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Social Media as a Tool to Promote Health Awareness: Results from an Online Cervical Cancer Prevention Study

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Abstract

Online social media platforms represent a promising opportunity for public health promotion. Research is limited, however, on the effectiveness of social media at improving knowledge and awareness of health topics and motivating healthy behavior change. Therefore, we investigated whether participation in an online social media platform and receipt of brief, tailored messages is effective at increasing knowledge, awareness, and prevention behaviors related to human papillomavirus (HPV) and cervical cancer. We conducted an online study in which 782 recruited participants were consecutively assigned to nine-person groups on a social media platform. Participants were shown a unique random set of 20 tailored messages per day over five days. Participants completed a baseline and post survey to assess their knowledge, awareness, and prevention behaviors related to HPV and cervical cancer. There were no statistically significant changes in knowledge and prevention behaviors from the baseline to the post survey among study participants. There was a modest, statistically significant change in response to whether participants had ever heard of HPV, increasing from 90 to 94% ($p = 0.003$). Our findings suggest that most study participants had substantial knowledge, awareness, and engagement in positive behaviors related to cervical cancer prevention at the start of the study. Nevertheless, we found that HPV awareness can be increased through brief participation in an online social media platform and receipt of tailored health messages. Further investigation that explores how social media can be used to improve knowledge and adoption of healthy behaviors related to cervical cancer is warranted.

Keywords Social media · Health awareness · Health promotion · Cervical cancer prevention

Introduction

Cervical cancer is highly preventable, yet more than 4000 women will die of cervical cancer each year in the USA [1]. Papanicolaou (Pap) tests and human papillomavirus (HPV) vaccines are important cervical cancer prevention measures. However, only 83% of women in the USA reported receiving appropriate Pap test screening—well below the national target of 93% [2], and only 43% of girls aged 13 to 17 are up to date on all the recommended vaccine doses for their age [3].

Online social media platforms like Twitter and Facebook represent a promising opportunity for public health promotion [4]. Research is limited, however, on the effectiveness of social media at improving knowledge and awareness of certain health topics and motivating healthy behavior change [4, 5]. The aim of this study is to evaluate whether participating in an online Twitter-like social media platform and receiving brief messages, or "tweets," focused on HPV and cervical cancer

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prevention is effective at increasing knowledge, awareness, and prevention behaviors related to cervical cancer.

Methods

Study Design

Study investigators designed an anonymous online platform ("Health Connect") for sharing and discussion of brief messages regarding HPV and cervical cancer prevention. Nine hundred unique messages based on actual tweets from Twitter were created. Messages included a balanced mix of factual information and personal experiences from organizations and individuals (e.g., "*WHO recommends #HPV vaccination for girls aged 9-13 years as this is the most cost-effective public health measure against cervical #cancer*" and "*My sisters and I just got our last round of injections to keep HPV and cervical cancer at bay! Every woman should ask their doc about it!*").

Study participants were recruited online using an advertising-based strategy through posts to popular social media sites and targeted email lists [6–9]. Individuals were eligible to participate if they were female, were 18 years or older, lived in the USA, spoke English as their primary language, and did not have cervical cancer. A total of 985 individuals completed the eligibility screening; 44 were ineligible, and 862 consented to participate. Of the 862 who consented to participate, 80 failed to respond to the enrollment invitation, resulting in a total of 782 participants enrolled in the study.

Enrolled participants completed a baseline survey assessing sociodemographic information, knowledge and awareness of HPV and cervical cancer, and behaviors related to getting the HPV vaccine and Pap tests. Out of the 782 enrolled participants, 765 completed the baseline survey (97.8% completion rate).

Throughout the enrollment period, participants were consecutively assigned to nine-person groups on the Health Connect platform. The 900 tweets were then randomly distributed to the nine women in each online group over five days. Each participant was shown a unique random set of 20 tweets per day in a personalized message feed. Participants could select and share her messages to her online group and everyone could then comment on the shared messages. At the end of the study, participants were asked to complete a post survey. A total of 569 participants completed the post survey (72.7% completion rate). Participants received $15 upon completion of the post survey.

Institutional review boards at the University of California San Francisco and the University of Pennsylvania approved all study procedures.

Measures

On the baseline and post surveys, HPV awareness was assessed by one question: "Have you ever heard of HPV? HPV stands for Human Papillomavirus." Knowledge on HPV was assessed by four questions: (1) "Do you think HPV can cause cervical cancer?" (2) "Do you think you can get HPV through sexual contact?" (3) "Do you think HPV causes AIDS?" and (4) "Do you think HPV can go away on its own without treatment?" HPV vaccine awareness was assessed by one question: "Have you ever heard of the HPV vaccine or shot to prevent cervical cancer?" If the answer was yes, then respondents were asked "Did you receive all three doses of the HPV vaccine?" Vaccine interest was assessed by one question: "Would you be interested in getting the vaccine?" Vaccination behaviors were assessed by two questions: (1) "Have you ever received the HPV vaccine or HPV shots?" and if the answer was yes, (2) "Did you receive all three doses of the HPV vaccine?" Finally, Pap test behavior was assessed by one question: "Sometimes, when a woman has a routine pelvic exam, she also has a Pap smear to test for cancer of the cervix. A doctor takes a cell sample from the cervix with a small stick or brush and sends it to the lab. Have you ever had a Pap test to check for cervical cancer?"

Table 1 Characteristics of study population

	Study participants, *n* (%)	
	Baseline survey (*N* = 782)	Post survey (*N* = 569)
Age		
18–26 years	161 (21)	121 (21)
> 26 years	621 (79)	448 (79)
Education		
Below bachelor's	263 (33.6)	192 (33.7)
Bachelor's degree	277 (35.4)	203 (35.7)
Master's degree or higher	223 (28.5)	170 (29.9)
Decline to answer	19 (2.4)	4 (0.70)
Income		
$75,000 and higher	244 (31.2)	180 (31.6)
$50,000–$74,999	155 (19.8)	122 (21.4)
$35,000–$49,999	102 (13.0)	80 (14.1)
< $35,000	181 (23.1)	126 (22.1)
Decline to answer	100 (12.8)	61 (10.7)
Race/ethnicity		
White	552 (70.6)	408 (71.7)
Black	60 (7.7)	45 (7.9)
Asian	42 (5.4)	34 (6.0)
Hispanic	88 (11.3)	66 (11.6)
Other	40 (5.1)	16 (2.8)

Table 2 Comparison of survey responses

	Survey response				*p* value
	Baseline, *n* (%)		Post, *n* (%)		
	Yes	No	Yes	No	
Awareness					
Ever heard of HPV	504 (90)	59 (10)	592 (94)	34 (6)	0.003*
Ever heard of HPV vaccine	526 (94)	31 (6)	530 (95)	27 (5)	0.450
Knowledge					
HPV causes cervical cancer	503 (98)	9 (2)	496 (97)	16 (3)	0.090
Get HPV from sexual contact	507 (96)	23 (4)	505 (95)	25 (5)	0.670
HPV causes AIDS	36 (8)	438 (92)	29 (6)	445 (94)	0.127
HPV can go away without treatment	119 (25)	355 (75)	117 (25)	357 (75)	0.782
Behaviors					
Ever received HPV vaccine	144 (26)	401 (74)	146 (27)	399 (73)	0.670
Received all three doses	105 (85)	18 (15)	108 (88)	12 (12)	0.083
Ever had Pap test	503 (90)	53 (10)	508 (91)	48 (9)	0.380

*Significant at $p < 0.05$

Analytic Strategy

Baseline and post survey responses were compared using McNemar's test. All analyses were conducted in SAS 9.4. *p* values < 0.05 were considered statistically significant.

Results

Study participants were predominately White (71%) and college educated (64%). Most participants were over 26 years old (79%), and nearly a third of the sample reported an annual

Table 3 Ever heard of HPV survey response by demographic subgroups

	Survey response				*p* value
	Baseline, *n* (%)		Post, *n* (%)		
	Yes	No	Yes	No	
Age					
18–26 years	107 (89)	13 (10)	109 (91)	11 (9)	0.564
> 26 years	397 (90)	46 (10)	420 (95)	23 (5)	0.002*
Education					
Below bachelor's	166 (86)	26 (14)	176 (92)	16 (8)	0.068
Bachelor's degree	183 (91)	18 (9)	190 (95)	11 (5)	0.127
Master's degree or higher	155 (91)	15 (9)	163 (96)	7 (4)	0.059
Decline to answer	–	–	–	–	–
Income					
$75,000 and higher	166 (92)	14 (8)	172 (96)	8 (4)	0.157
$50,000–$74,999	104 (85)	18 (15)	112 (92)	10 (8)	0.088
$35,000–$49,999	70 (89)	9 (11)	71 (90)	8 (10)	0.739
< $35,000	115 (91)	11 (8)	120 (95)	6 (5)	0.132
Decline to answer	–	–	–	–	–
Race/ethnicity					
White	374 (92)	33 (8)	387 (95)	20 (5)	0.053
Black	39 (87)	6 (13)	41 (91)	4 (9)	0.414
Asian	30 (91)	3 (9)	33 (100)	0 (0)	< 0.001*
Hispanic	50 (76)	16 (24)	56 (85)	10 (15)	0.109
Other	11 (92)	1 (8)	12 (100)	0 (0)	0.001*

*Significant at $p < 0.05$

household income of $75,000 or higher (Table 1). While we did not find statistically significant changes in any knowledge or behaviors related to HPV or cervical cancer prevention from the baseline to post survey, our results do demonstrate a statistically significant change in response to whether participants had ever heard of HPV, increasing from 90 to 94% ($p = 0.003$) from the baseline to the post survey (Table 2). Within specific demographic subgroups, the change in response to ever heard of HPV between the surveys was statistically significant among those older than 26 years old ($p = 0.002$), Asians ($p < 0.001$), and other race/ethnicity ($p = 0.001$). The percentage of participants answering "yes" to the question increased by 5%, 9%, and 8% respectively. Awareness of HPV also increased for individuals at all education and income levels, but we did not observe statistically significant increases within specific education or income subgroups (Table 3).

Discussion

Our online study was designed to examine the effectiveness of disseminating tailored messages in an online social media platform to improve knowledge, awareness, and behaviors related to HPV and cervical cancer prevention. While we did not find significant increases in knowledge or behaviors among study participants at the conclusion of the study, we did detect a small, statistically significant change in awareness of HPV. Our findings reveal that most study participants already had substantial knowledge, awareness, and engagement in positive behaviors related to cervical cancer prevention at the start of the study, leaving little room for improvement as a result of study participation due to a high ceiling effect. What is more, the duration of the study period—five days—was likely not long enough to substantially change behaviors. Nevertheless, our results show that HPV awareness can be increased through brief participation in an online social media platform and receipt of short, tailored health messages.

Conclusions

Our findings suggest that brief messages on social media can positively influence awareness of health information. By connecting individuals with one another, organizational information, and personal experiences, social media can be leveraged to promote awareness of specific health topics [10]. Public health organizations may find social media an effective tool to raise awareness of health information through dissemination of brief messages to targeted populations. More research is needed, however, to explore how social media can be used to improve health knowledge and adoption of healthy behaviors.

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