

Developing and Pilot Testing a Digital Storytelling Intervention to Promote HPV Vaccination among Vietnamese American Adolescents

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Abstract — We co-developed digital, personal stories about human papilloma virus (HPV) and HPV vaccination with Vietnamese American (VN) mothers of vaccinated adolescents, and examined the preliminary effect of the digital storytelling (DST) intervention in a community group of VN mothers who had unvaccinated adolescents. We compared HPV-related knowledge, attitudes, beliefs, and vaccination intent of VN mothers in the community group before and after viewing the digital stories (intervention). Stories 2-3 minutes in length were produced in Vietnamese and in English through a two-day workshop in collaboration with 2 VN mothers. Ten VN mothers who have unvaccinated adolescents viewed the stories and filled out an anonymous survey before and after the intervention. After the intervention, 100% ($n = 10$; M age = 48 years; $SD = 6.72$) of mothers intended to get their children vaccinated. Further, all mothers would recommend the digital stories to their relatives, friends or colleagues. This brief intervention using digital stories showed preliminary effects on promoting Vietnamese American mothers' intent to vaccinate their adolescent children against HPV.

Keywords - adolescent health; digital stories; intervention; health promotion; HPV; vaccine; Vietnamese American

I. INTRODUCTION

The human papilloma virus (HPV) infection is very common in the United States [1-2] and worldwide [3]. In the United States, about one in four, nearly 80 million Americans are currently infected [1]. This number is projected to increase by 14 million new cases each year [2]. For females, oncogenic HPV infection is the primary cause of cervical cancer; with over 70% of cervical cancer being caused by infection with HPV Types 16 and 18 [4]. In 2018, it is estimated that 13,240 new cases of invasive cervical cancer will be diagnosed and about 4,170 women would die from it [5]. For males, HPV can cause genital warts and is associated with penile, oral, and anal cancer [2]. Incidence of HPV-associated oropharyngeal cancer has significantly increased in men over the past 20 years. It has been estimated that HPV will cause more oropharyngeal cancers than cervical cancers by 2020 in the United States [6]. Male HPV infection also increases the risk of the HPV infections in their sexual partners [2]. The three HPV vaccines approved for youth aged 9-26 have been shown to be efficacious in preventing HPV-related cancers and diseases, and are recommended for routine vaccination of boys and girls at age 11 or 12 years [1]. Given the cost-

effectiveness of HPV vaccination, researchers have called for universal vaccinations in both females and males [7].

In the United States, Vietnamese American (VN) females are disproportionately affected by cervical cancer, as they are five times more likely to develop cervical cancer than are non-Hispanic white women [8]. Limited research, however, has been conducted to address HPV vaccination behaviors in VN, with the majority of studies being descriptive. Yi and colleagues [9] conducted interviews to assess HPV knowledge and awareness in 95 VN mothers who had a daughter aged 9-26 years old. They found that less than 50% had heard of HPV, and they suggested that future education should be made available in Vietnamese when targeting VN parents. Another survey study investigated if limited English proficiency and knowledge about HPV vaccine were associated with HPV vaccination in 113 VN women [10]. Only 14% ($n = 16$) of the sample had received the 1st HPV vaccines and only 9% ($n = 11$) had completed the 3-dose series. Higher English proficiency and better HPV-related knowledge were associated with higher rates of HPV vaccine uptake. The sparse literature focusing on HPV vaccination behavior in this at-risk population indicates that vaccination rates are low and that knowledge and awareness about HPV and vaccines are limited. Further, very few interventions have been designed to promote HPV vaccination in VN population.

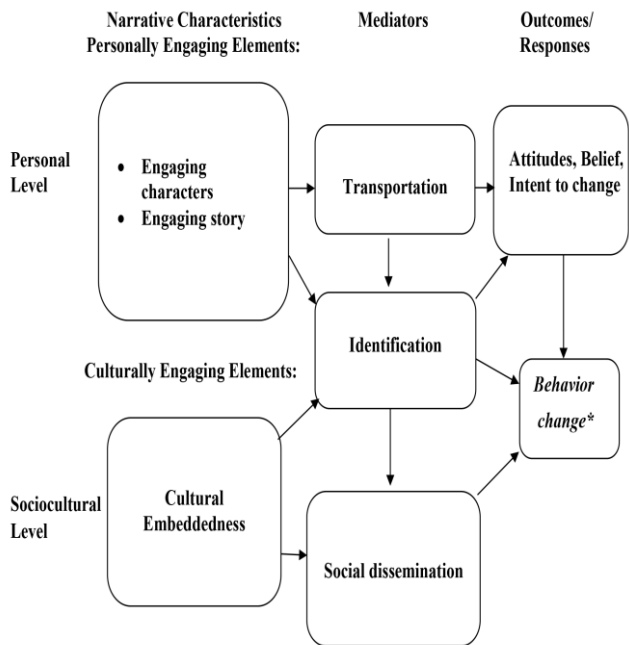
Storytelling, a specific form of narrative, has increasingly been showing promise as an effective culture-centric health promotion strategy to promote positive attitudes, beliefs, and health behaviors [11-17]. Digital storytelling (DST), which combines oral storytelling with computer technology, has been used as an innovative community-based participatory method tool to communicate culturally relevant health messages in health, educational, and community settings [18-19]. As a new media form of storytelling, DST engages a small group of participants in creating and sharing brief visual narratives incorporating photos/images, soundtrack/music, artwork, and the voice of community participants. The DST workshop allows participants to openly talk about their personal experiences, gain a sense of ownership of the experiences as they produce and edit their own story, and discuss issues of common concern with others [19]. Community members participating in creating digital stories have expressed feelings of empowerment, sense of self-efficacy, and have strengthened perceptions of social support to promote positive behaviors in varying health contexts [18, 20].

The product of DST workshops, a set of brief, participant-produced digital stories, has been shown to be a promising medium to communicate risk and to promote desired behavioral change within specific identity and cultural groups, including cancer prevention and screening [18, 11-12, 17, 21], HIV prevention [22], sexual and reproductive health promotion [23] and HPV vaccination [24-25]. Digital storytellers also see the value of sharing their stories with different audiences to promote health [26].

Theoretical Framework

This study was guided by the model of Culture-centric Narratives in Health Promotion [14-15; Figure 1]. The model begins with salient narrative characteristics at personal and sociocultural levels. At the personal level, narratives that are realistic, generate liking and empathy, have perceived similarity of characters, and have appealing storylines, and dramatic sequencing are regarded as more engaging. At the sociocultural level, narratives and characters embedded in meaningful aspects of the culture will evoke a sense of cultural resonance in viewers.

The narrative characteristics are expected to influence individual attitudes, beliefs, intent, and actual behavior change through three mediators: transportation (emotional engagement), identification (with characters, story, and cultural elements) and social dissemination or proliferation (taking the story to others). Research suggests relationship between the three mediators on attitudes, beliefs, and behavioral intention [12, 16-17], and on health behavior change [11-12, 16-17].



Note. Behavior change is not tested in this pilot research.

Figure 1. Model of Culture-centric Narratives in Health Promotion

To address the gaps in research, we collaborated with VN communities to develop bilingual (Vietnamese/English) personal digital stories about HPV and HPV vaccination. We then shared the stories with a small group of Vietnamese American mothers with unvaccinated adolescent children to promote HPV vaccination in VN adolescents, and compared their HPV-related knowledge, attitudes, beliefs, and intention to vaccinate their adolescent children against HPV.

II. METHODS

A. Design and Sample

Our study involved two phases. The first phase was to develop digital, personal stories about HPV and HPV vaccination among Vietnamese American women whose children have been vaccinated against HPV. Vietnamese American mothers with at least one child aged 11-17 years old who had completed HPV vaccines were invited to develop their personal stories during a two-day DST workshops (approximately 8 hours per day).

In the second phase of the study, we used a quasi-experimental pre- and posttest design to examine the impact of the storytelling intervention on VN mothers’ knowledge of, attitudes and beliefs about, and intent to have their adolescent child vaccinated. Women were recruited if they (a) self-identified as Vietnamese/Vietnamese American (b) were 18 years old or older, and (c) had one or more children aged 11-17 years old who had not been vaccinated for HPV. English fluency was not required, given the bilingual (Vietnamese/English) features of the intervention (digital stories) and multicultural and multilingual resources of the research team. If eligible mothers had more than one child aged 11-17 years old who had not received the HPV vaccination, we asked mothers to answer questions based on the oldest child.

B. Procedures

We recruited participants for both phases via word of mouth, Vietnamese broadcasting, newspapers, and flyers in Vietnamese American communities and nail salons during 2017-2018. This approach has been proven very effective in recruiting the target sample [27].

Phase I: Our team, including a bilingual VN interpreter, researchers who have conducted digital storytelling workshop (DST), and a media specialist facilitated the 2-day DST workshop. Prior to the workshop, the participants were told to think about the meaningful stories that they want to share with the group during the workshop and to bring a written script. We started with a brief orientation to review the purpose and process of the study, the voluntary nature of participation, and the confidential issues about the material generated from DST. We developed a list of prompts (e.g., What led you to have your son/daughter vaccinated?) to promote open discussions in the process of generating the stories. Next, workshop participants were invited to share stories from their own life experiences, in the context of a group production environment in a story circle on day 1. After each participant shared their HPV story, they received feedback from other participants and facilitators to elicit the most powerful story and finalize their

stories at the end of the 1st day of the workshop. One of the participants wrote her story in Vietnamese. Our bilingual interpreter assisted with translation verbally and in written format.

On the 2nd day of the DST workshop, participants brought photos/images that they would like to incorporate into their stories. We collaborated with participants to choose meaningful photos/images, identified story content, and created storyboards that combined the stories and photos/images. Participants also chose non-copyrighted background music for their stories.

The media specialist assisted participants recorded participants' voiceovers and showed them how to import and sequence the materials on the computer to produce a sequenced set of messages and images for conveying their digital stories. The participants also added story title, credits, textual graphics, and the background music to finalize their stories. Our team finalized the final version of the stories with English and Vietnamese subtitles and stored them in a master DVD. The participants signed a story release form to permit the sharing of their stories in public settings. We provided two meals and refreshment, and free parking during the workshop. Each participant also received USD 100 for their invaluable time and effort.

Phase II: We shared the digital stories produced by the VN women in Phase I with other VN mothers who had one or more children aged 11-17 years old who had not been vaccinated for HPV. Participants watched the stories and filled out the anonymous surveys assessing sociodemographic characteristics, HPV-related knowledge, attitude, beliefs and intent via electronic tablets provided by our team in community settings or in the salons where they worked. One mother participated in these activities from her home.

C. Measures

All study materials, including measures were translated and back-translated into Vietnamese and validated using a modified committee translation method [27, 28-29] before administration. We tested the measures in the Vietnamese population with face and content validity.

The pretest survey included sociodemographic characteristics (e.g., age), cancer history, HPV-related knowledge, attitudes and vaccination intent. The posttest survey included the same questions except sociodemographic characteristics and cancer history questions. Additionally, a narrative assessment tool developed based on the model of culture-centric narrative in health promotion [30], was included in the posttest to elicit participants' responses to the stories regarding the underlying structural ingredients [11, 30].

Sociodemographic form. This scale included 23 questions assessing sociodemographic characteristics (e.g., age, education, occupation, immigration history, number and age of children, acculturation level, poverty) and health-related questions (e.g., self and family history of cancer, health insurance, self-rated general health).

Knowledge, attitudes and beliefs. We examined VN mothers' changes in knowledge, attitudes and beliefs related to HPV by 6 Likert scale questions (1 = strongly disagree, 5 =

strongly agree) before and after they watched the digital stories.

Vaccination intent: One yes/no item was used to assess mother's intent to have her adolescent child vaccinated against HPV before and after they watched the digital stories.

Narrative/Story quality assessment. We used 12 5-point Likert scale items (1 = disagree a lot; 5 = agree a lot) to assess identification with story (6 items) and engagement/transportation with story (6 items). This scale has been tested among Latino adults and demonstrated high reliability Cronbach's alpha .93 - .95) and construct validity [30]. Although not included in Kim et al. [N30], we added one item to assess social dissemination included in the model [Figure 1]. The scale was administered after participants watched the digital stories.

D. Data Analysis

Study data collected via computers were saved and managed using Research Electronic Data Capture (REDCap) [31], a secure, web-based data collection application and then imported into SPSS 24.0 [32] for analysis. We first conducted univariate analyses (e.g., means, frequencies) to describe distributions of variables. Given the small sample size, we used non-parametric statistics to examine pre-post changes in key variables (e.g., attitudes, intent). We also calculated effect size on variables that showed significant changes over time. There were no missing data in pre- and posttest surveys.

E. Ethical consideration

This study was approved by the University Institutional Review Board before conducting the study. We received consents from Phase I and II participants in person or online. In Phase II, we collected data via an anonymous survey before and after they watched the digital stories. Survey participants created their unique ID that allowed us to link the data collected over time. The data was secured in a HIPAA-compliant and encrypted server with multilevel password protection, enterprise-level firewalls, and antivirus barriers.

III. RESULTS

Sample

Phase I: Two participants joined the study for Phase I DST production. Both VN mothers (52 and 59 years old; both have three children) were born in Vietnam. One had immigrated to the U.S. 26 years prior and speaks both Vietnamese and English fluently. The other mother immigrated to the U.S. about 3 years ago and primarily speaks Vietnamese. Both mothers work and have insurance, have family members diagnosed with cancer, and learn HPV vaccines from healthcare providers.

Phase II: In the community sample of 10 VN mothers (mean age = 48 years; $SD = 6.72$), all of them were born outside of the U.S. About 50% of them had a bachelor degree, 70% were working, and 40% of them having a child who received free or reduced price lunch at school. About 70% of these mothers used their native language while speaking to their U.S born children.

Fifty percent of the mothers reported having one or more family members diagnosed with cancer. About 50% of them had learned about HPV vaccines from healthcare providers ($n = 4$) and/or friend/neighbor ($n = 2$).

Knowledge, attitudes and beliefs

Findings from Wilcoxon Signed Ranks test suggested significant change in two items: “If nothing is physically wrong, then my child does not need the vaccines” (pretest $Mdn = 2.89$; posttest $Mdn = 1.70$; $Z = -2.23$, $p = 0.026$) and “It is our obligations to protect girls, so only girls should be vaccinated” (pretest $Mdn = 2.00$; posttest $Mdn = 1.60$; $Z = -2.00$, $p = 0.046$). The effect size of the change from pre- to posttest survey for these two items were 1.0 (large effect) and 0.8 (large effect).

Intent to vaccinate children against HPV

After the intervention (digital stories), 100% of the VN mothers intended to vaccinate their adolescent children against HPV.

Narrative/Story quality assessment

The mean score for identification was 3.80 ($SD = 0.57$), and the mean score for engagement/transportation was 3.68 ($SD = 0.49$). The mean score for social dissemination was 5.00 ($SD = 0.00$). Currently there are no normative data in a similar population indicating what is an “effective” level of identification and engagement/transportation. Our purpose, however, was to examine Vietnamese version scale properties and propose feasibility of use in future research where these will be examined as mediators (see Figure 1) with samples that are adequately powered.

IV. DISCUSSION

This study aimed to co-develop two digital, personal stories about HPV and HPV vaccination with VN mothers who had vaccinated adolescent children, and examined HPV-related knowledge, attitudes, beliefs and vaccination intent among a community group of VN mothers who have unvaccinated adolescents. Our findings suggest that digital stories developed by VN mothers changed other mothers’ attitude and beliefs toward HPV vaccination and intent to vaccinate their adolescent children, suggesting preliminary support for the effect of this brief intervention. Further, all of them stated that they would recommend this digital storytelling intervention to their relatives, friends or colleagues.

Consistent with prior research [13], the promising findings of this pilot research shows the potential of using digital stories in promoting healthy behaviors in a specific racial/ethnic population. Several characteristics of our intervention may explain the success. The two VN mothers who developed the stories shared similar characteristics with our community sample who watched the stories. All of them were foreign born and immigrated to the U. S. in adulthood. About 40% of the community sample indicated their children receiving free or reduced lunch at school, suggesting the economic status of this sample. While the VN mothers found the bilingual feature of the stories made it easy for them to understand, they also commented on the feasibility and effect

of the online digital stories (e.g., “I like it because the stories are very short but powerful and to the point!”).

The VN mothers also indicated that the digital stories intervention is relevant and engaging. The two items with highest scores in the Narrative Quality Assessment scale were “I could really relate to the people in the stories” and “I felt connected to some of the characters, like I could have been playing that role.” Further, all VN mothers reported “I plan to recommend this intervention to my relative, friends, colleagues.”

Empirical evidence suggests that healthcare providers’ recommendation is one of the most critical facilitators for HPV vaccination [33-34]. Although half of our VN mothers learned about HPV vaccines from their providers, they had not taken action yet. Our brief intervention developed by the VN mothers who shared similar characteristics of our target population may motivate them to vaccinate their children. We also provided a resource page including phone number and address of local free, walk-in vaccine clinics at the end of the intervention. Several mothers had found it is very helpful, especially for those who were too busy to make appointments with their pediatric providers or they could not afford the cost due to insurance status.

Our findings should be interpreted with caution. This pilot study’s small sample size did not allow for thorough testing of our theoretical model. We realize that two consecutive full day workshops (9am to 5pm) during the weekend could be challenging and time intensive endeavors, however, this arrangement was preferred by our participants due to their work schedules. The generalizability of study findings may only be limited to VN mothers.

We were not able to follow up with the VN mothers for the actual rates of initiating or completing HPV vaccination due to the limited time and resources of this pilot research. Without a comparison group, we could not examine how the reported vaccination intent might have differed from those who were not given the intervention. Further randomized controlled trials with sufficient sample size and include vaccination behavior as an outcome measure are needed to examine the efficacy and effectiveness of the DST intervention.

V. IMPLICATIONS AND CONCLUSION

The Healthy People 2020 target of 80% HPV vaccination rate (2-3 doses) for all youth by age 15. However, empirical evidence shows low vaccination rate in the VN population (14% received the 1st dose, only 9% completed the series). The VN population is the 4th largest among the Asian population groups in the United States and has increased 87% during the last decade in the State of Arizona [35]. Our linguistic and culturally congruent digital storytelling intervention shows high potential to reach this fast growing population with a higher risk for HPV-related cancers.

To our knowledge, this is the first DST intervention designed for VN mothers to increase HPV vaccination rates among their adolescent boys and girls. Our findings suggest

the stories produced in a DST workshop are culturally relevant and engaging. This brief intervention is feasible and acceptable for our target population. It may serve to not only educate but to change attitudes, beliefs and intent related to an important health behavior. Unlike other types of interventions, DST intervention is an easy-to-deliver, brief, and cost-effective, vehicle. To address limitations of this pilot research, future randomized controlled trials with sufficient sample size are needed to examine intervention efficacy and effectiveness, and the pathways through which intervention may increase vaccination rate.

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