HPV vaccine acceptance is high among adults in Mexico, particularly in people living with HIV

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Abstract

Objective. To measure HPV vaccine acceptance in diverse Mexican adult populations, taking into account HIV status.

Materials and methods. A total of 1 329 men and women, with and without HIV, participated in one of three intervention studies, offering HPV vaccination, carried out in the states of Morelos, Tlaxcala and Mexico City; either the bivalent (Morelos n=103, Tlaxcala n=127) or quadrivalent HPV vaccine (Mexico City n=1 099) was offered.

Results. HPV vaccine was accepted by 80.3% of participants; acceptance was higher in people living with HIV than those without (84.4 vs. 78%, p=0.004). Women had greater HPV infection knowledge (p<0.0001) than men and slightly higher (p=0.4) vaccine acceptance. The main reason for vaccine non-acceptance among HIV-positive participants was their doctor recommended they not get vaccinated.

Conclusion.

Resumen

Objetivo. Medir la aceptación de la vacuna de VPH en una muestra diversa de población adulta mexicana, teniendo en cuenta su estado de VIH.

Material y métodos. 1 329 hombres y mujeres con y sin VIH participaron en tres estudios de intervención, realizados en los estados de Morelos, Tlaxcala y Ciudad de México. Se ofreció la vacuna bivalente (Morelos n=103, Tlaxcala n=127) o cuadrivalente (Ciudad de México n=1 099) contra VPH.

Resultados. La vacuna fue aceptada por 80.3% de los participantes; la aceptación fue mayor en personas que viven con VIH que en aquellas que no (84.4 vs. 78%, p=0.004). Las mujeres tenían mayor conocimiento sobre VPH que los hombres y una aceptación de la vacuna ligeramente mayor (p=0.4). El motivo principal de la no aceptación de la vacuna entre personas con VIH fue que su médico recomendó que no se vacunaran.

Conclusión.
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PALABRAS CLAVE: VACUNA CONTRA HPV; ACEPTABILIDAD; PERSONAS VIVIENDO CON VIH; HOMBRES; MUJERES

Estudios muestran que la aceptabilidad de la vacuna contra el VPH es alta en hombres y mujeres, independientemente del estado de VIH. Se pueden lograr mayores tasas de aceptabilidad educando a los proveedores de atención médica para que recomienden la vacuna contra el VPH a sus pacientes.

Materiales y métodos
Este análisis se basa en tres estudios intervencionistas que se centraron en la vacunación contra el HPV y otros temas relacionados en el estado de Morelos, Tlaxcala y Ciudad de México, en México. Todos los estudios fueron aprobados por el Comité Ético, Bioseguridad y Comité de Investigación del Instituto Nacional de Salud Pública de México; además, se obtuvo el aval del Ministerio de Salud de Morelos y Tlaxcala, y del Complejo Clínicas Condesa-Iztapalapa en Ciudad de México. El estudio se presentó para los proveedores de atención, con intervenciones que antes de diseñar estrategias de promoción de la vacuna, se identificaron obstáculos y facilitadores a la vacunación en diferentes poblaciones que se podrían mejorar para mejorar la aceptabilidad y el uso de la vacuna contra el HPV.
recruitment, as was information about the effectiveness and safety of HPV vaccines for adults with and without HIV. Written informed consent was obtained for all participants in all states, including signatures by two witnesses.

**Participants and data collection**

In Morelos and Tlaxcala, healthcare users of the local Ambulatory Care Centers for Prevention and Treatment of AIDS and Sexually Transmitted Infections (CAPACTIS, by its acronym in Spanish) were recruited. Men and women living with HIV age 18 to 45 were asked to complete paper questionnaires and were offered the bivalent HPV vaccine as part of a voluntary study (separate from their normal clinical care), in 2016. In Mexico City, men and women (including transgender women) 18 to 45 years old, including individuals with and without HIV, were recruited at the Specialized Condesa-Iztapalapa Clinic in 2018; they completed questionnaires using computer-assisted personal interviewing and were offered the quadrivalent HPV vaccine, also as part of a voluntary study that was not part of their clinical care. All questionnaires collected socio-demographic data (age, years of education, sex assigned at birth; table I). The questionnaires applied in Morelos and Tlaxcala also included items about HPV-related knowledge and attitudes (with yes/no answers; table II). The questionnaire applied in Mexico City did not collect data on HPV-related knowledge or attitudes but did ask about which gender the person currently identified with. After completing the questionnaires, study participants were provided with information about the association between HPV and cervical and anal cancer, information about HPV vaccine, and any questions they had were answered.

**Analysis**

The survey data were entered (single data entry for paper questionnaires) into an excel worksheet or transferred from the file created by the computer-assisted personal interviewing program and analyzed using STATA v.13 statistical software. We used t-test for age differences and Chi square test for categorical variables.

### Table I

**Characteristics of men and women with and without HIV participating in HPV vaccine acceptability studies, Morelos*, Tlaxcala*, and Mexico City.† Mexico, 2016 and 2018**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total†</th>
<th>Women§</th>
<th>Men¶</th>
<th>P value²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Mean ± SD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age Morelos</td>
<td>34.8±10.2</td>
<td>38.1±11.4</td>
<td>33.6±9.5</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Mean age Tlaxcala</td>
<td>37.6±9.5</td>
<td>37.6±9.5</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Mean age Mexico City</td>
<td>28.7±7.6</td>
<td>30.0±8.2</td>
<td>28.1±7.3</td>
<td></td>
</tr>
<tr>
<td>Place of residence n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tlaxcala</td>
<td>127 (9.5)</td>
<td>127 (27.3)</td>
<td>0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Morelos</td>
<td>103 (7.7)</td>
<td>28 (6.0)</td>
<td>75 (6.2)</td>
<td></td>
</tr>
<tr>
<td>Mexico City</td>
<td>1099 (82.6)</td>
<td>310 (66.7)</td>
<td>789 (65.9)</td>
<td></td>
</tr>
<tr>
<td>Education n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>139 (10.4)</td>
<td>92 (19.7)</td>
<td>47 (5.4)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Junior high school</td>
<td>198 (14.8)</td>
<td>116 (24.9)</td>
<td>82 (9.4)</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>316 (23.7)</td>
<td>102 (21.9)</td>
<td>214 (24.7)</td>
<td></td>
</tr>
<tr>
<td>Undergraduate/college</td>
<td>496 (37.3)</td>
<td>114 (24.5)</td>
<td>382 (44.2)</td>
<td></td>
</tr>
<tr>
<td>Graduate studies</td>
<td>180 (13.5)</td>
<td>41 (8.8)</td>
<td>139 (16)</td>
<td></td>
</tr>
</tbody>
</table>

* Study participants in Morelos and Tlaxcala were healthcare users of Ambulatory Care Center for Prevention and Treatment of AIDS and sexually transmitted infections (CAPACTIS, in Spanish: Centro Ambulatorio para la Prevención y Atención en SIDA e Infecciones de Transmisión Sexual)

† Study participants in Mexico City were healthcare users of the Specialized Condesa and Condesa-Iztapalapa Clinics (Clínica Especializada Condesa y Clínica Especializada Condesa-Iztapalapa Dr. Jaime Sepúlveda Amor)

‡ The total sample was made up of 1 329 men and women, including 103 men and women living with HIV in Morelos and 127 women living with HIV in Tlaxcala, and 1 099 people in Mexico City (789 men and 310 women of whom 108 were transgender women, and of those in Mexico City in all 275 were people living with HIV and 824 without)

§ Women: 202 cisgender (non transgender) women and 108 transgender women

¶ For comparisons, we used t-test for age and Chi square test for categorical variable

SD= Standard deviation
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Results

In all, 1,329 men and women were included in this analysis, with 103 men and women living with HIV in Morelos, 127 women living with HIV in Tlaxcala, and 1,099 people (789 men and 310 women, including 108 transgender women, of whom in all 275 were people living with HIV and 824 without), at the Condesa and Condesa-Iztapalapa clinics (table I). Of the total sample, 65% were men and 35% women, with older average ages in Morelos and Tlaxcala and younger average age for participants from Mexico City. More women had only an elementary or junior high school education as compared to men, and more men had at least some college education, or graduate studies than women. All these differences are statistically significant.

For most questions on HPV-related knowledge, correct responses ranged from 65 to 92% (table II). Among the respondents who were asked questions about HPV-related knowledge (all of whom were people living with HIV), there were relatively high levels of knowledge about HPV being sexually transmitted, that HPV causes anal and cervical cancer and that an anti-HPV vaccine exists with somewhat fewer people reporting that the HPV vaccine can be applied to both men and women and only a fifth of participants (mostly women) knowing HPV can disappear without treatment. Women living with HIV had greater knowledge in all areas than men living with HIV, and also had much higher risk perception about acquiring HPV (78% for women versus 20% for men). All these differences were statistically significant (table II).

Vaccine acceptance (agreeing to –including providing signed, informed consent- and getting the application of the first dose of the HPV vaccine) was 80.3% in the total sample (table III). Acceptance was 96.8% in women from Tlaxcala (the sample included only women living with HIV), 84.5% in people from Morelos (including men and women living with HIV), and 78% in Mexico City (including men and women with and without HIV). These differences were statistically significant. Acceptance of the vaccine was slightly higher in women compared to men (81.5 and 80% respectively, but this difference was not statistically significant). Similar proportions of cisgender* and transgender women living in Mexico City accepted the HPV vaccine (data not shown). More people living with HIV accepted the vaccine as compared to those without HIV (84.4 vs. 78.0%) and this

and Chi square test for categorical variables. Descriptive statistics were used to examine age, education, gender and HPV knowledge and attitudes. HPV vaccine acceptability was defined as receiving the first dose of the vaccine. Comparisons were done using Chi square test for categorical variables, to assess variable association with vaccine reception and refusal.

Table II

<table>
<thead>
<tr>
<th>Item</th>
<th>Total n=230</th>
<th>Women n=155 (67.4%)</th>
<th>Men n=75 (32.6%)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think that HPV can be transmitted from one person to another through sexual contact? n (%)</td>
<td>No 18(7.89)</td>
<td>9(5.88)</td>
<td>9(12)</td>
<td>66(88)</td>
</tr>
<tr>
<td></td>
<td>Yes 210(92.11)</td>
<td>144(94.12)</td>
<td>66(88)</td>
<td></td>
</tr>
<tr>
<td>Do you think HPV can cause cervical or anal cancer? n (%)</td>
<td>No 36(15.79)</td>
<td>14(9.15)</td>
<td>22(29.33)</td>
<td>53(70.67)</td>
</tr>
<tr>
<td></td>
<td>Yes 192(84.21)</td>
<td>139(90.85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think that HPV can disappear on its own, without treatment? n (%)</td>
<td>No 180(79.3)</td>
<td>108(71.05)</td>
<td>72(96)</td>
<td>3(4)</td>
</tr>
<tr>
<td></td>
<td>Yes 47(20.7)</td>
<td>44(28.95)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compared with other people, do you think your risk of getting HPV is greater? n (%)</td>
<td>No 94(41.23)</td>
<td>42(22.22)</td>
<td>60(80)</td>
<td>15(20)</td>
</tr>
<tr>
<td></td>
<td>Yes 134(58.77)</td>
<td>119(77.78)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you know whether there is a vaccine that prevents HPV infections that are associated with cancer? n (%)</td>
<td>No 37(16.23)</td>
<td>13(8.5)</td>
<td>24(32)</td>
<td>51(68)</td>
</tr>
<tr>
<td></td>
<td>Yes 191(83.77)</td>
<td>140(91.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think the HPV vaccine can be applied to men and women? n (%)</td>
<td>No 80(35.09)</td>
<td>44(28.76)</td>
<td>36(48)</td>
<td>39(52)</td>
</tr>
<tr>
<td></td>
<td>Yes 148(64.91)</td>
<td>109(71.24)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For comparisons, we used Chi square test for categorical variables.

*Cisgender is a term used to refer to people whose gender identity and the gender assigned at birth agree (people who were labeled as female at birth and identify as women or who were labeled as male at birth and identify as men). That is, people who are not transgender.
difference was statistically significant. Among study participants living with HIV and receiving treatment at CAPASITS in Morelos and Tlaxcala, those who decided not to receive the vaccine gave as their principal reason for doing so that their physician recommended they not get vaccinated (data not shown).

**Discussion**

Among adult residents of three states in Mexico, acceptance of the HPV vaccine in general is high, without significant differences due to sex/gender (between cisgender men and women or between cisgender women and transgender women) or HIV status. In the study populations included in this analysis, a high level of acceptance of the HPV vaccine was observed among people living with HIV, as has been found in other studies.\(^\text{28,39}\) A number of studies have also found that high HPV vaccine acceptability in men who have sex with men (with or without HIV) was 75%.\(^\text{33,46}\) As for women, in a cohort of young female sex workers living with HIV, 100% agreed to apply the first dose of vaccine, while 79% completed the 3-dose schedule.\(^\text{48}\) Our results therefore suggest that it would be feasible to introduce a vaccination program against HPV between adults in Mexico, including among people living with HIV, who are at high-risk of developing HPV-associated cancers.\(^\text{28}\)

Women and men living with HIV are disproportionately affected by HPV infection and associated diseases.\(^\text{49,50}\) In their vaccination recommendations, the Centers for Disease Control and Prevention (CDC) have proposed the introduction of the HPV vaccine for people living with HIV, irrespective of the CD4 lymphocyte count.\(^\text{51}\) In Mexico, the National Center for the Prevention and Control of HIV and AIDS (Censida, by its acronym in Spanish) is studying the possibility of universal introduction of vaccination against HPV in people living with HIV. In order to make this public policy decision, it is essential to consider acceptability of the vaccine among healthcare users,\(^\text{29,34,35,38,39,48}\) logistical aspects of vaccine implementation\(^\text{42,52-54}\) as well as the need for providing current, accurate information to healthcare professionals about the safety and efficacy of HPV vaccination among adults in general and specifically those living with HIV.\(^\text{55-58}\) Although our findings must be interpreted with care given the cross-sectional design, they indicate, as other studies have shown, that healthcare provider recommendation is an extremely

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**Table III**

**HPV vaccine acceptance among men and women with and without HIV participating in HPV vaccine acceptability studies, Morelos,\(^\text{a}\) Tlaxcala,\(^\text{b}\) and Mexico City,\(^\text{c}\) Mexico, 2016 and 2018**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Accepted the first dose of the HPV vaccine (n=1,067 (80.3%))</th>
<th>Did not accept the first dose of the HPV vaccine (n=262 (19.7%))</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tlaxcala</td>
<td>122 (96.8)</td>
<td>5 (3.2)</td>
<td></td>
</tr>
<tr>
<td>Morelos</td>
<td>87 (84.5)</td>
<td>16 (15.5)</td>
<td></td>
</tr>
<tr>
<td>Mexico City</td>
<td>858 (78.0)</td>
<td>241 (22)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Gender(^\text{#})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>379 (81.5)</td>
<td>86 (18.5)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>688 (79.6)</td>
<td>176 (20.3)</td>
<td>0.4</td>
</tr>
<tr>
<td>Living with HIV(^&amp;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not living with HIV</td>
<td>641 (77.7)</td>
<td>183 (22.2)</td>
<td>0.004</td>
</tr>
<tr>
<td>Living with HIV</td>
<td>426 (84.3)</td>
<td>79 (15.6)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Study participants in Morelos and Tlaxcala were healthcare users of Ambulatory Care Center for Prevention and Treatment of AIDS and sexually transmitted infections (CAPACITS, in Spanish: Centro Ambulatorio de la Prevención y Atención en SIDA e Infecciones de Transmisión Sexual)

\(^b\) Study participants in Mexico City were healthcare users of the Specialized Condesa and Condesa-Iztapalapa Clinics (Clínica Especializada Condesa y Clínica Especializada Condesa-Iztapalapa Dr. Jaime Sepúlveda Amor)

\(^c\) For comparisons, we used Chi square test for categorical variables

\(^#\) Gender: Since we included transgender women (n=108) in the sample (under women), this category refers to gender and not sex

\(^&\) Study participants living with HIV or those without HIV were distributed as follows: Tlaxcala: 127 people living with HIV; Morelos: 103 people living with HIV; Mexico City: 275 people living with HIV and 824 people without HIV
important factor for encouraging HPV vaccination among people living with or without HIV. This is especially important if healthcare providers are to support such public policies by recommending the HPV vaccine to their patients. Knowledge about HPV was high; in our study, 84% of participants knew that HPV can cause cancer, which compares favorably to another study of women living with HIV where only 50% knew about this association. The Mexican men in this study also had more knowledge than that observed in others, such as a study of heterosexual, gay and bisexual men, which found that among those who had heard of HPV, less than a third correctly responded that HPV can cause oral, anal and penile cancers. In addition, knowledge about HPV was higher among women than men, even though women had significantly lower levels of formal education. This seems to indicate that women have acquired their knowledge about HPV through interaction with healthcare providers, in spite of a lack of formal education. These findings support the need for providing healthcare personnel with the resources they need in order to promote HPV knowledge and especially to recommend HPV vaccination among their patients.

A limitation of this analysis is that given that data on knowledge and attitudes regarding vaccination against HPV were not collected among participants from Mexico City, the analysis cannot provide a complete view on the relationship between these aspects and the acceptance of the first dose of HPV vaccine, even for this study population. Also, information was not collected from healthcare users about whether their healthcare providers recommended they get the HPV vaccine, nor was data collected from the healthcare providers themselves. Data are only available for the application of the first dose of vaccine but not for subsequent doses, although more than one vaccine dose was applied in the HPV vaccine to their adult patients irrespective of their HIV status. Healthcare personnel should be provided with educational experiences that support them in developing greater knowledge, self-efficacy and readiness for change in relation to recommending HPV vaccination as well as specific resources for providing patient counseling and education about HPV vaccination.

Acknowledgements

We would like to thank the study participants who made this possible, and also the healthcare and research personnel at the Cuernavaca and Tlaxcala CAPSITS and the Condesa and Condesa-Iztapalapa Clinics. The study at the CAPSITS was carried out thanks to funding provided by Censida, Mexico’s National AIDS Prevention and Control Program. The study at the Condesa and Condesa-Iztapalapa Clinics was funded by the Ministry of Science, Technology and Innovation (Secretaría de Ciencia, Tecnología e Innovación; Seciti) of Mexico City under the grant SECITI/094/2017, as part of the project, “Prevention and control of HPV-related neoplasia in high risk groups in Mexico City: An intervention with a social dimension”.

References


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Artículo original