

Fotonovela as an Educational Tool to Increase Human Papilloma Virus Vaccination in Puerto Rico

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ABSTRACT

Background: Although vaccines against Human Papilloma Virus (HPV) are readily available, there are still low percentages of vaccinations in the population, especially in underserved and minority groups. Various of educational interventions aimed at increasing knowledge and positive attitudes towards vaccination are already in use. We aim to measure HPV vaccination awareness and attitudes among participants in Puerto Rico after being exposed to seeing the fotonovela.

Methods: We administered an online pre and post-exposure survey after seeing the fotonovela. The questionnaire included demographic information, perceived susceptibility to HPV, perceived benefit of vaccination in a committed relationship, intention to vaccinate, intention to encourage others to vaccinate, and attitudes towards the fotonovela booklet.

Results: Participants (210) between ages 18-45 years responded to the questionnaire. The surveys showed an increase in the number of individuals who believed they were susceptible to HPV, had an intent to vaccinate, even if they were in a relationship, and encouraged others to vaccinate after seeing the fotonovela. Overall, the use of the fotonovela had favorable educational outcomes since participants could relate to the characters and responded that they had learned a lot from this intervention.

Conclusion: Our findings demonstrated that the use of fotonovela booklets is a valuable tool for educating about the HPV vaccine effectively and entertainingly to Hispanic communities.

Keywords: Human papilloma virus; Fotonovela; Hispanic population; Health educational tool

INTRODUCTION

Human papillomavirus (HPV) is a widespread, sexually transmitted infection (STI) worldwide with a prevalence between 0.09 and 0.13 [1]. In the United States, HPV is currently the most common STI, with risk factors such as having multiple sexual partners and unprotected sex [1]. Although HPV is mainly known as the cause of genital warts, several of the more than 100 HPV serotypes correlate to most genital, anal, and oropharyngeal cancers in men and women [2-4]. The unusually high incidence rate of cervical cancer in PR (9.1%) compared to the USA national rate (5.9%) in Non-Hispanic Caucasian females may be due, in part, to lower HPV vaccination rates [5].

Nevertheless, advances in the understanding of HPV, and concerted efforts to reduce its incidence rates have resulted in the development of two vaccines, Gardasil-9® and Cervarix®. These vaccines are efficacious and readily available, free of charge, under private and public health care programs in Puerto Rico [6]. The HPV vaccination regimen consists of three injections

for eight months; nonetheless, vaccine completion rates remain significantly lower than initiation rates [7]. Hurdles regarding the reduction of HPV incidence among both women and men may include ineffective education on the topic and a lack of general awareness regarding the availability, efficacy, and understanding of the safety of the HPV vaccine, as well as the risks, consequences, and symptoms of HPV [6]. As of 2014, the overall vaccination rates in the USA were still low in females ages 11-18 (22%) and 19-26 (11%) [7].

Several factors influence the global problem with HPV infection and vaccination rates, including differences in health policy, socio-cultural circumstances, and individual health beliefs. In the United States, HPV vaccination is recommended for males and females at ages 11-26. The FDA increased vaccination eligibility ages to 45 years of age for males and females [8]. However, in Puerto Rico and the United States, the vaccination level is still lower than the 80% goal set by Healthy People 2020 [9]. In the United States, women in relationships who reported being married or living with a partner are less likely to be interested in

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HPV vaccination. Women who were married were more likely to cite not needing the vaccine than never-married women [10].

Based on these rates, educational efforts may not be sufficiently effective in conveying an understanding of the risks, consequences, and symptoms of HPV. They have also fallen short in increasing awareness of the vaccine's availability, efficacy, and safety. Educational interventions are typically assessed within three categories: parental education, adolescent education, and comparative message persuasiveness [11]. Although health promotion strategies such as fact sheets, videos, and lectures have traditionally been used, thus far, it has had limited effects when utilized for HPV and HPV vaccine education [11].

Furthermore, very few of these educational strategies are tailored to the Hispanic community, which may contribute to the inefficacy of traditional educational tools in Puerto Rico [12]. It is crucial to educate individuals who have not yet been vaccinated regarding the risks and consequences associated with HPV infection and the safety and effectiveness of the HPV vaccine. In this study, we evaluated using a tailor-made fotonovela to increase awareness and positive attitudes in the Hispanic community of both HPV risks and prophylactic measures.

A fotonovela is a visually striking educational tool that minimizes the use of words relative to images and presents real-life situations in a narrative format [13]. Narratives are an effective way to convey health information, as they incorporate cultural norms [14]. Although we found no evidence of the use of fotonovelas in Puerto Rico, they are exceedingly popular in Latino communities in the USA due to their format and consistency with current cultural practices [15]. The fotonovela's comic book-like format with images and bilingual dialogue bubbles makes it effective for English and Spanish speakers; this design also allows the fotonovela to be easily shared among peers [13]. It is important to note that general literacy skills are not always consistent with health literacy, and patients may, in some cases, be unaware of their low literacy skills in a health care setting [16]. The fotonovela addresses this disparity through its photo- and narrative-based presentation of health information, which increases the range of health literacy levels with which it is compatible.

We propose that using a fotonovela as an educational tool will improve HPV vaccine awareness and the intent to vaccinate among participants ages 18-45 in Puerto Rico. By implementing a fotonovela as an HPV educational tool, we will accomplish the following specific aims: measure awareness of HPV and HPV vaccination and estimate the intent to vaccinate against HPV.

MATERIALS AND METHODS

The study included a pre-exposure and a post-exposure questionnaire based on the methodology used by Chan in 2015 on a population of young adults in Southern California. These authors developed the questionnaires and fotonovela based on The Health Belief Model (HBM) [12]. Permission to use these materials, including questionnaires and fotonovela content, was granted by Chan at the University of California, Los Angeles. The San Juan Bautista School of Medicine IRB (EMSJBIRB-8-2019) approved the study.

Participants and procedures

From August 2019 to February 2020, we recruited 210 participants between 18-45 years in Puerto Rico. Participants were both male and female from different social settings and educational levels. We recruited the participants through social media, WhatsApp,

the Department of Health of Puerto Rico's website, and emails. The invitation included an online survey tool that contained the fotonovela and the pre-and post-exposure questionnaires. Our study began with an informed consent stating that participation was voluntary and without compensation. Next, participants first fill the pre-exposure questionnaire. Then, they received instructions to read the fotonovela. Finally, they answer the post-exposure questionnaire. The entire study, with the use of the online survey tool, lasted approximately 25 minutes total.

Fotonovela

The fotonovela used in this study has a total of 18 pages and is entitled "Lo Que Usted No Sabe" (What you don't know). [12]. The story details a young Latina female who learned about the importance of being vaccinated against HPV while in a committed relationship.

The fotonovela was explicitly designed to address the health belief model's primary constructs, which have been shown to influence vaccine uptake in young adult women. These constructs are perceived susceptibility, perceived benefits, perceived barriers, self-efficacy, and cues to action. The fotonovela addressed perceived susceptibility, perceived severity, and perceived benefits via educational messages in the fotonovela relating to common misconceptions.

These messages included the link between HPV and cancer, male vaccination, vaccine safety, and the risk of acquiring HPV even when in monogamous relationships. Self-efficacy was promoted via story protagonists who served as role models for healthy behavior. Finally, a cue to action would be the fotonovela itself, aimed to motivate readers to act.

Pre-exposure and post-exposure intervention Questionnaire

The pre-exposure and post-exposure questionnaire compared individual attitudes and intentions related to HPV and the HPV vaccine [12]. The pre-exposure consisted of five study questions and nine demographic questions, while the post-exposure consisted of 19 questions. Five of the post-exposure were the same five study questions of the pre-exposure questionnaire to compare changes in the participant's responses. The other 14 additional questions were divided into 13 dichotomous (true/false) questions related to attitudes about the fotonovela content and one open-ended question, which asked the participant to write three facts that they learned from the fotonovela.

Compared to Chan's study in 2015, demographic questions were slightly modified to be more relevant for the Puerto Rican population [12]. The changes are as follows: Spanish was listed first as the primary language, followed by English as the second option. The question changed to reflect Puerto Rico as the first option in the demographic question asking where the person was born. The options continued by the United States, the Dominican Republic, and others. Finally, any questions asking about locations were changed to reflect our area, Puerto Rico.

We assessed attitudes and intentions toward HPV vaccination with five items on a 5 item Likely scale with an "Undecided" option [12]. The items measured included perceived susceptibility to HPV, perceived benefit of vaccination in a committed relationship, intention to vaccinate, intention to encourage family and friends to vaccinate, and attitudes towards vaccination.

Analysia

All questionnaires were anonymous, and we stored the responses in the google form data excel sheet without any identifying

factors. The quantitative analyses used R (version 4.0.2) and graphics using ggplot 2 [17]. We used the paired Wilcoxon_Mann_Whitney non-parametric test to compare and evaluate the change in perspective between pre-exposure and post-exposure item questions after the fotonovela intervention [18]. A Chi Square test was used to assess the change in feelings about HPV vaccination pre and post fotonovela [18]. Frequencies and percentages were computed for all variables. Education level was assessed as higher education versus lower education where higher education includes from college level or above, while lower includes any education level below college.

RESULTS

The mean age of the 210 participants, between 18-45 years old in Puerto Rico was 24.7 ± 6.3 (Table 1). From the total population of participants, 70% were females, and 96% born in Puerto Rico with self-identification as Latino/Hispanic. The preferred reading language was Spanish (69%), while 30% preferred English, and 1% selected both languages. Although 43% mostly spoke Spanish in their household, 33% spoke only Spanish, and 22% spoke English and Spanish. Single participants constituted 79% of the general population, followed by 10% for married and living with a partner. Finally, 82 % of participants stated to have higher education (at least some university level) (Table 1).

Table 1: Demographic characteristics of participants (N=210).

Age Range (years)	N (%)
18-20	70 (33)
21-25	63 (30)
26-30	54 (26)
31-45	23 (11)
Education	
Lower education	38 (18)
Higher education	172 (82)
Gender	
Male	62 (30)
Female	146 (70)

Figure 1 presents the responses to the question assessing the pre-exposure versus post-exposure change in perception of the likelihood of being infected. The increase in the belief of susceptibility to HPV infection after watching the fotonovela was significant (Wilcoxon test with ties, $p < 0.001$) (Figure 1).

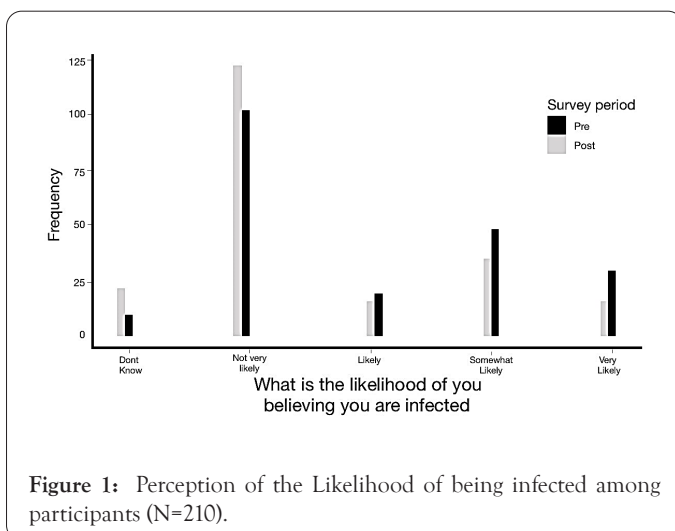


Figure 1: Perception of the Likelihood of being infected among participants (N=210).

Figure 2 presents the responses to the question for assessing the pre-exposure versus post-exposure change in the participants' likelihood of wanting to get vaccinated. The difference in the desire to get vaccinated after seeing the fotonovela was significant. Individuals were more likely to get vaccinated after seeing the fotonovela (Wilcoxon test with ties, $p < 0.001$) (Figure 2).

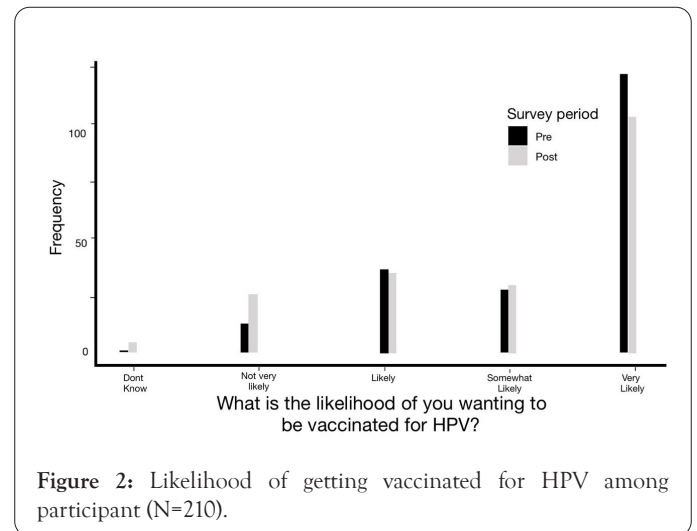


Figure 2: Likelihood of getting vaccinated for HPV among participant (N=210).

The percentage that wanted to be vaccinated against HPV during a committed relationship changed from 77% to 87% after the fotonovela. The percentage of people who did not believe they needed to be vaccinated decreased from 6% to 2%, and the people who thought that maybe they needed to get vaccinated changed from 17% to 11% presented in Table 2. The overall change in perspective about vaccination in a committed relationship was significant and positive (Wilcoxon test with ties $p < 0.005$) (Table 2)

Table 2: Participants' likelihood of being vaccinated during a committed relationship before and after the fotonovela.

	No	Maybe	Yes
Pre-survey	13 (6)	35 (17)	162 (77)
Post-survey	5 (2)	23 (11)	182 (87)

The responses to the question "How will receiving the HPV vaccine make you feel?" are presented in Table 3. The general pattern suggests that viewing the fotonovela resulted in a significant change in their feelings regarding HPV vaccination (Contingency table, Chi-Square=8.77, $df=3$, $p < 0.05$) (Table 3).

Table 3: Participants' responses about their feelings of receiving the HPV vaccine before and after the fotonovela.

How you feel	Pre, N=210 (%)	Post, N=210 (%)
Anxious	11 (5)	14 (7)
Don't know	35 (17)	19 (9)
Empowered	48 (23)	68 (32)
Safe	116 (55)	109 (52)

Figure 3 presents the responses to the question "how likely were the participants to encourage friends and family to be vaccinated." The change in the likelihood of participants' perception about encouraging family and friends to get vaccinated was significant and showed a positive increase (Wilcoxon test with ties $p < 0.002$) (Figure 3).

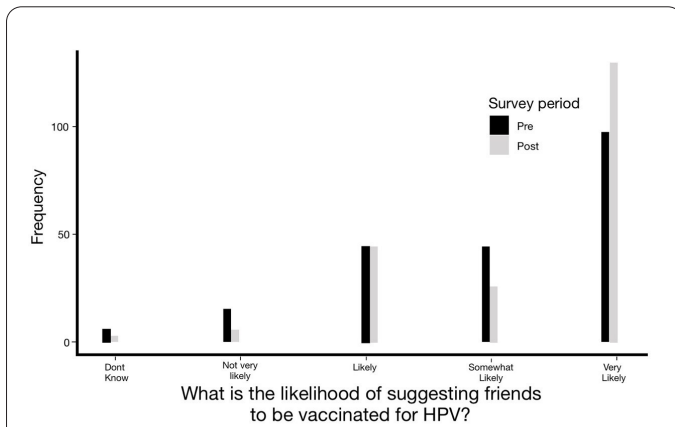


Figure 3: Likelihood of suggesting friends or relatives to be vaccinated for HPV among participant (N=210).

Of the 210 participants, the vast majority found the fotonovela interesting (92%), easy to read (94%) and would talk to the family about it (93%). The participants like (94%) and found important the information provided by the fotonovela (97%), most of them affirming that the people in the fotonovela are like the people they know (74%). Accordingly, after viewing the fotonovela booklet, the participants were intrigued to learn more about the topic (80%).

DISCUSSION

A fotonovela is an educational tool used in public health as part of prevention plans. We assessed the impact of this tool in a Hispanic population between the ages of 18-45 years old to evaluate if this educational method is useful for increasing the rate of HPV vaccination. In addition, this assessment addressed the participants' feelings about infection, vaccination, sharing that information with friends and family, and changes in their beliefs after being exposed to a fotonovela.

Since HPV may present as an asymptomatic infection, many people may be infected without being aware [19,20]. Adding to this, the lack of information about HPV would lead to a false sense of security since they are not presenting symptoms [21,22]. From our study population, 32% perceived themselves as susceptible to HPV infection. This percentage is within the reference range of previous studies in Asian American participants assessing their perception of the risk of being infected with HPV [19]. However, this percentage is 11% percent higher than the percentage of low-income Hispanic participants in a similar study in Southern California [12].

Subsequently, this lack of knowledge regarding HPV can correlate with the significant 14% increase in the perception of individuals' susceptibility regarding HPV infection after reading the fotonovela. From these findings, is evident that more information about HPV is necessary for the public to be aware of their possible susceptibility to an infection with this virus. In our study, we found that 85% of the population were more likely to consider being vaccinated before the fotonovela, which is a higher baseline compared to a study in the Iranian and Southern California population where around 60% to 70% of the population had the intention to vaccinate against HPV [12, 23].

However, our study results show that participants had a significantly higher likelihood (93%) of getting vaccinated after

seeing the fotonovela. Additionally, our study shows a significant positive change of 4% in the participants' perspective regarding vaccination in a committed relationship and a reduction in the number of participants who answered they would "not" get vaccinated, or they "may" get vaccinated. After viewing the fotonovela, 98% of the responders expressed the desire to be vaccinated. This result is an important finding since risk perception has been one of the many documented barriers to HPV vaccination [24]. In a 2019 study assessing the association of perceived risk and relationship status in college adults, 80% of all participants perceived themselves to be at low risk of infection when they were in a committed relationship [25]. It has been observed that individuals in a committed relationship were less likely to get vaccinated [26,27]. Furthermore, individuals in a relationship who perceive themselves at lower risk are less likely to participate in protective behaviors [28].

From all pre-exposure responses in our study, 78% of participants stated that receiving the HPV vaccine would make them feel empowered or safe. Some of the reasons that hinder individuals from getting an HPV vaccination are vaccine side effects, cost, safety, and effectiveness [29, 30]. After intervention with the fotonovela, the baseline of people feeling empowered and safe at the thought of receiving an HPV vaccine increased by 12%. This finding correlates to a 2018 study assessing HPV and cervical cancer knowledge in high-risk minority women in Cook County. This study found that the knowledge acquired in an educational intervention increases the population's likelihood at risk to feel that the HPV vaccine is safe [30].

As a result of the pretest question assessing participants' likelihood to encourage family and friends to get vaccinated, 89% of them reported likely to do so. However, a study made in Puerto Rico found that a lower percentage of pregnant women were willing to vaccinate their children against HPV (60%) [9]. This result also diverges from a study in 2016, where 40% of Latinas stated that they would recommend the HPV vaccine to others [31,32]. It is documented that friends and family's recommendations have a significantly higher positive impact that can influence a young adult to vaccinate against HPV [21]. After reading the fotonovela, there was a significant 7% increase in the likelihood of participants to encourage family and friends to get vaccinated. Furthermore, there is a positive correlation between perceiving the vaccine as safe and willing to get vaccinated, with encouraging others to do the same [31].

Finally, a fotonovela booklet is an easy way to capture the reader's attention with its visual content. The simple and familiar dialogue, combined with portraying relatable characters in everyday situations, makes it easy for the reader to learn and retain the message [32]. For example, most participants in our study felt that the fotonovela was interesting, intriguing, and easy to read with important information. They also felt some connection with the characters and would talk to their family about the fotonovela and its contents.

There are some limitations in this study.

One of them being the generalizability that these results represent the Puerto Rican population. For example, in this study, 82% of the participants had a higher education than PR's general population, which is only 25% [33]. Also, since the questionnaire was administered online, it does not consider people who do not have access to the internet, smartphones, tablets, and computers to access the questionnaire and differences in socioeconomics,

often related to educational levels. Lastly, we did not ask if the participant had already been vaccinated against HPV. In the future, we encourage evaluating the long-term effects this tool may have if any of the participants decided to get vaccinated after this intervention and to broaden the spectrum of participants.

CONCLUSION

A fotonovela is used in Hispanic communities due to its ease in communicating information with dramatic, easy-to-read stories with pictures and characters that this community can relate to. After viewing the fotonovela, we found that more participants believed that they were susceptible to HPV infection. Subsequently, more participants were inclined to be vaccinated against HPV and that they should be vaccinated against HPV even when they were in a committed relationship.

Overall, participants felt more empowered and safer about being vaccinated against HPV and were more likely to encourage others to do the same. This study demonstrated that fotonovelas are an effective and entertaining way to educate younger, educated, Hispanic-Puerto Rican communities. It also shows the fotonovela as an easy and adjustable tool for the community's preferred language and culture.

AUTHORS' CONTRIBUTIONS

Grisel Burgos-Barreto participated in the study design, acquisition of data and revised the data. Grisel Burgos-Barreto, Edison Martinez-Monegro and Brian Virella-Berio participated in the data analysis and drafted the manuscript. All authors read and approved the final draft of this manuscript.

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