants significantly increased correct identification of most gynecologic cancer symptoms post-session, including pelvic pain/pressure (37.5% pre-session vs. 70.3% post-session), abdominal or back pain (28.1% pre-session vs. 62.2% post-session), bloating (21.9% pre-session vs. 56.8%), change in bathroom habits (6.3% vs. 32.4%), and itching or burning of the vulva (21.9% pre-session vs. 78.4% post-session). These participants reporting they ''agree'' or ''strongly agree'' they were confident in their ability to talk to their doctor about gynecologic cancer significantly increased post-session (81.3% pre-session vs. 97.2% post-session).

The number of SelfMade participants increased their correct identification of several gynecologic cancer symptoms, including abdominal or back pain (71.9% pre-session vs. 97.1% post-session), bloating (50.0% pre-session vs. 97.1% post-session), change in bathroom habits (46.9% pre-session vs. 85.7% post-session), and changes in vulva color or skin (59.4% pre-session vs. 91.4% post-session) post-session.

The number of SelfMade participants reporting that they knew to seek medical care if signs or symptoms of gynecologic cancer last for 2 weeks (43.8% pre-session vs. 74.3% post-session) or more and to see a doctor immediately for abnormal bleeding or discharge (87.5% pre-session vs. 100% post-session) increased significantly post-session. Intentions related to talking to their doctors about genetic testing also increased post-session for these participants (56.3% pre-session vs. 81.3% post-session) (Table 4).

Discussion

This article represents a unique collaboration between the CDC's IK campaign and its Consortium of National Networks to Impact Populations Experiencing Tobacco-Related and Cancer Health Disparities. Overall, after participation in IK sessions, women saw increases in their understanding of gynecologic cancer symptoms and reported increases in behavioral intentions related to gynecologic cancers. However, specific changes in knowledge differed by population.

As a whole, our results show that the IK campaign materials are effective at increasing knowledge and increasing health-related behavioral intention, consistent with other educational campaigns.[13] With regard to increased risk factor knowledge, SelfMade and Nuestra Voces participants showed positive results. However, participants from NHBN saw no increases in knowledge of risk factors, except smoking. These differences in pre-session knowledge and changes in post-session knowledge suggest that the IK materials may be more effective in some populations versus others.

NHBN participants attended sessions as part of existing treatment programs for substance abuse or behavioral modification. Because the information was presented as part of a larger program, the women may have been less able to focus on the material being presented as compared with participants from the other networks who attended sessions outside of any additional educational programming. Further, because NHBN participants are dealing with other significant and more immediate health issues (mental and substance abuse disorders), it may be more challenging to improve cancer knowledge in this population.

People with a mental illness experience increased rates of chronic disease; however, programs that improve healthy behaviors in this population are necessary and important.[14] Recent evidence suggests that engaging caregivers may be helpful in increasing knowledge and reducing risk factors of chronic disease risk factors in this population.[15] Future educational efforts that include caregivers in this population may be more effective.

Knowledge of testing, vaccination, and diagnostic information increased substantially among Nuestra Voces participants. This increase in knowledge suggests that IK materials may be an effective tool to educate Hispanic women about how to prevent HPV-associated cancer. This is a particularly positive finding because Hispanic women have the highest rates of cervical cancer in the United States and HPV vaccination rates are generally low in the United States.[16–18] SelfMade participants also showed substantial knowledge gains regarding HPV vaccination recommendations. These participants were generally younger than participants from the other networks; therefore, it is possible that vaccination recommendations resonated more with them since they are closer to the target vaccination age range.

Overall awareness of gynecologic cancer, symptom awareness, and health-seeking intentions increased significantly among participants from SelfMade and Nuestra Voces. Because many of the SelfMade participants were university students currently receiving information in classroom settings, they may have been generally more receptive to the materials presented during sessions. The knowledge gains seen in this population suggest that there may be a benefit to presenting this information to a broader range of age groups and in settings where women are already accustomed to educational materials being presented.

NV participants saw more significant increases in knowledge related to vaccinations, genetic testing, and symptom recognition than participants from other Networks. This supports the fact that the Spanish language IK materials are effective in increasing awareness and symptom recognition.

Participants also reported increases in intentions of getting the HPV vaccine and talking to friends and family about gynecologic cancer. Such conversations could expand the reach of information provided to others in the community, as friends and family members are considered important sources of cancer-related information.[19] Women also felt more confident in their ability to talk to their doctor about gynecologic cancer and symptoms that they may be having, which could lead to more women feeling empowered as patients, resulting in better patient–provider relationships.[20] Overall, we did not see significant increases in knowledge of cervical cancer screening

and genetic testing for gynecologic cancers, highlighting the potential need for additional resources in these areas.

IK materials were created for a wide audience to increase awareness of the gynecologic cancer risks and symptoms. Research shows that message tailoring is associated with improved uptake of health education materials.[21] By utilizing National Networks, who understand the unique needs of their populations and how to reach them, the educational sessions were tailored to be most beneficial to the participants. However, there were a few persistent misunderstandings of gynecologic cancer information post-session, including some risk factors for gynecologic cancer, screening for cervical cancer, and genetic testing for uterine and ovarian cancers.

Although session formats were adapted by each National Network, the print materials provided in each session were the same, with the exception of Spanish materials provided to NV participants. Research shows that tailoring of print materials to specific audiences is more effective than utilizing a one-size-fits-all approach.[22] Although IK materials are already available in both English and Spanish, the misunderstandings present after these educational sessions indicate that materials and session formats may benefit from further tailoring for different populations and utilization of additional formats for presenting information, such as storytelling, telenovelas, game-based approaches, and others to empower women to not delay medical care when symptoms present, and to stay up-to-date with cervical cancer screening.[23–25]

Our analysis had some limitations and strengths of note. Because underserved populations can be hard to recruit for intervention, our sample was relatively small from each individual Network and may not be representative of all women within these populations. Also, social desirability bias could have affected participant responses to questions related to behavioral intentions and confidence, causing them to overstate their agreement with statements presented. We were only able to assess group-level changes in knowledge and intentions, and therefore individual changes could not be assessed.

Our study was, however, designed according to standard knowledge and behavioral theories and recruitment of participants and sessions and was carried out by National Networks who have extensive experience in administering to their target populations. The gains in knowledge seen provide useful information for how to further engage these populations for chronic disease education and reduction.

Conclusion

Overall, utilizing IK materials was effective in increasing participant awareness of signs and symptoms of gynecologic cancer and their related behavioral intentions, and such knowledge increases could lead to a greater awareness of this information in the community and lead women to feel more empowered in their interactions to identify and discuss symptoms with providers. However, because differences were seen in knowledge changes among the participant groups and some misunderstandings of information presented remained, additional tailoring of materials could lead to further increases in future knowledge gains.

Author Disclosure Statement

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. We have no financial disclosures to report.

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