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Effects of an Education Intervention about HPV Self-Testing for Healthcare Providers and Staff

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Abstract

Background—Human papillomavirus (HPV) self-testing is an emerging cervical cancer screening strategy, yet efforts to educate healthcare providers and staff about HPV self-testing are lacking. We report the findings of a brief education intervention about HPV self-testing for healthcare providers and staff.

Methods—We conducted education sessions during 2015 with healthcare providers and staff (n=33) from five federally qualified health centers located in Appalachian Ohio. Participants attended a one-time session and completed pre- and post-intervention surveys. Analyses for paired data assessed changes in knowledge and beliefs about HPV, HPV-related disease, and HPV self-testing.

Results—The intervention increased participants' knowledge and affected many of the beliefs examined. Participants answered an average of 4.67 of six knowledge items correctly on pre-intervention surveys and 5.82 items correctly on post-intervention surveys ($p<0.001$). The proportion of participants who answered all six knowledge items correctly increased substantially (pre-intervention=9% vs. post-intervention=82%, $p<0.001$). Compared to pre-intervention surveys, participants more strongly believed on post-intervention surveys that it is important to examine HPV self-testing as a potential cervical cancer screening strategy, that their female patients would

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Compliance with Ethical Standards

The Institutional Review Board at The Ohio State University approved this study. Informed consent was obtained from all individual participants included in the study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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be willing to use an HPV self-test at home by themselves, and that they have the knowledge to talk with their patients about HPV self-testing (all $p < 0.05$).

Conclusions—A brief education intervention can be a viable approach for increasing knowledge and affecting beliefs about HPV self-testing among healthcare providers and staff. Findings will be valuable for planning and developing future HPV self-test interventions that include an education component for healthcare providers and staff.

Keywords

HPV; cervical cancer; screening; women's health

Introduction

Human papillomavirus (HPV) infection is a common sexually transmitted infection (STI) among females in the United States (US), with over 40% having a current genital HPV infection [1]. Persistent infection with oncogenic HPV types causes virtually all cervical cancers [2]. Although cervical cancer is largely preventable through screening and follow-up care for precancerous lesions, nearly 13,000 new cases and more than 4,000 deaths due to cervical cancer are expected to occur in the US in 2016 [3]. The majority of these new cases will have had infrequent or no prior cervical cancer screening tests [4]. Current US cervical cancer screening guidelines recommend screening with cytology (i.e., Pap testing) every 3 years for women ages 21–29 [5]. Women ages 30–65 should be screened with a combination of cytology and HPV testing every 5 years (preferred strategy) or cytology alone every 3 years (acceptable strategy) [5]. The HPV testing included in the guidelines involves samples collected by a healthcare provider in a clinic setting.

HPV self-testing is an emerging cervical cancer screening strategy that enables women to collect a cervicovaginal sample with a device on their own and return it for testing. Compared to physician-collected samples, HPV self-tests have comparable sensitivity and specificity for detecting cervical disease [6]. International studies have shown that up to about 35% of unscreened and underscreened women will use an HPV self-test at home and return it by mail [7]. As a result, multiple countries, such as the Netherlands in 2016 and Australia in 2017, will begin including HPV self-testing as part of their national cervical cancer screening programs [8, 9]. HPV self-testing is currently not a licensed or recommended screening strategy in the US, but it is starting to be examined frequently in research studies. Focus group and survey studies have shown that most US women would be willing to use an HPV self-test at home (i.e., high acceptability) [10–13]. Recent efforts have even implemented and established the feasibility of mail-based HPV self-testing programs for US women [14]. Taken together, these studies suggest that HPV self-testing may help reach and screen women in the US who have not been screened for cervical cancer recently.

As interest in HPV self-testing continues to increase, it becomes important that we understand healthcare providers' knowledge and beliefs about HPV self-testing and begin to educate them about this topic. Healthcare providers and staff will need to be informed about HPV self-testing and how to effectively communicate about it with their patients. However,

to our knowledge, very little is known about efforts to educate healthcare providers and staff about HPV self-testing.

The current report includes the results of a brief education intervention about HPV self-testing for healthcare providers and staff that was conducted as part of the Health Outcomes through Motivation and Education (HOME) Project. The goal of the HOME Project was to develop and pilot test a mail-based HPV self-test program for women living in the Appalachian Ohio region. Appalachian Ohio is a 32-county region in the southern and eastern part of the state. Residents of Appalachian Ohio are predominately non-Hispanic white and have higher rates of poverty compared to the rest of the state [15]. The cervical cancer incidence rate is higher for Appalachian Ohio compared to the rest of Ohio and the national rate [16]. Multiple factors likely contribute to this disparity, including an increased prevalence of infection with oncogenic HPV types and low utilization of Pap testing among women from Appalachian Ohio [17, 18].

One component of the HOME Project involved education sessions about HPV self-testing for healthcare providers and staff at participating health centers. We believed it was important that the healthcare providers and staff at these health centers were knowledgeable about HPV self-testing since their female patients were approached to participate in the mail-based HPV self-testing program. Findings from these education sessions will be valuable for planning and developing future HPV self-test interventions that include an education component for healthcare providers and staff.

Methods

Participants

For the HOME Project, we partnered with the Valley View Health Centers, which is a system of federally qualified health centers that serve residents of Appalachian Ohio. We conducted education sessions with a convenience sample of healthcare providers and staff from five Valley View Health Centers. The health centers are located in counties (Jackson, Pike, and Scioto counties) that have cervical cancer incidence rates that are higher than the state rate for Ohio [19]. We conducted a total of three education sessions, with two of the sessions including healthcare providers and staff from multiple health centers. Sessions were held in common areas at the health centers and were open to all healthcare providers and staff involved with patient care. Staff not involved with providing patient care (e.g., accounting staff) did not participate. To maximize attendance, we conducted the education sessions during existing meeting times for the health centers and provided participants with a \$25 gift card. All education sessions occurred during October 2015. We report data on 33 healthcare providers and staff who completed an education session, excluding three individuals who started but did not complete an education session because of job responsibilities. The Institutional Review Board at The Ohio State University approved this study.

Intervention

We developed an automated PowerPoint presentation for the education sessions. The presentation provided information about HPV infection and HPV-related diseases, current cervical cancer screening recommendations, HPV self-testing and its use in the HOME Project, and how to talk with patients about HPV self-testing and self-test results. A physician from the study team (MTR) reviewed presentation content for medical accuracy and provided narration for the PowerPoint slides. The presentation was designed to be brief and lasted about 15 minutes. Two members of the study team (MLK, PLR) attended each of the education sessions and answered questions following the presentation. Prior to the start of the presentation, participants provided informed consent and completed a written pre-intervention survey. Following completion of the presentation, participants completed a written post-intervention survey.

Measures

Pre-intervention surveys collected information on participants' demographic characteristics, including age, gender, race/ethnicity, marital status, education level, employment status, and job title. Pre- and post-intervention surveys assessed participants' knowledge and beliefs about HPV, HPV-related disease, and HPV self-testing. The educational presentation included information that targeted each of the knowledge and belief items. Pre- and post-intervention surveys included identical knowledge and beliefs items.

Knowledge was assessed using six items that had response options of true, false, and don't know. Items (correct response indicated in parentheses) asked participants if: (a) many counties in Appalachian Ohio have higher rates of cervical cancer compared to the rest of the state (true); (b) HPV infection is rare (false); (c) women can complete an HPV self-test by themselves at home and return it through the mail (true); (d) HPV self-testing can detect high-risk HPV types that cause almost all cervical cancers (true); (e) HPV self-testing is currently a recommended cervical cancer screening strategy for US women (false); and (f) women who complete an HPV self-test should still receive a Pap test (true). We classified participants' responses as "correct" or "incorrect" for each item. Responses of don't know were classified as incorrect for each item.

Belief items targeted constructs from the Health Belief Model [20] and other constructs believed to be important for evaluating the education sessions. Participants' beliefs were assessed with six statements about: (a) their female patients being at risk for HPV infection (i.e., perceived susceptibility); (b) how severe of a threat cervical cancer is to their female patients' health (i.e., perceived severity); (c) the importance of examining HPV self-testing as a potential cervical cancer screening strategy (i.e., perceived benefit); (d) how willing their female patients would be to use an HPV self-test at home by themselves (i.e., perceived willingness); (e) their confidence in talking with female patients about HPV self-testing (i.e., self-efficacy); and (f) having the knowledge to talk with their female patients about HPV self-testing (i.e., perceived knowledge). All belief items used a 5-point scale with responses of "strongly disagree," "disagree," "not sure," "agree," and "strongly agree" (coded 1–5).

Data Analysis

We first calculated descriptive statistics for demographic characteristics and the knowledge and belief items. We compared pre- and post-intervention responses for knowledge and beliefs items using either McNemar's chi-square test (categorical variables) or the Wilcoxon signed rank test (continuous variables). Data were analyzed with Stata Version 14.1 (College Station, TX) using two-tailed statistical tests and a critical alpha of 0.05.

Results

Participant Characteristics

All participants were non-Hispanic white with a mean age of 43.2 years (Table 1). Most participants were female (88%), married (82%), and had at least a college degree (72%). Almost all participants worked full-time (91%). The 33 participants included 20 nurses, 5 nurse practitioners, 5 medical assistants, and 3 other providers/staff (1 physician, 1 case manager, and 1 social worker).

Knowledge

Participants answered an average of 4.67 of the six knowledge items correctly on pre-intervention surveys and 5.82 items correctly on post-intervention surveys ($p<0.001$). The intervention increased the proportion of participants who answered all six knowledge items correctly (pre-intervention=9% vs. post-intervention=82%, $p<0.001$). For individual knowledge items (Table 2), the intervention increased the proportion of participants who correctly answered the items on whether women can complete an HPV self-test at home by themselves and return it through the mail (pre-intervention=73% vs. post-intervention=100%, $p=0.004$) and whether HPV self-testing is currently a recommended cervical cancer screening strategy for women in the United States (pre-intervention=18% vs. post-intervention=82%, $p<0.001$). Although the proportion of participants who provided correct responses increased for most of the other knowledge items as well, these differences were not statistically significant (all $p>0.05$). This is likely due in part to a high proportion of participants providing correct responses for these other items on the pre-intervention survey (range: 91%–100%).

Beliefs

The intervention significantly affected almost all of the beliefs examined (Table 3). Following the intervention, participants more strongly believed that their female patients are at risk of getting HPV infection at some point in their lives (pre-intervention mean=4.4 vs. post-intervention mean=4.7, $p=0.007$), cervical cancer is a serious threat to their female patients' health (pre-intervention mean=4.5 vs. post-intervention mean=4.7, $p=0.014$), and it is important to examine HPV self-testing as a potential cervical cancer screening strategy (pre-intervention mean=4.2 vs. post-intervention mean=4.5, $p=0.013$). The intervention also resulted in participants more strongly believing that their female patients would be willing to use an HPV self-test at home by themselves (pre-intervention mean=3.4 vs. post-intervention mean=3.8; $p<0.001$) and believing that they have the knowledge to talk with

their patients about HPV self-testing (pre-intervention mean=3.7 vs. post-intervention mean=4.5; $p<0.001$).

Discussion

HPV self-testing is a cervical cancer screening strategy that will soon be integrated into national screening program in the Netherlands and Australia [8, 9]. In the US, it is a strategy that is starting to be examined frequently in research studies [10–14]. These past studies have focused primarily on the acceptability and feasibility of HPV self-testing among women, with little known about the knowledge and beliefs of healthcare providers and staff about self-testing. The current study assessed healthcare providers' knowledge and beliefs about HPV self-testing and the effects of a brief education intervention. To our knowledge, this is the first HPV self-testing education intervention targeting healthcare providers and staff.

Our intervention increased participants' knowledge about HPV self-testing. These findings agree with previous healthcare provider education interventions about HPV and HPV vaccine, which also improved providers' baseline knowledge about these topics [21–23]. In our study, nearly all participants correctly answered pre-intervention items regarding general HPV and cervical cancer information. However, participants' knowledge about HPV self-testing was much lower on the pre-intervention survey. For example, nearly 80% of participants incorrectly thought that HPV self-testing is currently a recommended cervical cancer screening strategy in the US. This coincides with a recent study that also showed many healthcare providers lack knowledge about current cervical cancer screening guidelines [24]. Our results suggest that it will be important for future efforts targeting healthcare providers and staff to focus primarily on information about HPV self-testing and cervical cancer screening guidelines, rather than more basic information about HPV and cervical cancer.

Our intervention positively impacted almost all belief items examined, including participants' beliefs about the importance of examining HPV self-testing as a potential cervical cancer screening strategy, the willingness of their patients to use an HPV self-test at home, and having the knowledge to talk with their patients about HPV self-testing. It is interesting that although our intervention increased participants' beliefs about having the knowledge to talk with patients about HPV self-testing, it did not substantially affect their confidence in talking with patients about self-testing. If HPV self-testing becomes a recommended screening strategy in the US, it will be important that providers have both the knowledge and the confidence to talk with their patients about HPV self-testing. Therefore, future efforts targeting healthcare providers and staff should include strategies for increasing their self-efficacy to talk with patients about HPV self-testing. Potential strategies and activities may include communication skills trainings and role play, which can be a valuable tool for improving provider-patient communication skills [25].

Study strengths include a focus on a geographic area with high cervical cancer rates, various strategies to increase attendance at education sessions (i.e., incentives and conducting the sessions during existing meeting times for the health centers), and survey assessments both

before and after the educational presentation. Limitations include conducting education sessions among a convenience sample of participants from one system of federally qualified health centers in Appalachian Ohio, having all non-Hispanic white participants (over 90% of Appalachian Ohio residents are non-Hispanic white [15]), and having relatively few male participants. We also had a modest sample size, though we were still able to detect statistically significant increases with this sample size. Similar to previous studies involving education sessions for providers [21], we were unable to observe how education sessions would translate into a clinical setting and whether participants would retain information over time.

As interest in HPV self-testing as a cervical cancer screening strategy continues to increase in the US, it becomes important that we begin to educate healthcare providers and staff about HPV self-testing. Our findings suggest that a brief education intervention can improve knowledge and positively affect beliefs about HPV self-testing among healthcare providers and staff. This type of intervention may offer a relatively low effort and potentially effective strategy for educating healthcare providers and staff about HPV self-testing. Findings will be valuable for planning and developing future HPV self-test interventions that include an education component for healthcare providers and staff.

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Table 1Characteristics of healthcare providers and staff who participated in the education sessions (*n*=33)

	<i>n</i> (%)
Age (years)	43.2 (10.1)
Gender	
Female	29 (88)
Male	4 (12)
Race / ethnicity	
Non-Hispanic White	33 (100)
Other	0 (0)
Marital Status	
Single	2 (6)
Married	27 (82)
Separated/Divorced	4 (12)
Education Level	
High School Degree	9 (27)
College Degree	12 (36)
Graduate / Professional School	12 (36)
Employment Status	
Full-time	30 (91)
Part-time	3 (9)
Job Title	
Nurse	20 (61)
Nurse Practitioner	5 (15)
Medical Assistant	5 (15)
Other ^a	3 (9)

Note. Table reports *n* (%) for all variables except age, for which the mean (standard deviation) is reported. Percents may not sum to 100% due to rounding.

^aIncluded 1 physician, 1 case manager, and 1 social worker

Table 2

Comparison of knowledge items from pre-intervention and post-intervention surveys (n=33)

	Pre-intervention Correct, <i>n</i> (%)	Post-intervention Correct, <i>n</i> (%)	<i>p</i>
Many counties in Appalachian Ohio have higher rates of cervical cancer compared to the rest of the state.	31 (94)	33 (100)	0.500
Infection with HPV is rare.*	33 (100)	33 (100)	1.000
Women can complete an HPV self-test at home by themselves and return it through the mail.	24 (73)	33 (100)	0.004
HPV self-testing can help detect infection with high-risk HPV types that cause almost all cases of cervical cancer.	30 (91)	33 (100)	0.250
HPV self-testing is currently a recommended cervical cancer screening strategy for women in the United States.*	6 (18)	27 (82)	<0.001
Women who complete an HPV self-test should still receive a Pap test.	30 (91)	33 (100)	0.250

Note. Table reports the frequency and percentage of correct responses for each knowledge item. The correct response was “true” for all items except for items with superscript (*), for which the correct response was “false”. McNemar’s chi-square test was used to make comparisons and produce the reported *p*-values.

HPV = human papillomavirus.

Table 3

Comparison of belief items from pre-intervention and post-intervention surveys (n=33)

	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	<i>p</i>
My female patients are at risk of getting an HPV infection at some point in their lives.	4.4 (0.6)	4.7 (0.5)	0.007
Cervical cancer is a serious threat to my female patients' health.	4.5 (0.5)	4.7 (0.5)	0.014
It is important to examine HPV self-testing as a potential cervical cancer screening strategy.	4.2 (0.6)	4.5 (0.5)	0.013
My female patients would be willing to use an HPV self-test at home by themselves.	3.4 (0.8)	3.8 (0.6)	<0.001
I am confident that I could talk with female patients about HPV self-testing.	4.4 (0.7)	4.5 (0.5)	0.700
I have the knowledge to talk with my female patients about HPV self-testing.	3.7 (0.9)	4.5 (0.6)	<0.001

Note. Table reports the mean and standard deviation for each belief item. All items used a 5-point response scale ranging from “strongly disagree” to “strongly agree” (coded 1–5). The Wilcoxon signed rank test was used to make comparisons and produce the reported *p*-values.

SD = standard deviation, HPV = human papillomavirus.