



Partnering with social media influencers to promote HPV vaccination in diverse communities

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ABSTRACT

Background: While human papillomavirus (HPV) vaccination is one of the most effective ways to prevent HPV-related cancers, many children and adolescents remain unvaccinated. Resistance often stems from parental vaccine hesitancy and mistrust of the health care system, both of which may be higher in communities of color. Partnering with social media influencers may be an effective method for disseminating health messages. We tested the impact of HPV social media posts developed by influencers on outcomes of knowledge, attitudes, and intentions to vaccinate.

Methods: Ten social media influencers who identified as African American or Hispanic created posts about the HPV vaccine. Next, influencers recruited followers to complete a baseline survey, view the post, and complete an endpoint survey. We measured changes in knowledge, attitudes, and intentions to vaccinate their children against HPV. We also captured trust in the influencer and perceptions of the post. Mean scores or frequencies were calculated; changes from baseline to endpoint were assessed with repeated measures *t*-tests.

Results: Of ten social media influencers, four were African American and six were Hispanic; all were female and eight were married. Seven influencers indicated Instagram as their preferred platform; seven posted daily. The influencers recruited 134 followers (86 % female, 56 % non-Hispanic Black, 24 % Hispanic) who, on average, had been following their influencer for 1 to 3 years. We observed significant increases in knowledge of HPV and the vaccine ($p < 0.001$), attitudes towards vaccinating against HPV ($p < 0.001$), and intentions to vaccinate ($p < 0.001$) after viewing a post created by an influencer.

Discussion: As public health professionals struggle to reach key audiences, social media influencers may be powerful opinion leaders, especially where mistrust of traditional institutions is high.

1. Background

1.1. The Importance of HPV Vaccination

The human papillomavirus (HPV) vaccine is an effective tool against HPV infection, known to be the cause of virtually all cervical cancer cases and a portion of cancers of the vulva, vagina, penis, anus, and head and neck [1]. Furthermore, HPV is also the cause of anogenital warts and recurrent respiratory papillomatosis [2]. HPV vaccination was first recommended for use in the United States for female adolescents and young adults in 2006 [3] and male adolescents and young adults in 2009 [4]. Despite this, HPV vaccine coverage remains suboptimal, and lags behind that of other routinely recommended adolescent vaccines [5].

1.2. Vaccine hesitancy

In 2019, the World Health Organization identified vaccine reluctance or refusal as a top ten threat to global health; [6] this designation was prior to the COVID-19 pandemic, which led to even more dramatic increases in vaccine hesitancy [7]. Vaccine-hesitant individuals are a heterogeneous group who hold varying degrees of indecision about specific vaccines or vaccination in general [8]. Vaccine-hesitant individuals may accept all vaccines but remain concerned, some may refuse or delay some vaccines but accept others, and some individuals may refuse all vaccines. Hesitancy is often fueled by risk perceptions of diseases, concerns regarding vaccine safety, perceived need and usefulness of vaccines, past experiences with health services, information sources, trust in institutions and health care providers, and

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sociodemographic characteristics [9].

1.3. Social media influencers

An aspect of social media that has emerged in recent years are ‘online influencers’, which are everyday people who are incredibly influential within their online social networks [10]. While millions of people post content to social media every day, online influencers have a cohort of followers who trust their thoughts, opinions, and perspectives and perceive them to be credible messengers. For years, online influencers have been recruited to disseminate information and encourage consumer behaviors [11,12]. Only recently have health communication and behavioral scientists begun to shift their attention to partnering with online influencers to promote health messages, demonstrating their ability to change health perceptions and alter behaviors [13,14]. To our knowledge, this the first study to engage social media influencers in writing about and promoting HPV vaccination.

1.4. Study purpose

The purpose of the study was to understand the impact of social media messages about the HPV vaccine, created by influencers, on knowledge of HPV and the HPV vaccine, attitudes towards vaccination, and intentions to vaccinate among parents or guardians of children who had not received the HPV vaccine. Ten online influencers, whose primary audience were parents from communities of color, each recruited up to 20 of their own followers to complete a baseline survey, view a social media post from their influencer, and immediately complete an endpoint survey. We focused on communities of color because of the disproportionately higher rates of cervical cancer [15] and lower rates of HPV vaccination in these communities [16]. The study was approved by the Institutional Review Board at Thomas Jefferson University.

2. Methods

2.1. Recruiting social media influencers and followers

We collaborated with a multicultural influencer marketing agency to identify and recruit ten influencers. We created criteria for selecting the influencers, which included: identified as Hispanic, Black, Native American, Asian or LGBTQ+; was a parent or caregiver of at least one child aged 9–14; regularly created social media health, wellness, or parenting content; not considered “very hesitant” about childhood vaccines; posted on their social media account at least once in the past three months; and maintained at least a 1 % engagement rate with their followers. Influencers did not have to have their child(ren) vaccinated against HPV but had to be willing to write about it in their post. The marketing agency did the initial contact and screening of influencers; those who were eligible were passed to the study team for verification and approval. In addition to meeting the criteria, the study team was aiming to maximize diversity and representation among the influencers. Review of influencers continued until all ten spots were filled.

2.2. Influencers created posts about the HPV Vaccine

Next, the 10 influencers were given three weeks to create one social media posting of their choice, for the social media platform of their choice, that encouraged their readers to vaccinate their children and adolescents against HPV. The study team created a one-page sheet of key facts about the HPV vaccine that included current vaccination rates and disparities among populations, as well as information on which cancers could be prevented by vaccination. Influencers were encouraged to be creative in their content development, speaking to their audience, in the language and context that their audience responds to, using images and information that is relevant and important to their audience. Prior to posting, a member of the study team checked the content only for factual

accuracy to ensure that no misinformation about the HPV vaccine was shared with readers. A sample of posts is included as Fig. 1.

2.3. Survey data collection

The study team created the baseline and endpoint surveys that followers would complete before and after viewing their influencer’s social media post. The baseline survey contained measures about their knowledge of HPV and the vaccine (4 items, developed by the study team), attitudes towards HPV infection (adapted) [17], attitudes towards vaccination in general [18] and specifically towards the HPV vaccine [19], their intention to vaccinate their children or adolescents against HPV, trust in and use of media sources for HPV vaccine information, emotional attachment and informational value from influencers, [20] and sociodemographic information. The endpoint survey included all of the measures from the baseline survey, minus the scales of trust in and use of media sources for HPV vaccine information, emotional attachment and informational value from influencers, and sociodemographic information. The endpoint survey also included perceptions of quality [21] and personalization [22] of the social media post.

2.4. Follower recruitment and data collection

Once the influencers created their posts, they were asked to recruit their own followers to participate in the study. The study team created recruitment posts with an active study link that the influencers could use if desired. We advertised the study as a children’s health study rather than a vaccine study, to potentially reduce biases in enrollment. Followers who clicked the link were taken to a page to screen for eligibility, which consisted of having at least one child aged 9 to 14 who had not been vaccinated against HPV. Those who were eligible provided consent to participate and completed the baseline survey. Next, they were shown the post created by the social media influencer that recruited them. The post appeared exactly as it would appear in real-life, as if the influencer had released the post on their platform. Lastly, they immediately completed the endpoint survey. All study activities were completed in one sitting, online, through Qualtrics, a HIPAA-compliant, secure survey management platform. Followers were compensated \$55 for participating in the study.

2.5. Survey data analysis

Data from the participants’ baseline and post survey were collected through Qualtrics. Responses were analyzed using common statistical methods. The demographics of respondents were summarized with mean and standard deviation for numeric variables and with frequency counts and percentages for categorical variables. The responses to some assessments were measured on a Likert scale and the mean and standard deviation of the Likert score was tabulated for these variables. Baseline and endpoint means for knowledge, attitudes, and intention were compared using the Wilcoxon signed rank test. This analysis was done for the study population as a whole and then stratified by race/ethnicity (Hispanic, Black/Non-Hispanic, Other) and vaccination status (yes vs. no). The difference, along with the means and standard deviation of the difference, within each strata were calculated. For vaccination status, Wilcoxon rank sum test was used to compare the means of differences; for race/ethnicity, the Kruskal-Wallis test was used. For responses on the endpoint survey pertaining to information quality (6 questions), personalization (3 questions), and entertainment (5 questions) a composite score was calculated by averaging the items in each category across all participants. Each of these 3 composite scores was then correlated with the difference in pre post changes in questions to knowledge, attitude, and intention to vaccinate using Spearman’s correlation coefficient. The means and SD of these differences were also reported in this analysis. The significance level of all test was set a priori



Fig. 1. Samples of social media posts created by influencers.

at the 0.05 level. All analysis were performed using SAS 9.4 (SAS Institute Inc. Cary, NC).

3. Results

3.1. Demographic characteristics of influencers and followers

All ten influencers were female; four identified as Black/African and six identified as Hispanic. Eight influencers reported that they were married. Five of the influencers reported that they were “not at all hesitant” about childhood shots, while 3 reported they were “not too hesitant” and 2 reported being “somewhat hesitant.” Six influencers reported that their eligible children had been vaccinated against HPV, three influencers reported that their eligible children had not been vaccinated, and one influencer was unsure of their children’s HPV vaccine status. All influencers reported that they began posting more than 3 years ago; half reported starting more than 10 years ago. The ten influencers recruited a combined total of 134 followers to the study. Eighty-six percent were female and 75 % were married. Slightly over half (56 %) identified as Black/African American, 24 % identified as Hispanic, and 20 % indicated more than one racial or ethnic group. Roughly one-third (33 %) had been following their influencer for 1 to 3 years, one-third (35 %) had been following their influencer for less time, and one-third (32 %) had been following their influencer for more time. Further details can be found in Table 1.

3.2. Credibility and Sources of HPV vaccine information

Followers reported that doctors or health care providers were their most trusted source of HPV vaccine information (M 2.90, SD 0.88), followed by health officials (M 2.46, SD 0.92), friends or family members (M 2.28, SD 0.91), and social media influencers who were not celebrities. The least trusted source for HPV vaccine information were elected officials (M 1.55, SD 0.70). Similarly, followers reported getting information the most from doctors or health care professionals (65 %), followed by friends or family (45 %), and social media sites (43 %). Further details can be found in Table 2.

3.3. Credibility of the influencer

Most followers found their influencer highly credible, reporting that they get useful information from the influencer (M 5.80, SD 1.55), value the opinion of the influencer (M 5.66, SD 1.48), and get new information from the influencer (M 5.60, SD 1.54). They were least likely to feel emotionally attached to the influencer (M 4.64, SD 1.90). Further details can be found in Table 3.

Table 1
Influencer and Follower Characteristics.

Characteristic	Influencers (N = 10)	Followers (N = 134)
Age in years, M (SD)	44.3 (5.6)	39.8 (6.6)
Gender		
Female	10 (100)	115 (86)
Male	0 (0)	19 (14)
Race/Ethnicity		
Non-Hispanic Black	4 (40)	79 (56)
Hispanic or Latina	6 (60)	33 (24)
Other/More than one race	0 (0)	22 (20)
Highest Education		
High school diploma	0 (0)	13 (10)
Some college	2 (20)	31 (23)
College degree or higher	8 (80)	90 (67)
Marital Status		
Married/Living with a partner	8 (80)	100 (75)
Single/Separated	2 (20)	34 (25)
Relationship to Child		
Parent	10 (100)	128 (96)
Grandparent, stepparent, or legal guardian	0 (0)	6 (4)
Vaccine Hesitancy		
Very hesitant	0 (0)	0 (0)
Somewhat hesitant	2 (20)	34 (25)
Not too hesitant	3 (30)	71 (53)
Not at all hesitant	5 (50)	29 (22)
Preferred Platform to Post*		
Instagram	7 (70)	
Tik Tok	2 (20)	
Twitter	2 (20)	
Blog	1 (10)	
Posting Frequency		
Daily	7 (70)	
Once or twice a week	2 (20)	
Once or twice a month	1 (10)	
Length of Time Following Influencer		
Less than 6 months		27 (20)
6 months – 1 year		20 (15)
1 year – 3 years		44 (33)
3 years – 5 years		24 (18)
More than 5 years		19 (14)

* Not mutually exclusive.

3.4. Baseline to endpoint changes on primary outcome measures

Knowledge about HPV and the vaccine significantly increased from baseline (M 1.28, SD 0.87) to endpoint (M 1.72, SD 0.93) ($p < 0.001$). Feeling that HPV infection is serious significantly increased from baseline (M 4.00, SD 0.94) to endpoint (M 4.30, SD 0.88) ($p < 0.001$). Feeling that the HPV vaccine is safe significantly increased from baseline (M 2.65, SD 0.91) to endpoint (M 2.93, SD 0.86) ($p < 0.001$), as did feeling that the HPV vaccine is effective (baseline M 2.88, SD 0.84 vs. endpoint

Table 2
Trust in and Use of Information Sources, $N = 134$.

How much do you trust the following sources to provide accurate HPV information? *	
	M (SD)
Social Media Influencers (Not Celebrities)	2.16 (0.89)
Celebrities	1.64 (0.81)
News Media	2.09 (0.84)
Friends or Family Members	2.28 (0.91)
Doctors or Health Care Providers	2.90 (0.88)
Elected Officials (President, Governor, Mayor)	1.55 (0.70)
Health Officials (CDC, WHO)	2.47 (0.92)
Over the past two years, have you gotten HPV information from any of the following sources?	
Information Channel (those reporting "Yes")	N (%)
Social Media Sites	58 (43.28)
News Media	45 (33.58)
Friends or Family Members	60 (44.78)
Doctors or Health Care Providers	87 (64.93)
Elected Officials (President, Governor, Mayor)	15 (11.19)
Health Officials (CDC, WHO)	50 (37.31)

Likert scale response ranged from 1 to 4.

Table 3
Credibility of the Influencer ($N = 134$).

	M (SD)
I feel emotionally attached to this influencer.	4.64 (1.90)
I feel a bond with this influencer	4.97 (1.82)
This influencer is special to me	5.03 (1.77)
I miss this influencer when they do not post	4.81 (1.84)
I get new information from this influence	5.60 (1.54)
I get interesting information from this influencer	5.75 (1.56)
I get useful information from this influencer	5.80 (1.55)
My opinions sometimes change after I view a post from this influencer	4.99 (1.54)
I value the opinion of this influencer	5.66 (1.48)
I would buy or do something that this influencer recommended I do	5.31 (1.60)
Credibility of the Influencer (overall)	5.18 (1.31)

Likert scale responses ranged from 1 to 7.

$M 3.15$, $SD 0.85$, $p < 0.001$), and necessary (baseline $M 2.76$, $SD 1.01$ vs. endpoint $M 3.14$, $SD 0.98$, $p < 0.001$). Intentions to vaccinate ones' child against HPV significantly increased from baseline ($M 3.25$, $SD 1.27$) to endpoint ($M 3.69$, $SD 1.31$) ($p < 0.001$). Further details can be found in [Table 4](#).

3.5. Quality and personalization of the social media post

Followers were most likely to indicate that the social media post that they viewed was understandable ($M 6.25$, $SD 1.28$), informative ($M 5.97$, $SD 1.46$) and helpful ($M 5.72$, $SD 1.67$). Followers were least likely to indicate that the post was thrilling ($M 4.25$, $SD 1.74$) and fun ($M 4.43$, $SD 1.69$). Further details can be found in [Table 5](#).

Table 4
Baseline to Endpoint Changes on Primary Outcome Measures ($N = 134$).

Variable	Baseline M (SD)	Endpoint M (SD)	P-value
Knowledge of HPV and the Vaccine (Score) ¹	1.28 (0.87)	1.72 (0.93)	<0.001
Attitude Questions			
HPV infection is real ²	4.17 (1.02)	4.42 (0.86)	<0.001
HPV infection is serious ²	4.00 (0.94)	4.30 (0.88)	<0.001
Concerned about your child getting HPV ³	2.69 (0.95)	2.88 (0.94)	0.003
The HPV vaccine is safe ³	2.65 (0.91)	2.93 (0.86)	<0.001
The HPV vaccine is effective ³	2.88 (0.84)	3.15 (0.85)	<0.001
The HPV vaccine is necessary ³	2.76 (1.01)	3.14 (0.98)	<0.001
Intention to Vaccinate ²	3.25 (1.27)	3.69 (1.31)	<0.001

¹ Scores ranged from 0 to 4 ²Likert scale responses ranged from 1 to 5 ³Likert scale responses ranged from 1 to 4.

Table 5
Quality and Personalization of the Social Media Post ($N = 134$).

In my opinion, this post was _____ when thinking about HPV vaccine for my child:	M (SD)
Ineffective/ Effective	5.65 (1.53)
Unhelpful/ Helpful	5.72 (1.67)
Not Informative/ Informative	5.97 (1.46)
Not Valuable/ Valuable	5.67 (1.59)
Not Understandable/ Understandable	6.25 (1.28)
Impractical/ Practical	5.59 (1.70)
Not Fun/ Fun	4.43 (1.69)
Dull/ Exciting	4.77 (1.43)
Not Delightful	4.79 (1.68)
Not Thrilling	4.25 (1.74)
Not Enjoyable	4.87 (1.66)
Mean Engagement Score (11 Items)	5.18 (1.31)
Mean Information Score (Items 1–6)	5.81 (1.30)
Mean Entertainment Score (Items 7–11)	5.27 (1.21)
This post makes recommendations that fit my needs.	5.52 (1.80)
Overall, this post is tailored to my situation.	5.37 (1.76)
I believe this post is customized to my needs.	5.32 (1.69)
Mean Personalization Score (3 items above)	5.41 (1.64)

Likert scale responses ranged from 1 to 7.

4. Discussion

Novel approaches like this one that partnered with social media influencers to deliver credible health information to parents is important because rates of HPV vaccination remain suboptimal. Research continues to show that the HPV vaccine is safe and effective in reducing HPV-related infections and pre-cancers [23]. Epidemiological data shows the real-world impact of the vaccine at a population level: a systematic review found a significant decrease in HPV 16/18 infections in countries with female vaccine coverage of at least 50 %, [24] while a recent study found a substantially reduced risk of invasive cervical cancer at the population level in Sweden [25]. While rates of HPV vaccination are now quite similar for Hispanic, Black/African American, and White females, [5] we cannot rest on short term successes while so many young adults remain at risk for HPV infection due to lack of vaccination.

Most people spend substantial portions of their day viewing social media content. By some estimates, more than 90 % of Americans report viewing content on social media, spending somewhere between 2 and 5 h each day, depending on the age group [26]. Given that half of adults report getting their news from a social media site [27] and many report getting health information from social media, [28] the role of social media in information seeking cannot be understated. Health professionals and organizations are using social media to disseminate health-related knowledge on healthy habits and medical information for disease prevention, as it represents an unprecedented opportunity to increase health literacy, self-efficacy, and treatment adherence among populations [29,30]. However, the value and impact of social media in health interventions and health outcomes has had mixed results [31]. In our study, we found that a brief intervention that exposed parents to an HPV vaccine message changed knowledge, attitudes, and intentions to vaccinate and may hold promise for larger scale interventions in the future.

While most people acknowledge that social media has become a part of their lives, most people will also acknowledge the dangers and downsides of social media. Chief among these concerns is the sheer volume of misinformation and disinformation that circulates through its channels, much of it hard to discern fact from fiction. Indeed, a recent survey found that two-thirds of Americans felt that 'a lot' or 'some' of the information that they see on social media is misleading and that they find it hard to tell whether health information on social media is true or false [32]. A recent systematic review of health misinformation on social media found that the HPV vaccine was the most commonly

misrepresented vaccine [33]. Our study partnered with social media influencers to develop accurate information about the HPV vaccine in a way that study participants found credible and understandable, demonstrating the potential of this type of partnership in disseminating health messages about vaccination on social media.

There are strengths and limitations to the study. Strengths include partnering with a multicultural marketing agency to reach a diverse group of influencers who could, in turn, reach a diverse audience of parents. Influencers were allowed and encouraged to develop the content of their HPV vaccine post just as they would for any other post, ensuring that the posts mimicked real-life as closely as possible. Influencers recruited their own followers to the study, allowing us to evaluate influencer trust, credibility, and the impact of a post that someone would actually see in their daily life. Limitations primarily consist of measuring impact data immediately after viewing the post and not being able to measure actual HPV vaccine uptake, both due to the short time frame of the study. While the influencers did not have access to the survey data from the followers, it is impossible to know if the follower responses were impacted in any way by social desirability bias. However, the positive results seen in this context warrant future research in a more rigorous study design.

To our knowledge, this is the first study of its kind to understand the impact of messages about HPV vaccination created directly by social media influencers and evaluated by their own followers. We found significant improvements in knowledge of HPV and the vaccine, attitudes towards vaccination, and intentions to vaccinate among a group of parents whose age-eligible children had not yet been vaccinated. Possibly even more important, the followers rated their influencers as credible and the social media posts as informative and understandable. In a world where so much misinformation and disinformation is circulating on social media, partnering with social media influencers to disseminate health information is a promising strategy for HPV vaccine promotion and cancer prevention.

CRediT authorship contribution statement

Amy E. Leader: Writing – original draft, Supervision, Resources, Methodology, Investigation, Funding acquisition, Conceptualization. **Amelia Burke-Garcia:** Writing – review & editing, Supervision, Resources, Methodology, Investigation, Conceptualization. **Dasha Afanaseva:** Writing – review & editing, Project administration, Methodology, Investigation. **Erin Cutroneo:** Writing – review & editing, Project administration, Methodology, Investigation. **Preethi Selvan:** Writing – review & editing, Project administration, Methodology, Investigation. **Kayla Madden:** Writing – review & editing, Project administration, Methodology, Investigation. **Joshua Banks:** Writing – review & editing, Validation, Formal analysis. **Angela Sustaita-Ruiz:** Writing – review & editing, Resources, Project administration, Data curation.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Amy Leader reports financial support was provided by Merck & Co Inc. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2025.127085>.

Data availability

Data will be made available on request.

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