







RESEARCH PAPER



Feasibility of a combined strategy of HPV vaccination and screening in Mexico: the FASTER-Tlalpan study experience

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ABSTRACT

There has been a noticeable shift in discussions about cervical cancer, moving from prevention to elimination. Interventions such as FASTER, human papillomavirus (HPV) vaccination and HPV screening are innovative intervention strategies which can be utilized to begin a path to elimination. To explore the feasibility of the FASTER strategy, an evaluation was carried out in eight primary health-care centers within the Tlalpan Health-Jurisdiction of Mexico City between March 2017 and August 2018. A mixed methods approach was used to evaluate three components: infrastructure, patient acceptability, and health-care professionals' perceptions. This included checklists of requirements for the infrastructure rollout of FASTER and interviews with women and health-care professionals. Nearly all (93%) of the 3,474 women aged 25–45 years accepted HPV vaccination as part of a combined vaccination and screening program. The main reason for acceptance was prevention, while having doubts about the vaccine's benefits was the main reason for refusal. Most of the 24 health-care professionals had a positive opinion toward HPV vaccination and identified the need to increase dissemination, inform the population clearly and concisely and currently extend the age range for vaccination. The evaluation of eight primary health-care centers showed they had the necessary infrastructure for the development of a joint HPV prevention strategy, but many centers required improvements to become more efficient. Together these findings suggest that although HPV vaccine acceptance was high, there is the need to increase education and awareness among potential vaccine recipients and health-care professionals to implement the FASTER strategy.

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Introduction

Human papillomavirus (HPV) vaccines are safe and cost-effective tools to prevent HPV infections, resulting in global recommendations for their use.¹ This has led to reframing the public health problem of cervical cancer and moving from control to elimination of HPV-related diseases.² Currently, it is considered feasible to eliminate cervical cancer through vaccination, screening and opportune treatment, as necessary strategies to move towards the elimination of HPV in the world.^{2–4} This means, moving from control (reduction the frequency of the disease) to elimination (reduction of HPV infection and related disease to zero or close to zero in a country or defined geographical area).^{2,5}

In poor countries, where the burden of cervical cancer is high, the disease has not been controlled; however, there are strategies that could lead to elimination.^{3,4} Highlighting the need for efficient prevention programs, with the capacity to mitigate the burden of cervical cancer in the short term. In response to this

need, a combination of HPV vaccination and HPV screening has been proposed in countries where HPV screening has already been incorporated into their prevention programs.⁶ FASTER is a strategy on the path to elimination, it is recognized that it is not an easy task for countries with fewer resources, but it is undoubtedly a promising alternative and a starting point to achieve this challenge. The FASTER strategy proposes to combine HPV-based screening and HPV vaccination in women ages 25–45 years.⁶ A perspective such as this one would accelerate the decline in the occurrence of cervical cancer, hence the origin of the title FASTER.⁶ A combined vaccination and screening program would also mitigate the demand for screening of women and health services. Screening intervals are extended, the program is more cost-effective for reducing the burden of cervical cancer, especially in the most vulnerable populations where low-income women usually reside.^{6–8}

To date, there is no information on the ideal way to implement FASTER, and whether it is feasible from the per-

spective of the participants and health-care professionals. In Mexico, both of the cervical cancer prevention strategies in FASTER are available; however, several knowledge gaps remain: (1) women's perceptions about HPV vaccination, (2) health-care professionals' perceptions about the HPV vaccine, (3) convenience of HPV screening, and (4) infrastructure needed to carry out these strategies within the cervical cancer prevention programs in the country.

In order to respond to these concerns, the FASTER-Tlalpan feasibility study is currently underway with the objective to evaluate the potential impact of the incorporation of HPV vaccination in the timely detection of the cervical cancer program.^{7,8} The study has incorporated an evaluation element on different aspects of feasibility to introduce a combined vaccination and screening program as part of the cervical cancer prevention program in Mexico City. We report findings of the evaluation on three components: (a) identifying the infrastructure available; (b) the acceptability of HPV vaccine in women between 25 and 45 years of age taking part in the cervical cancer prevention program; and (c) the perspective of health professionals.

Results

Infrastructure available for the rollout of a combined strategy

None of the primary health-care centers (n = 8) observed had room for an extra refrigerator for vaccine storage. All primary health-care centers, including T-I, had areas for proper storage of vaccines. However, there was not enough space to place refrigerators solely dedicated to the storage of the HPV vaccine. Seventy-five percent of the centers had electric generators to ensure the cold chain is maintained following possible electrical failures, and 88% of the centers had at least one portable cooler available to maintain the cold chain inside a doctor's office.

None of the primary health-care centers in the study had an assigned or unique area for the detection or collection of cervical samples. Half (50%) of the units carried out the sample collection in a clinic shared with other services, primarily treatment services. The other half did not have a designated place, shared or exclusive, for the timely detection of cancer. For sample collection, 63% of the centers had a suitable examination table and lamps that facilitate the process. None of the centers had a private space for the delivery of results and for counseling. None of the eight health centers complied with the eight elements evaluated.

Evaluating the acceptability of the administration of HPV vaccine

For the study, 3,474 women between 25 and 45 years were recruited during a period of 17 months. Three thousand two hundred and twenty-eight women (93%) accepted the vaccine, and 246 (7%) did not. Of the 246 women that did not accept the vaccine, 18% refused it due to plans to become pregnant. The mean age of the women enrolled in the study was 36.2 years (SD = 6). The uptake of the HPV vaccine did not vary

by age group (93% for 25–34 year-olds and 92.9% for 35–45 year-olds). There were no significant differences by education, occupation, marital status, age of sexual debut or the total number of sexual partners between age groups. (See [Table 2](#)). All women who provided sociodemographic data also participated in the short interview component of the study.

Acceptability of vaccination as part of the cervical cancer prevention program

Five thematic areas were identified in favor of HPV vaccination. The three topics that appeared most frequently were; prevention, sexual behavior and previous medical history which lead to the need to be protected from infection or disease (cancer, HPV, genital warts). It was important to prevent both HPV and other infectious diseases. Protecting themselves from HPV transmission or from cancer also helps to favor the adoption of vaccination. Other reasons that led to the decision to get vaccinated were related to sexual behavior, specifically, the number of sexual partners and the monogamy of their partners. Other motivating factors were having a history of cancer, HPV, genital warts (in the woman or in her partner), the fear of contracting HPV or cancer, and the need to be healthy so they could continue to take care of others, particularly their children. The vaccine being available for free was another promoter of acceptability ([Table 3](#)).

Reasons for rejecting vaccination

Although only 7% of women did not accept the vaccine, the reasons for the rejection are significant as they may represent barriers for vaccination in the general population. The main reasons for rejection were doubts about the safety of the vaccine and possible post-vaccine consequences. In addition, some participants feared to combine the vaccine with concurrent treatments for other pathologies and possible adverse reactions. A lack of confidence in the vaccine is another factor that discouraged women based their decision on what they have heard from others about the vaccine. Fear of vaccinations, a lack of information, not feeling at risk for HPV, and a lack of interest in the vaccination were other barriers to HPV vaccine acceptance. See [Table 4](#). On the other hand, only one woman reported not accepting the vaccine because of her religion and another because her doctor told her that the vaccine does not work.

Reasons that other women might reject vaccination

The interviews explored women's opinions on the reasons their peers might have for rejecting the HPV vaccine. From their perspective, a lack of information, beliefs and customs, the attitude of the partner, disinterest or laziness, and the permission from the partner would be some of the most frequent reasons HPV vaccine rejection. Some women mentioned: the relative novelty of the vaccine may which might affect awareness of it; machismo, taboos and social preconceptions; partners not allowing the woman to get vaccinated; fear that the vaccine could accelerate the cancer virus; and finally, irresponsibility, laziness, having many sexual partners, and not wanting to face the consequences of potentially having HPV. Other reasons for rejection included: not perceiving

oneself at risk, shame, low-self-esteem, ignorance, fear of what others think (social norms), not perceiving the benefit of the vaccine in adulthood, or the fear of adverse reactions. To a lesser extent, women mentioned as barriers the cost of the vaccine, fear of inoculation, and other reasons such as thinking that there is no HPV or that it may affect reproductive health (Table 5).

Strategies for the acceptability of vaccination from participants

As recipients of the cancer prevention and control programs, the perception of participants is a fundamental guide to formulating strategies that favor the acceptability of HPV vaccination. Women were asked about what the health sector could do to facilitate vaccination. Three themes emerged from their responses: (a) providing information, (b) motivation and sensitization, and (c) improving services in the health sector.

Providing information. Women considered it important to disseminate information about HPV (clear, concise information, data on the frequency of infection), the HPV vaccine (benefits and risks), cervical cancer and prevention. In addition, they believed it is necessary to inform not just the women but also their partners. This can help ameliorate social misconceptions.

Motivation and awareness. Participants discussed the importance of motivating women and educating their partners through information.

Improve services in the health sector. From their perspective, women consider it important to strengthen community work, improve patient care, improve infrastructure, provide counseling, and promote universal HPV vaccination (Table 6).

Mechanisms to disseminate information

Participants were consulted on the best way to disseminate information among women and the community in general, given that women will use the information in their decision-making. From their perspective, it is important to: (a) carry out community activities such as health campaigns or health days; (b) provide support material such as brochures, flyers, posters, or other written materials that show images about HPV and cancer; (c) give talks in waiting rooms in primary health-care centers; (d) promote through mass media and social networks; and (e) hold conferences, discussion forums and presentations in public places.

Perspectives of health-care professionals on the implementation of a combined program of vaccination and screening

HPV vaccines

Doctors and nurses believed the vaccine is useful to: (i) prevent types of HPV; (ii) help expand coverage and reduce risks; (iii) prevent cancer and, (iv) protect children and adolescents. Health-care professionals had a positive opinion about vaccination. However, at the same time, they identified needs such as increased dissemination about the vaccine, extending the

age range of vaccination, and informing the population in a clear and accurate manner.

Benefits of the vaccine

Health-care professionals were asked to list three benefits that vaccination would have for participants in the HPV detection program. They reported a decrease in cost as the main benefit of the vaccine for the health sector as a whole. Other benefits reported were: (i) decreased incidence of and mortality from cervical cancer, (ii) emphasizing prevention over treatment, (iii) reaching national health goals.

Perceptions of the reasons for women to accept or reject the vaccination

Health-care professionals perceive that women would accept vaccination for several reasons, mainly: (i) to prevent HPV/protect from infections; (ii) to prevent cervical cancer; (iii) the fact that it is a free public service and, (iv) for fear of having the disease.

On the other hand, reasons that would lead to the rejection of the vaccine were perceived to be: (i) lack of knowledge regarding the vaccine benefits; (ii) lack of counseling about the vaccine; (iii) lack of awareness of the HPV vaccine; (iv) fear or mistrust in the vaccine, and (v) social beliefs, myths, customs or habits around the vaccine – e.g. that the vaccine causes infertility, is not good, kills, causes cancer, is ineffective – see Table 7.

Opinions on the joint strategy of vaccination and screening

In general, health-care professionals believe that the combination of vaccination and screening is a good strategy for the prevention of cervical cancer. They believe that a combination of these prevention measures (primary and secondary) would have a greater impact in achieving a decrease in cervical cancer, risk of infection and incidence of the virus. In terms of burden of disease, they mentioned: (i) the opportunity to emphasize the prevention of cervical cancer incidence and mortality/HPV infections/serious lesions; (ii) interrupting the chain of transmission; and (iii) decreasing the incidence of HPV infection and cervical cancer incidence and mortality in young and adult women. In addition, they believe that performing both procedures in the same visit is an opportunity to detect and prevent, expand coverage or decrease the number of follow-up visits.

Opinion on possible obstacles to implement a combined strategy

Just over 25% of all the professionals interviewed (n = 24) thought there was no obstacle to implementation. They believed women would accept the HPV vaccine and all that remains are discussions with decision-makers to achieve implementation.

Among the challenges health-care professionals mentioned: i) lack of infrastructure and/or adequate organization within the services; ii) lack of supplies; iii) lack of promotion; iv) lack of medical and paramedical personnel; v) factors related to the couple – machismo, the (male) partner does not accept that someone touches their (female) partner – ; vi) myths, culture, distrust and, vii) that the woman herself does

not accept new alternatives. However, the vast majority said that all these barriers could be solved with better organization of services.

Discussion

Overall our findings suggest that a combined strategy (FASTER) is feasible in a cervical cancer prevention program. The joint strategy of vaccination and screening had a high acceptability among women and health-care professionals at primary health-care centers using the timely detection of the cervical cancer program. Some barriers were identified but these can be overcome with better dissemination of information and community outreach. Health-care professionals were also receptive to the idea of the joint strategy. A positive attitude toward the HPV vaccine was observed in most participants; however, some inaccurate ideas were identified. The importance of strengthening knowledge among health-care professionals is essential given that they are advisors, key informants, and first contact for women seeking health services. Given that health-care professionals can have a significant influence on the attitudes and decisions of their patients, it is fundamental that they understand the objectives of the new program, the benefits, and results. As far as the infrastructure, we observed the capacity to vaccinate and sufficient infrastructure in place to support both vaccination and cancer screenings. Although not all clinics had this capacity and, in some cases structural improvements would need to occur to support the program. These findings, from the Tlalpan district of Mexico City, are similar to what has been observed in vulnerable populations of other developed countries. For example, this was also found in indigenous populations in Canada, where it was observed that some of the barriers to HPV vaccination are limited resources and gaps in the infrastructure and services.⁹

Therefore, before implementing this combined program, it is fundamental to re-engineer primary health-care centers to be able to support screening and vaccination programs. This would involve prioritizing and reorganizing these services and strengthening units by providing the necessary medical equipment to perform these procedures. Education is another fundamental component for implementation; this could include counseling, the dissemination of accurate information, or the design of educational strategies that help increase knowledge and favor positive attitudes towards the HPV vaccine.¹⁰ Educational efforts should be designed to address the needs of women, with the aim of reducing negative beliefs, perceptions, or misconceptions that could compromise the acceptability of the vaccine. The findings from this study show that both women and health-care professionals lack accurate information about HPV and the vaccine. However, the acceptance of the vaccine was close to 100% among adult women. This finding echoes what other studies have observed regarding high levels of HPV vaccine acceptance even in instances of low-level awareness and knowledge about HPV, cervical cancer or vaccination.^{11–13} In Mexico, the high acceptability of the vaccine among women has also been documented,¹⁴ however, the need to promote knowledge about the benefits of the

vaccine is also recognized.¹⁵ An additional recommendation that could be offered to women to increase acceptability is to spread the message that the vaccine not only helps them but also their partners in the future cancer prevention. This could also help partners to not to oppose vaccination. It is important to reduce the knowledge gap even when the response to vaccination is positive to ensure that accurate information is disseminated to the entire population. It is evident that some women have little information about the vaccine and others are poorly informed. The content used for educating the population should clarify the benefits of the vaccine (prevention of infections caused by the main viruses associated with cervical cancer and genital warts), mitigate fear and promote the acceptability of the vaccine among the population. The acceptability of the vaccine has been explored mainly in adolescent, parent, and health-care professional populations throughout the world. This is primarily due to the fact that vaccination has been directed predominantly at female adolescents. Therefore, there are fewer studies that address the acceptability of the vaccine in adult women. However, the findings of this study are similar to the research on acceptability of the vaccine among adolescents, where it was documented that prevention of future HPV infection is one of the main predictive factors for vaccine uptake.¹⁶ Similar to the findings in our study, the fear of cancer is another main reason for accepting the vaccine.¹⁷ It was observed that the determinants of acceptability among adolescents and parents are similar to those found in the women in our study. Other studies indicate that having information about HPV infection and safety or efficacy of the vaccine can help to increase acceptance rates.¹⁸ In our population, information about the vaccine does not seem to be a determinant for its acceptance. The reasons for vaccine acceptance given by women seem to be more inclined towards their beliefs and perceptions about the benefits of the HPV vaccine and not so much on formal information provided by health-care professionals. Some studies have shown that low knowledge or lack of knowledge about the vaccine is indeed a barrier to vaccination.¹⁹ Still, participants have other motivations for accepting the HPV vaccine, which suggests that increasing awareness should not be the only target for cervical cancer prevention programs including vaccination.

In order to implement a joint vaccination and screening strategy, it is important to consider the perspectives offered by the women and health-care professionals in our study. In the first place, it is necessary to strengthen the infrastructure for screening and make spaces available for counseling. For women who identified barriers in the form of social norms or false beliefs about the effectiveness and safety of the vaccine, substantial time may be needed to help counsel them. There is also a need to develop education strategies for the prevention of cervical cancer with the participation of the community considering their ideas, perceptions, and preferences to promote knowledge, awareness, promote vaccination, and timely detection. The results of our study suggest that a combined vaccination and screening program would be accepted by both women and health-care professionals, but there are structural needs in health centers that would need to be addressed prior to implementation.

Strengths and Limitations

However, we recognize that our study does not contain adult women and health-care professionals from all socioeconomic backgrounds, especially in rural areas, where determinants of acceptability of a program like FASTER-Tlalpan could be different. Generalizability of results is a limitation of this study and a potential limitation of any study, based on who enrolls in the study and recruitment methods. We used a convenience sample and did not use a sample size calculation in this study. Results may have been different if another sampling frame was used. Additionally, there could be distinct factors related to acceptance or rejection of the vaccine itself in these different contexts, both by women and health-care professionals. We also provided a brief explanation about the HPV vaccine in the informed consent, including the fact that the vaccine is safe and provided to girls in their fifth year of elementary school in Mexico. Providing this information could have potentially biased vaccine acceptance in a positive way. Due to the limited sample size, results for this qualitative study are not meant to be representative of a larger population of health-care workers. Despite these limitations, this study is the first to report on the feasibility of combined vaccination and screening program for women in the region. A strength of this study is the inclusion of multiple stakeholders (physicians, patients) and health-care facilities themselves as a whole.

Methodology

This study was done in the Tlalpan Health-Jurisdiction of Mexico City during a period of 17 months, between March 2017 and August 2018. Of all 20 primary health-care centers under the Tlalpan health-jurisdiction, 11 are T-I, 3 are T-II, and 6 are T-III, similar to other jurisdictions in Mexico City. We used a mixed methods approach to evaluate the different components of the project. We used a convenience sample and did not utilize a sample size calculation in this study. This study was approved by the Ethics, Research and Biosafety Committees of the National Institute of Public Health with registration numbers: 1322–2015 and 1417–2016.

Identifying available infrastructure

To evaluate the infrastructure component of the study, eight primary health-care centers were included: two T-I primary health-care centers, two T-II primary health-care centers, and four T-III primary health-care centers. T-I centers are smaller and usually have only one care module with a doctor and nurse. T-III centers are usually composed several of T-I and T-2 centers. T-III centers are comprised of a minimum of five care modules and usually have laboratory, clinical analysis, and x-ray services. After obtaining administrative permission, two researchers visited each facility to verify the existence of spaces and conditions for vaccination and screening. Researchers observed the facilities using a checklist and interviewed the heads of the facilities, typically doctors, to request additional information and clarify question from the checklist. The checklist included eight elements: four on vaccination

Table 1. Checklist of evaluated elements, FASTER-Tlalpan Study, Mexico City, Mexico.

Vaccination component:	
1.	Space for refrigerators for vaccine storage
2.	Number of refrigerators
3.	Availability of portable coolers suitable for maintaining a cold chain in the doctor's office
4.	Electric generators in case of power outages
Screening component:	
1.	Existing private space suitable for the collection of samples dedicated to the timely detection of cancer
2.	Space for the sample collection shared with other service(s) -not dedicated solely to timely detection
3.	Appropriate examination table with examination lamp
4.	Private space for the delivery of results and counseling

and four on screening, with which each facility was evaluated to obtain a compliance ratio of the minimum equipment necessary to carry out HPV screening and vaccination (Table 1).

The following aspects were reviewed for the vaccination component: 1) Space for refrigerators for vaccine storage; 2) Number of refrigerators; 3) Availability of portable coolers suitable for maintaining a cold chain in the doctor's office; and 4) Electric generators in case of power outages. The following aspects were reviewed for the screening components: 1) Existing private space suitable for the collection of patient samples dedicated to the timely detection of cancer; 2) Existing shared non-private space suitable for the collection of patient samples not limited to cancer detection; 3) Appropriate examination table with examination lamp; 4) Private space for the delivery of results and counseling. Ideally, it is desirable to have seven elements, four from the vaccination component and three from the screening component (excluding #2). This item was included to identify the

Table 2. Sociodemographic and clinical characteristics of the women in the FASTER-Tlalpan Study, Mexico City, Mexico.

		All screened women n = 3,474	Accepted the vaccine n = 3,228 (93%)
Age (years)	Mean (SD)	36.2 (6.0)	36.2 (6.0)
Age groups (years)	25–34	1,360	1,265 (93.0)
	35–45	2,114	1,963 (92.9)
Education	Primary and middle school	1,980	1,832 (92.5)
	High school	964	901 (93.5)
Occupation	University	526	491 (93.4)
	Housemaker	1,915	1,772 (92.5)
	Employed	1,359	1,270 (93.5)
	Student	60	55 (91.7)
Marital status	Professional	134	125 (93.3)
	Single	789	729 (92.4)
	Married/Civil union	2,439	2,264 (92.8)
Age of sexual debut	Divorced/ Separated/Widow	236	225 (95.3)
	17 years or under	1,579	1,473 (93.3)
Total number of sexual partners	≥18	1,895	1,755 (92.6)
	1	1,089	1,012 (92.9)
	2–3	1,538	1,417 (92.1)
Parity	4+	846	798 (94.3)
	0	1,366	1,281 (93.8)
	1–3	1,858	1,724 (92.8)
	4+	250	223 (89.2)

*Due to missing data, percentages might not add up to 100.

Table 3. Key themes on HPV vaccine acceptability among Mexican women, FASTER-Tlalpan Study, Mexico City, Mexico.

Themes	Subthemes	Selected Quotes
Prevention and health self-care	Infections/HPV/Transmission	"It's a method of prevention" "To improve my health" "To not have this Papilloma virus illness" "It's to prevent the illness in case I had it" "Because one never knows the [kind of] person who was in someone's life previously and to avoid infections" "HPV currently affects women and it is good to prevent it" "For protection in case of having [sexual] relations and catching it" "To protect myself from the illnesses out there" "A control for future risks"
	Cervical Cancer	"To prevent a type of cancer because of having two partners" "I know it is something very important and it can prevent cervical-uterine cancer" "To be better protected" "So that I can be well and not get sick" "The Mexican woman is at great risk"
Sexual behaviors	Partner's sexual behaviors	"Because my husband has had various partners" "I have a husband and one never knows what will happen or how faithful he is"
	Woman's sexual behaviors	"I've had many sexual partners" "If I have unprotected sex I will be protected" "For safety and because with my partner, we don't use that sort of protection" "Because I have family history of cervical-uterine cancer"
Medical history	Cancer HPV Infections	"I need it because I have the virus" "I've had other infections and it is painful" "I am diabetic, and I want to prevent infections"
	Genital warts	"I would have liked to because I don't know if it prevents other infections and I have some warts that I would like to treat"
Fear	Cancer	"I am afraid to get cancer and it is happening much more" "I do not get checked very often"
	HPV The future of their children	"To prevent and to not get sick, because I am terrified of HPV" "For my health because I have to care for my children"
Benefits of the vaccine	Cost-free	"Because it's free" "To take advantage of the fact that it's free because they are very expensive and for prevention"
	Healing properties and immunity	"It's an alternative to a cure for this illness" "Because it creates antibodies for us"

conditions in which the sample collection was made. In a context like that of a middle-income country such as Mexico, it is feasible to implement a strategy such as FASTER with the available infrastructure.

Assessing acceptability of HPV vaccine

To evaluate the acceptability of vaccination, the nursing staff invited women who visited primary health centers for any reason, to participate. Women between the ages of

25–45, who were willing to participate in study procedures and provide informed consent were invited to participate. The study excluded pregnant or lactating women, women who had a recent delivery, and those who planned to become pregnant or discontinue the use of contraceptives during the first 12 months of the study (month 0–12). The study also excluded women who previously received the HPV vaccine, those with a history of allergy, suspected allergy or hypersensitivity reaction exacerbated by any of the components in the HPV vaccine (including allergy to yeast or aluminum) and women with a life-threatening clinical condition or illness. Finally, women with a history of cervical cancer or hysterectomy and those who were recipients of any research product related to HPV vaccine were also excluded. The purpose of the study was explained to potential participants, along with the procedures, possible risks or benefits, and finally, they were told that their decision to participate would not interfere with the care or services received at the primary health-care center. A total of 3,474 FASTER-Tlalpan study participants were interviewed in order to understand the reasons why women accept or reject this vaccine. Prior to data collection, informed consent was obtained with approval by the Ethics and Research Committees of the National Institute of Public Health. Furthermore, a unique non-identifiable identification number was assigned to each participant which was used to identify them during the study processes. Women who refused vaccination were invited to participate in the screening component. All participants

Table 4. Reasons for rejecting the HPV vaccine among Mexican women, FASTER-Tlalpan Study, Mexico City, Mexico.

<i>Fear of adverse reactions- Fear of getting the vaccine while on other medications</i>
"I feel that there could be a reaction in my body"
"I didn't accept it because of the fear of a reaction because I take an anticonvulsant and [medication] for hypertension"
"I am taking a lot of medications because I have asthma"
<i>Fear of the inoculation- Perception of the vaccines being unsafe- Lack of trust in the vaccine</i>
"I'm afraid of injections, I don't want it"
"I do not trust the vaccine I think it is not useful for protecting us"
"It scares me, and I don't trust it, people say it's bad"
<i>Lack of information</i>
"I don't have all the information and I have my doubts"
"I don't have enough information about the vaccine and I prefer to ask"
"I don't have the information and I've heard negative things"
<i>Risk perception</i>
"Because I don't need it anymore"
"It's not necessary and I don't know what reaction will happen"
"I am not at risk"
<i>Lack of interest</i>
"I am not interested in the vaccine"
"I don't have time"
"For the moment, I do not wish to participate in the vaccination program"

Table 5. Reasons that other women might reject vaccination, FASTER-Tlalpan Study, Mexico City, Mexico.

Theme	Subtheme	Selected quotes
<i>Lack of information/ignorance/beliefs/customs/religion</i>		
"Lack of information and ignorance, and habits and beliefs"		
"Her religion doesn't allow her [to get the vaccine], doesn't permit it."		
Ignorance"		
"All the taboos and what they say, that [the vaccine] affects and accelerates the cancer virus"		
"Ignorance and the lack of knowledge of what it's for or how it helps [HPV vaccine]"		
"Because of ignorance and that it's not just injectable water or the actual virus to cause illness"		
"Because of their idiosyncrasies, or because of ignorance or lack of information"		
"It's ignorance because they think it's going to give them HPV"		
<i>Partner attitudes/permission</i>		
"Because they allow themselves to be manipulated by their husband"		
"Fear of the vaccine and of the thought of having to ask their husband for permission"		
"Repressed by the husbands, unfortunately"		
"Sometimes because their husbands are jealous and they [the women] don't want their partners doing something to them"		
<i>Disinterest, laziness, lack of time</i>		
"Laziness, that they don't care about their health"		
"They leave it until the last minute, they don't give it time, they don't take care of themselves"		
"To not come using the excuse that they don't have time or because they have to take care of the children"		
<i>Lack of trust in the vaccine</i>		
"Fear of being used as guinea pigs"		
"Fear of knowing that they have the virus and because they think that the government is trying to kill people"		
"Fear because they think they are getting the illness injected and that then they will get sick"		
"They don't trust that the vaccine has been well tested in people"		
<i>They do not perceive that they are at risk</i>		
"They don't think they can get papilloma, they blindly trust their partner"		
"Because of disinformation or because they think that nothing will happen to her"		
"They think they are healthy, and they don't need it or that they will never get HPV"		
<i>Shame</i>		
"Because of shame or they already got HPV and they don't want to get vaccinated"		
"They are ashamed, the lack of information and because if they go ahead and do it they might feel it is because they have been really gross or dirty"		
"Shame, laziness, they finally come around when they are dying"		
"The lack of culture and shame of not being able to ask because they don't even know what HPV is"		
<i>Lack of selfcare</i>		
"That they are irresponsible, and they don't love themselves"		
"Because they don't care about their bodies or they are not well informed about the benefits for themselves"		
"They don't take care of themselves and they don't care about their health"		
<i>Fear of what others will think (social norms)</i>		
"They are scared about what others will say"		
"They are scared, because others may think that because they are getting vaccinated, that it means they already have the illness"		
<i>They do not perceive a benefit in being vaccinated as adults</i>		
"Because they are older and the information is for girls"		
"Because there is no point in doing this for adults"		
"They are too old to receive the vaccine"		
"They say that vaccines are not for adults because they don't need them"		
<i>Fear of adverse reactions</i>		
"Because of fear of a reaction that could even lead to death and ignorance blinds us"		
"Fear of being allergic or having some kind of reaction"		
"Distrust, there is no trust in vaccines because of adverse reactions"		
<i>Vaccine cost</i>		
"The cost"		
"Ignorance and not having economic possibilities"		
<i>Fear of the needle stick (jab)</i>		
"Ignorance and the fear of the pain of the prick"		
"Because of fear of the pain of the prick"		

Table 6. Strategies proposed by women to achieve the acceptability of the vaccine, FASTER-Tlalpan Study, Mexico City, Mexico.

Theme	Subtheme	Selected quotes
Provide information	HPV Infection	"Give more information about the vaccine and HPV screening so that they know that if they don't take care of themselves, they could get the illness"
		"Bad information, give them information that won't frighten them"
		"Give more information of all the cases that have happened"
		"More information, more dissemination and to have HPV statistics"
	Vaccine (benefits and possible risks)	"Inform the right way, the pro and cons of the vaccine"
		"Give information in pamphlets, because they only know it's for girls"
	HPV related cancer	"More information because they have erroneous ideas like that it [the vaccine] causes cancer"
		"Inform them that it is a means of prevention"
	Prevention	"Inform them of the research and the problems they could have"
		"More research"
Innovations	"Provide more talks, information for the partner"	
	"Convince them through talks explaining the way to prevent, that they think about their children"	
Motivation and sensitization	Motivation for the woman	"Tell them that it is important that they get the vaccine and that it is for the good of themselves and their families"
		"Motivate people so that they value their lives"
Improvements to the health sector	For the partner	"Remove the myths or machista comments from the men who doubt the effectiveness of the vaccine"
		"Talks for the men because they don't understand"
Improvements to the health sector	Community work	"Go out to do fieldwork"
		"Give more talks to the community"
	Care improvements	"More promotion, go to the houses to give information"
		"Better treatment because sometimes [health care professionals] shout at you"
	Add to current infrastructure	"Give good service"
		"Be more human"
	Counseling	"Give better attention"
		"More places for screenings"
	Universal HPV vaccination	"Have more places"
		"Explain with clear language"
		"Explain well, so that there are no doubts"
		"Reassure them and don't give them alarming information that paralyzes them so that they can continue the treatment"
		"Transmit trust"
		"Dialogue is important to give the adequate information"
		"Propose that the vaccine is obligatory"
		"Make it obligatory if not then their husbands won't allow them to come"

completed a questionnaire in which socio-demographic information, gynecological-obstetric history, and sexual and reproductive history was collected. In addition,

participants completed a brief interview consisting of four open-ended questions; 1. Did you accept the HPV vaccine? 2. Why did you make that decision? 3. In your opinion, what could we do to increase HPV vaccination among

Table 7. Potential barriers to HPV vaccination from a health-care professional perspective, FASTER-Tlalpan Study, Mexico City, Mexico. (N = 24).

Categorized barrier	Number of times barrier listed*
"Lack of information"	16
"They believe that the is not good/that it harms"	12
"Fear of the vaccine/distrust"	12
"There are many myths about the vaccine"	10
"They believe it sterilizes them"	6
"Because of the bad information transmitted through mass communication like the television"	6
"They fear the secondary reactions"	4
"They don't believe in the vaccine"	4
"Because their husbands don't let them (they are not given permission to make decisions)"	4
"Being unaware of the benefits/ignorance"	4
"Because of ways and customs"	2
"They believe that the vaccine kills"	1
"They believe that it can cause cancer"	1
"They doubt that it is authentic because it is free"	1
"They believe that HPV does not exist and that they don't need the vaccine"	1
"They believe it will cause them to develop the papilloma virus"	1
"The cost of the vaccine through private means"	1
"Because they have to return to get a second dose of the vaccine (they might forget or don't want the second dose)"	1

*All health-care professionals listened to more than one barrier.

other women? 4. In your opinion, what reasons would a woman have for not getting vaccinated?

Perspectives of health-care workers

To explore the perspectives of health-care professionals, 11 doctors and 13 nurses involved with the cervical cancer prevention program were interviewed at primary health-care centers (2–4 health-care workers per center). The doctors and nurses were interviewed on their opinion regarding: (a) the HPV vaccine; (b) the benefits of vaccination for adult women and whether they perceived benefits from this for the health sector as a whole; (c) the reasons a woman would have to accept or reject vaccination; (d) their thoughts about a strategy that combines screening and vaccination, and (e) any challenges they perceived in implementing this process.

Processing and analysis of information

A descriptive analysis of the sociodemographic variables (age, education, occupation, marital status, age of sexual debut, total number of sexual partners and parity) was performed. The analysis was done in Stata, version 13.1. The approach for the analysis qualitative was thematic and we used open coding. The open-ended answers were transcribed by members of the research group, and qualitative analysis was carried out by one researcher; phrases or keywords were identified and coded manually. Another researcher reviewed the code list and their definitions, and these two researchers discussed the coding process while it was underway. The codes were grouped into topics by means of the constant comparison method (a process for reviewing and comparing data, including procedures such as coding data, identifying similarities and differences to be grouped into categories that lead to theories about the study phenomenon.),^{20,21} and these

similarities and differences were discussed by two researchers. The analysis sought to identify the factors that could facilitate or inhibit vaccination and the understanding of attitudes towards HPV vaccination.

Conclusion

Our evaluation allowed us to observe that incorporating vaccination into the screening program does not imply drastic changes or include significant barriers. On the contrary, what was found is a lack of planning and operational difficulties in the provision of screening services. Therefore, the challenges to overcome are the usual difficulties of screening even in the country's capital. Health-care centers have the necessary infrastructure for the development of a joint vaccination and screening strategy. However, the clinics and equipment for the collection of cervical samples require improvements to make the service more efficient. The acceptance of the vaccine was nearly 100%; however, it will be necessary to strengthen education and increase awareness among both potential recipients and health-care professionals.

The results of this study are useful for decision makers and contribute to other research to enter into the policy, programs, and initiatives aimed at preventing cervical cancer in Mexico. To implement a joint vaccination and screening strategy we must consider the importance of addressing the suggestions identified during our work. It is necessary to strengthen the infrastructure for screening and make spaces available for counseling. Although it was possible to demonstrate the acceptability of vaccination in a single region of the country, it is important to strengthen the communication between participants and health-care professionals, including education, advice and clear recommendations that favor vaccination and screening.

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