

KNOWLEDGE, ATTITUDES, AND BELIEFS ABOUT HPV VACCINATION AMONG MEN
IN THE INLAND EMPIRE, CALIFORNIA: A QUALITATIVE ANALYSIS

By

Raneem Abdelkarim Alaraj

A capstone project submitted for Graduation with University Honors

February 10, 2022

University Honors

University of California, Riverside

APPROVED

Dr. Brandon Brown

Department of Social Medicine, Population, and Public Health

Dr. Richard Cardullo, Howard H Hays Jr. Chair

University Honors

Abstract

Background: In 2018, human papillomavirus (HPV) vaccine approval was expanded beyond 9-26 years to include adults ages 27–45. Little research has considered attitudes toward HPV vaccination among newly eligible men, for whom uptake in adolescence remains suboptimal.

Methods: In 2020, we conducted demographic surveys and six virtual focus groups with 34 unvaccinated men ages 27–45 living in California’s Inland Empire. Participants were asked to discuss their attitudes toward HPV vaccination. We systematically identified predominant attitudes using the rigorous and accelerated data reduction technique.

Results: Our sample was diverse (79% Hispanic/non-White; 26% gay/bisexual) and contained participants from across the socioeconomic spectrum. Among participants who had been eligible for HPV vaccination prior to 2018 ($n=26$), only 12% had ever received a provider recommendation to vaccinate. Overall, participants considered HPV to be a “women’s only” disease, were unaware HPV-related cancers affect men, and did not perceive themselves as eligible for vaccination. Participants were eager to learn more about HPV vaccination and expressed a desire for health providers to initiate vaccine education. Every group expressed willingness to be vaccinated, provided they could review age-specific vaccine safety and efficacy information, easily access the vaccine in a clinic or pharmacy, and not incur significant personal financial burdens.

Conclusion: Identification of gender-specific attitudes toward HPV vaccination is important for informing local vaccination promotion initiatives. Men aged 27-45 may lack HPV vaccine awareness yet be receptive to vaccination. Health providers could be leveraged to promote HPV vaccination for men in this age group who could still benefit from vaccination.

Acknowledgments

This project was funded by a Community Medicine and Population Health Mini-Grant from the Riverside Community Health Foundation and the UCR School of Medicine Center for Healthy Communities (PI: Andrea Polonijo). It would not have been possible without administrative, recruitment, and data collection assistance from Christina Reaves (Borrego Health); Michelle Burroughs, Shaleta Smith, Carla Urmeneta, Tilak Patel, and Ezekiel Adu-Gyamfi (University of California, Riverside); and Durga Mahapatra (University of Pittsburgh).

I would like to express my gratitude to my mentors. First, I would like to thank my faculty mentor, Dr. Brandon Brown, for his continuous support of this project and my undergraduate career. Lastly, I am also grateful to Dr. Andrea Polonijo for allowing me to assist with her project. I sincerely appreciate her continuous source of guidance, mentorship, and support.

Background

According to the National Center for Health Statistics, HPV is the most common sexually transmitted infection in the United States, with a prevalence rate of 43% among U.S. adults (McQuillan et al., 2017; Rosen et al., 2018). Data from 2014-2018 suggest about 46,143 HPV-associated cancers are diagnosed in the U.S. annually, and 44.3% occur among men (Centers for Disease Control and Prevention [CDC], 2021). High-risk HPV infections can lead to penile, anal, and oropharyngeal cancers in men (as well as cervical, anogenital, and oropharyngeal cancers in women), while lower-risk HPV infections can lead to anogenital warts (McQuillan et al., 2017).

HPV vaccinations are routinely recommended for everyone aged 9-26 to help reduce the risk of developing HPV-related cancers and anogenital warts, and prevent the transmission of HPV to sexual partners (Lee et al., 2018). Vaccinations are given in a series of three shots protecting against various types of HPV including the common strains of cancer. As of 2009, the HPV vaccine has been approved for men; as of 2018, HPV vaccine eligibility expanded to include adults aged 27-45. This age eligibility expansion may be particularly beneficial for men as they face low rates of vaccine series completion by age 26; as of 2018, only 9% of men aged 18-26 have been fully vaccinated against HPV (Boersma and Black, 2020). Men aged 27-45 are encouraged to engage in shared clinical decision making with their doctors to see if they are at risk of new HPV infections and can benefit from vaccination (Meites et al., 2019). Studies of adolescents and adults under age 27 have revealed disparities in HPV vaccination by gender, socioeconomic status, and race-ethnicity, among other sociodemographic characteristics. A study of students aged 18–26 from Midwestern college campuses found males had a 20% lower HPV

vaccination rate than their female peers (Lee et al., 2018). The study additionally suggested that future HPV vaccine interventions should target males from lower socioeconomic status groups since they are generally not aware that HPV vaccinations are covered by insurance and face elevated healthcare barriers (Lee et al., 2018). Demonstrating disparities in vaccine uptake by race-ethnicity, a 2017 multi-survey study of U.S. parents found that provider recommendation for HPV vaccination was much lower for Black parents compared to White parents, leading to Black adolescents having significantly lower odds of vaccination compared to their White peers (Fenton et al., 2018).

Although the majority of the literature on HPV vaccination focuses on adolescents and adults younger than age 26, this literature conveys that multiple factors—including knowledge about HPV, doctor’s recommendations, and sociodemographic characteristics—all play a role in shaping vaccine uptake (Fenton et al., 2018; Lee et al., 2018). With the expansion of HPV vaccine eligibility to include adults aged 27-45 years-old, it is important to identify factors contributing to vaccine acceptance across this population, and subgroups within it, to inform future vaccine promotion initiatives. HPV vaccination of adults aged 27-45 could be especially beneficial for men who are socioeconomically disadvantaged or identify as part of some minoritized racial-ethnic groups (Blacks, Hispanics) because these groups are less likely to be fully vaccinated in adolescence and typically face an elevated incidence of HPV-related cancer (McQuillan et al., 2017; Spencer et al., 2019).

A few recent studies have examined why vaccine-eligible adults (up to age 45) have not received HPV vaccinations. A study by Alber and colleagues (2021) used an online survey and the Integrated Behavioral Model to better understand the relationship between attitudes, beliefs, social norms, and HPV vaccine uptake. The study concluded that the social norms of one’s

environment and health provider recommendation are both highly associated with HPV vaccine uptake among adults (Alber et al., 2021). Another study by Domgue et al. (2020) used a health screening survey to examine reasons for non-vaccination among adults in Texas. The study found that lack of knowledge of the HPV vaccine and failure to receive a provider recommendation contribute the most to non-uptake. These few studies demonstrate that knowledge, attitudes, beliefs, norms, and provider recommendations all interplay to shape the vaccination intentions of adults and underscore the need for more research on HPV vaccination among adults in the newly-eligible age range for uptake.

The few previous studies examining contributors to HPV vaccine acceptance among adults aged 27-45 have primarily relied on quantitative surveys, with predetermined response categories. Qualitative approaches, however, may give us greater insight into participants' knowledge, attitudes, and beliefs of the HPV vaccination, as they enable researchers to capture participants' attitudes more fully—in their own words. Building on the studies above, this paper uses qualitative methods to provide a deeper understanding of previously unvaccinated men's knowledge, attitudes, and beliefs about HPV vaccination. At the time of the study (2020) and due to the recent age expansion, little research has been conducted on knowledge, attitudes, and beliefs about HPV vaccination among adults over age 26. To potentially close this gap, we chose Southern California's Inland Empire as the site for this study, with the intention of generating specific knowledge to guide future interventions to increase HPV vaccination among men in the region, who may still benefit from vaccination at ages 27-45.

Methods

Study Site

The study was conducted in the Inland Empire of Southern California, a large region encompassing Riverside and San Bernardino counties, that is situated adjacent to Los Angeles and Palm Springs. The majority of Inland Empire residents identify as part of a minoritized racial-ethnic group, with 52% identifying as Hispanic or Latinx, 7% as Asian, and 7% as Black. Moreover, the region is socioeconomically challenged, resulting in a low ranking of Quality of Life and Clinical Care (Daly & Somaiya, 2019) and a shortage of healthcare professionals, leaving residents medically underserved (California Health Care Foundation, 2020).

Participants and Recruitment

The study was approved by the University of California Riverside Institutional Review Board on 6/5/2020 (IRB approval #19-288). Participants were recruited through email announcements from community health organizations, postcards displayed in 20 community health clinics throughout the Inland Empire, and posts in Inland Empire groups on social media (Facebook, Instagram, Twitter, and Reddit). To qualify for the study, participants needed to: (1) be able to speak English, (2) identify as male, (3) be between the ages of 27- 45, (4) reside in the Inland Empire, (5) identify as White, Black, Hispanic, and/or Asian, (5) have not received any previous HPV vaccine, (6) and have access to an internet-enabled laptop, tablet, or smartphone.

Participants enrolled in the study by following a QR code or weblink and completing an online consent form and demographic survey in Qualtrics. The demographic survey was used to ensure that participants met all eligibility criteria, obtain information about key sociodemographic characteristics (i.e., household income, education, marital status, sexual orientation, health insurance, HPV vaccination status of family members, and history of

healthcare provider recommendations to vaccinate). To prevent fraudulent participation—which is often an issue when conducting online studies—we reviewed registrants’ GeoIP addresses and removed those that were duplicates or originating from outside of the state (Kramer et al., 2016). 50 registrants qualified for the study and were invited to participate; 34 participated in the study and received \$30 gift cards as an incentive.

Focus Groups

Virtual focus groups were used to generate qualitative data. Focus groups have been used in previous health and social science studies as they enable researchers to produce quick complex information about group perspectives, norms, and values and elicit in-depth explanations from participants (Liamputtong, 2011). By hosting focus groups virtually, we were able to safely gather data which would not have been possible to do in person during the COVID-19 pandemic. Moreover, the virtual focus group format has been recommended to collect data from participants who are often hard to reach, including those that come from marginalized racial-ethnic and socioeconomic backgrounds and are typically hard to schedule for face-to-face groups (Liamputtong, 2011). Focus groups were text-based and hosted in an Adobe Connect virtual chat room. The text-based format allowed participants in each group to discuss personal and potentially sensitive health-related information openly and anonymously with one another.

A trained moderator led six focus groups with approximately 5-7 participants in each group. The moderator posed questions using a semi-structured interview guide (see Table 1) that covered three areas: (1) knowledge and beliefs about HPV, (2) knowledge and beliefs about HPV vaccines, and (3) attitudes toward HPV vaccination. All focus groups took place between November 2020 and January 2021 and lasted 90 minutes. A research assistant attended each focus group and monitored chat room access. Participants used pseudonyms to remain

anonymous from one another. Participants engaged in group discussions and asked questions as needed. When questions arose, the moderator relayed basic information provided by the Centers for Disease Control and Prevention (2020).

Data Analysis

Descriptive statistics (frequencies, percentages, medians, and range) were calculated for the demographic data using Stata 16. The focus group chat logs were downloaded from Adobe Connect and imported into Microsoft Excel. Qualitative data were then analyzed using the "rigorous and accelerated data reduction" (RADaR) qualitative analysis technique (Watkins, 2017). This involved first merging all focus group data in a single Excel sheet and deleting any text that was not relevant to the question: "What are men's knowledge, attitudes, and beliefs about HPV and HPV vaccination? Two members of the project team (R.A.; A.P..) then open-coded the remaining data and identified recurring themes resolving discrepancies through discussion. A third researcher (B.B.) reviewed the final themes and codes to confirm interpretations maintained internal validity.

Results

Sample

The sample included 34 men between the ages of 27 and 41, who had not previously received any HPV shots. Descriptive statistics for the sample are detailed in Table 2. The sample was diverse in terms of race-ethnicity, with 44% Hispanic (n=15), 21% White (n=7), 24% Black (n=8), and 12% other/mixed (n=4). Also diverse in terms of sexual orientation (26% identified as gay or bisexual). Participants had a mean household income of \$81,612 (range = \$0 to over \$150,000 [highest household income value has been suppressed to protect participant confidentiality]). The majority were unmarried (61.76%, n= 21), had health insurance (82.35%,

n=28), and had obtained a bachelor's degree or higher level of education (67.64%, n=23). Eighty-five percent (n=29) did not know of a family member that had been vaccinated against HPV. Twenty-six participants had previously been eligible for HPV vaccination between the ages of 9 and 26 (i.e., were currently aged 39 or younger), among these 88% (n=22) had never had a health provider recommend HPV vaccination to them.

Five key themes emerged from the qualitative data: (1) awareness of and knowledge about HPV and HPV vaccination, (2) embarrassment and stigma surrounding vaccination (3) perceived personal risks of HPV, (4) concerns about vaccine risks, and (5) healthcare providers are trusted sources of information about HPV vaccination. These themes are detailed below and in Table 3.

Awareness and Knowledge about HPV and HPV Vaccination

General Knowledge about HPV and HPV vaccination. Participants had varying levels of knowledge about HPV and HPV vaccination. Most participants were generally aware that HPV is a sexually transmitted disease. Several participants understood that warts can be caused by the transmission of HPV through genital skin. Although participants commonly knew that HPV is linked to cervical cancer in women, most participants were not aware of cancers linked to HPV in men and strongly believed that HPV is less serious for men than women. Many participants had questions about HPV, which are summarized thematically in Table 4. Questions generally focused on the mode of HPV transmission, logistics of HPV testing, HPV vaccine eligibility criteria, vaccine safety, and how to access vaccines.

Due to the recent expansion of age eligibility in 2018, most participants were also unaware that they were eligible to be vaccinated against HPV. Although participants understood that HPV vaccination is routinely recommended for teenagers, they were generally unaware that

adults their age could qualify for vaccination. For example, one participant emphasized: “All I know is there is an age limit, and I am over the age limit” (37, Other/Mixed, graduate/professional degree).

HPV is a “Women’s Only” Disease. A common misconception was that HPV is a “women’s only” disease—most men lacked awareness that vaccine-preventable HPV-related cancers affect men. For example, a participant shared, "I thought it was more important for young ladies to get vaccinated and didn’t realize how important it was for men as well" (41, Hispanic, < bachelor's degree). Similarly, another stated, “I remember hearing when I was younger that guys didn't have to worry too much about it” (27, mixed race-ethnicity, bachelor’s degree).

Several participants emphasized that HPV can present cervical cancers in women, for example, one shared: “As a heterosexual male, I feel it [HPV] is serious due to the potential cancer risk it can present in women” (37, mixed race-ethnicity, graduate degree). Furthermore, when the moderator asked participants what HPV-related cancers affect men, the majority could not determine what they were. Once the trained moderator informed the participants about the cancers presented in men, many were surprised.

When it came to the knowledge about HPV vaccination, participants expressed concerns that they had believed that it was recommended only for women. This concern resulted from the fact that if males heard about the vaccine, they heard it from their female family members. For example, a participant stated, “I remember hearing about it when my cousin told me she was going to vaccinate her daughters, but I haven’t been vaccinated for it”(41, Hispanic, <bachelor’s degree). While another participant stated that they heard that the vaccine was only required for

women since they heard about it “from [their] parents while [their] younger sister was getting her HPV vaccination” (27, mixed race-ethnicity, bachelor’s degree).

Embarrassment and Stigma Surrounding Vaccination

Some participants considered embarrassment and stigma as barriers that might prevent them from being vaccinated. The concern was that family or friends would find out they were vaccinated and judge them harshly. For example, a participant mentioned that he and others might avoid the vaccine “to avoid criticism as people might think that you are sexually active with lots of partners” (30, Black, graduate degree). Other participants noted that people in their lives might consider the vaccine as a necessity for only those with lots of sexual partners, and one noted that “family might be questioning why I would get such a vaccine” (41, Asian, graduate degree).

A few participants also mentioned religion and how the religious community may frown upon those receiving the HPV vaccination. One participant shared that those in the religious communities will face difficulties receiving the vaccine because the “religious community might balk at the idea [of obtaining an HPV vaccine] if they’re conservative in views of pre-marital sex” (37, mixed race-ethnicity, graduate/professional degree).

Perceived Personal Risks of HPV

Monogamous Relationships. Participants who were married or in a long-term committed relationship saw a low perceived risk of HPV and did not perceive the need to be vaccinated, while many participants—regardless of marital status—expressed that a committed relationship was already an efficient HPV prevention measure. For example, a participant noted: “There’s always a way to stay out of the STD [sexually transmitted disease] issue and that’s by staying with one partner” (30, White, <bachelor’s degree). While another states, “I think you should

respect some people's beliefs let's say they are practicing other prevention measures like having only a partner so no need for it" (30, Black, graduate/professional degree).

Participants also had discussions about how HPV vaccination could potentially promote miscommunication and a lack of trust between a couple. For example, a participant shared a potential reason for not taking the vaccine was "fear of stigma, and why need a vaccine against STDs when you have only one partner, it could be construed as wanting to protect yourself if you are stepping out on your partner" (28, White, <bachelor's degree). However, a few other participants pointed out that they would still prefer to get vaccinated since long-term relationship stability is unknown and partners should understand the importance of the vaccine. When asked about reasons for getting the HPV vaccine, one participant replied with "Divorce" (30, Mixed, bachelor's degree). While another noted: "I do think it is important to get but perhaps only if you are going to be sexually active with multiple people. I am only sexually active with one person and have been with them for nearly 8 years" (27, Mixed, <bachelor's degree). Most monogamously coupled participants did not see a possibility of changing partners that could lead to new HPV transmissions.

Practicing Safe Sex. Despite most participants being not married or in a domestic partnership, another common reason participants perceived themselves to be at low personal risk for HPV was that they believed their safer sex practices were sufficient for disease prevention. For example, one participant shared that a reason for potentially not taking the vaccine was "always practicing safe sex and condoms" (32, Black, <bachelor's degree), engaging in safe practices. Another emphasized: "Since I believe it [HPV] is sexually transmitted, then one can easily contract by engaging in unsafe sex" (30, Black, bachelor's degree). Several questions as to

whether HPV can be prevented with condoms arose as participants lacked awareness that HPV can still be transmitted through skin-to-skin contact.

Concerns about Vaccine Risks

Concerns about the Unknown. The possibility of non-specific long-term side effects was raised by several participants. Participants often stressed the need for concrete statistical data on possible risks of HPV vaccination for men within their age group. Despite being approved in 2006, many participants noted their concerns stemmed from the fact they considered HPV vaccination to be relatively new and were afraid of the potential for side effects to emerge in later years. If participants had heard about side effects, the primary way they had obtained this information was from the vaccine advertisements themselves.

Other participants mentioned how they wanted to hear the experiences of those who had been vaccinated against HPV to eliminate their concerns about side effects. As one participant stated: “None of my friends or family members have been vaccinated, that’s why I am kind of reluctant” (30, Black, bachelor's degree). Several participants also raised concerns about not knowing what the vaccine was manufactured with. For example, one participant noted, “my family is religious, and they believe that vaccines have aborted tissues” (41, Hispanic, <bachelor’s degree).

Infertility, Sterility, and Birth Defects. In addition to general concerns about side-effects, questions and concerns about whether being vaccinated against HPV made you sterile were raised. Multiple participants expressed that they had heard the vaccine caused infertility, as one participant asked, “Doesn’t it cause infertility, or is that a misconception?” (34, Black, graduate/professional degree).

Healthcare Providers are Trusted Sources of Information

When participants learned that HPV vaccines were recommended for men, many were surprised to learn that their physicians had not informed them. After learning about the cancer risks for both men and women, participants stated they were open to considering taking the vaccine. As one participant shared: “if people were told about the cancer, they would want to get vaccinated (41, Hispanic, <bachelor's degree).

Participants commonly noted that they trusted their primary care physicians, with many emphasizing they would be open to getting vaccinated after discussing HPV with their physicians and receiving a recommendation. For example, a participant emphasized, “a doctor’s recommendation would be very influential in my decision of getting the vaccine” (37, mixed race-ethnicity, graduate degree). While another participant noted, “I trust my doctor and his group to tell me what I should know” (30, Mixed, bachelor's degree). Upon the conclusion of each focus group, many participants expressed how they had learned so much about HPV and HPV vaccination and stated how they wanted to do further research on these topics. Many wanted to start their research at their healthcare provider’s office. For example, a participant stated, “This chat will be enough for me to seek out information and bring it up with my PCP” (27, mixed race-ethnicity, bachelor's degree). While another noted, “I got some good information from this chat to read up and do my research with my doctor’s office” (30, White, <bachelor's degree).

Discussion

To our knowledge, this is one of the first studies to qualitatively examine men’s knowledge, attitudes, and beliefs about HPV and HPV vaccines since 27-45-year-olds became

eligible for vaccination. In doing so, it contributes to better understanding the factors that underscore men's low HPV vaccination rates. We find that while unvaccinated men aged 27-45 years old may be open to receiving the HPV vaccine, there is an overall lack of awareness about their eligibility, and the seriousness of conditions that chronic HPV infection poses to men.

With studies revealing disparities in HPV vaccination by gender (Lee et al., 2018; CDC 2016), identifying barriers to HPV vaccination among men is crucial to promoting equitable vaccine uptake. We identified low levels of awareness and knowledge of the HPV-related cancers that affect men, as many men in our sample believed that HPV was a “women's only” disease that only caused cervical cancers in women. Additionally, many participants questioned whether men were even eligible for vaccination, as they had only ever heard of physicians recommending the vaccine to their female peers, but never had a physician recommend the vaccine to them.

Corroborating recent findings (Domgue et al., 2020), we also identified low levels of awareness about the HPV vaccine. The HPV vaccine was FDA-approved over a decade ago to prevent cancers in men (Office of the Commissioner, 2018), yet the men in our sample demonstrated a lack of knowledge about its preventive benefits. Specific knowledge gaps that men may have regarding the vaccine were emphasized in the questions they raised about vaccine eligibility, vaccine safety, and vaccine accessibility as well as HPV etiology, transmission, and prevention. In addition, despite the age expansion of HPV vaccine eligibility (Office of the Commissioner, 2018), there was a lack of awareness about the age qualifications for the vaccine. The lack of awareness of vaccine eligibility is likely driven by the age expansion being relatively new. Though there will most likely be an increase in knowledge regarding eligibility in

upcoming years, these knowledge gaps nonetheless represent important barriers to vaccine uptake among currently eligible adult men.

A recent study (Alber et al., 2021) proposes that the social norms of one's environment are influential in making vaccine uptake decisions. Corroborating this finding, our participants emphasized that the embarrassment and stigma associated with the HPV vaccine may negatively influence uptake decisions. Men in our sample raised concerns regarding the social norms in their environment: (1) the vaccine was labeled as a necessity for only those with many sexual partners, (2) family and peers would judge individuals who had received the vaccine, and (3) specific religious communities frowned upon premarital sex, and thus vaccination against a sexually transmitted infection. Changing social norms may thus be an important target for vaccine promotion interventions.

Overall, our results suggest a need for reliable information about HPV and HPV vaccination targeted at men aged 27-45. Informational resources may mitigate barriers of vaccine uptake by presenting accurate information on HPV-related diseases among men, HPV transmission and prevention, and gender and age-based vaccine eligibility. Previous research (Thompson et al. 2020) indicates there are positive associations between information-seeking behavior and HPV vaccine uptake. Therefore, HPV disease and HPV vaccine information needs to effectively reach populations not actively seeking knowledge. Participants in our study shared that their own HPV vaccine knowledge was garnered via various online resources, pharmaceutical advertisements, and discussions with family and friends. As participants expressed a desire to listen to personal experiences of vaccinated individuals, including vaccinated men aged 27-45 in pharmaceutical advertisements and other vaccine promotion materials may be critical for encouraging men to seek more information regarding the HPV

vaccination. Distribution of HPV vaccine information on fliers via community health centers may also be critical in reaching patients who are not actively engaging in shared clinical decision-making with their physicians.

Echoing previous studies that find healthcare provider recommendations are highly associated with vaccine uptake (Alber et al., 2021; Domgue et al., 2020), the majority of participants in this study stated that their physicians are trusted sources of vaccine information. Previous literature has also shown that health provider recommendations may have a stronger impact on men's (vs. women's) vaccine uptake, yet their recommendations are less frequent and of lower quality (Gilkey and McRee, 2016). In this study, most participants had not received a provider recommendation to vaccinate or discussed HPV vaccination with their health providers—nonetheless, they desired to do so before making their ultimate decision regarding HPV vaccine uptake. This underscores how healthcare providers (and particularly physicians) are key to sharing information about HPV and HPV vaccination with men, and how existing patient-provider interactions may miss opportunities for vaccine promotion.

Previous studies have found providers feel they must discuss sexuality before making HPV vaccine recommendations, resulting in lower quality and less frequent recommendations (Domgue et al., 2020; Gilkey and McRee, 2016). Moreover, a recent survey found 42% of U.S. physicians were unaware of shared-clinical decision making guidance for 27-45 year-olds (Hurley et al., 2021). Therefore, clearer guidelines are needed to support physicians in initiating shared-clinical with patients and determining which patients may benefit from HPV vaccination. With a recent survey revealing that provider recommendation for HPV vaccination was lower for Black patients (Fenton, et. al., 2018), future research should further consider how such guidelines can be leveraged to address such racial disparities.

Limitations

This study gave a greater insight into the knowledge, attitudes, and beliefs about HPV and HPV vaccination among men aged 27-45, but limitations still exist. The results are regionally specific and not generalizable to the entire Inland Empire or beyond. Although our sample had 44% Hispanic male participants, our focus groups were only conducted in English and HPV vaccine-related knowledge, attitudes, and beliefs may differ for non-English speakers.

In addition, given participants were primarily recruited via social media and through community health clinics, it excludes individuals who both are disengaged from social media or have another or no source of health care. Utilizing virtual focus group chatrooms allowed us to engage with a socioeconomically and racial-ethnically diverse sample but excluded participants with no internet connection. While GeoIP addresses were reviewed to ensure participants met location inclusion criteria, in filtering out participants with foreign GeoIPs we may have inadvertently excluded a few legitimate participants (Kramer et al., 2016). Filtering was necessary, however, given some individuals made duplicate registration attempts or attempted to register from outside of the state.

The text-based focus groups encouraged shorter and less detailed responses than we would have expected from face-to-face groups, however, they facilitated anonymity between participants, accessibility for participants with low-bandwidth internet connections, and generated themes likely similar to those that would be obtained via face-to-face groups (Campbell et al., 2001, Liamputtong, 2011, Woodyatt et al., 2016).

Conclusion

Identification of gender-specific barriers to HPV vaccination is important for informing local vaccination initiatives to promote equitable vaccine uptake. Men aged 27-45 may be

receptive to HPV vaccination yet have low awareness about eligibility and existing knowledge gaps regarding the HPV disease. To address these barriers, an intervention strategy that provides reliable information about HPV and HPV vaccination targeted at men aged 27-45 may help initiate shared clinical decision making. Since physicians are valued as trusted sources of vaccine information, they could be leveraged to promote HPV vaccination for this group.

REFERENCES

- Boersma, P. (2020). *Human Papillomavirus Vaccination Among Adults*. 354, 8. *Cancers Associated with Human Papillomavirus, United States—2014–2018* | CDC. (2021). Retrieved February 3, 2022, from <https://www.cdc.gov/cancer/uscs/about/data-briefs/no26-hpv-assoc-cancers-UnitedStates-2014-2018.htm>
- Commissioner, O. of the. (2020, March 24). *FDA approves expanded use of Gardasil 9 to include individuals 27 through 45 years old*. FDA; FDA. <https://www.fda.gov/news-events/press-announcements/fda-approves-expanded-use-gardasil-9-include-individuals-27-through-45-years-old>
- Daly, M., & Somaiya, C. K. (2019). Loma Linda University Health Community Health Needs Assessment. *Community Benefit Office*: 148. https://lluh.org/sites/lluh.org/files/docs/about-us/lluh-chna_2019.pdf
- Fenton, A. T., Elliott, M. N., Schwebel, D. C., Berkowitz, Z., Liddon, N. C., Tortolero, S. R., Cuccaro, P. M., Davies, S. L., & Schuster, M. A. (2018). Unequal interactions: Examining the role of patient-centered care in reducing inequitable diffusion of a medical innovation, the human papillomavirus (HPV) vaccine. *Social Science & Medicine (1982)*, 200, 238–248. <https://doi.org/10.1016/j.socscimed.2017.09.030>
- Gilkey, M. B., & McRee, A.-L. (2016). Provider communication about HPV vaccination: A systematic review. *Human Vaccines & Immunotherapeutics*, 12(6), 1454–1468. <https://doi.org/10.1080/21645515.2015.1129090>
- HPV Vaccine-Related Beliefs and Knowledge among Adults 18–45 Years Old: American Journal of Health Education: Vol 52, No 1*. (2020). Retrieved February 3, 2022, from <https://www.tandfonline.com/doi/abs/10.1080/19325037.2020.1844102>

California Health Care Foundation. (2020). *Inland Empire: Increasing Medi-Cal coverage spurs*

safety-net growth. California Health Care Almanac. <https://www.chcf.org/wp-content/uploads/2020/12/RegionalMarketAlmanac2020InlandEmpire.pdf>

Kramer, J., Rubin, A., Coster, W., Helmuth, E., Hermos, J., Rosenbloom, D., Moed, R., Dooley, M., Kao, Y., Liljenquist, K., Brief, D., Enggasser, J., Keane, T., Roy, M., & Lachowicz, M. (2014). Strategies to address participant misrepresentation for eligibility in Web-based research. *International Journal of Methods in Psychiatric Research*, 23(1), 120–129. <https://doi.org/10.1002/mpr.1415>

Kramish Campbell, M., Meier, A., Carr, C., Enga, Z., James, A. S., Reedy, J., & Zheng, B. (2001). Health behavior changes after colon cancer: A comparison of findings from face-to-face and on-line focus groups. *Family & Community Health*, 24(3), 88–103. <https://doi.org/10.1097/00003727-200110000-00010>

Lee, Hee Yun, Katherine Lust, Suzanne Vang, and Jay Desai. “Male Undergraduates’ HPV Vaccination Behavior: Implications for Achieving HPV-Associated Cancer Equity.” *Journal of Community Health* 43, no. 3 (June 1, 2018): 459–66. <https://doi.org/10.1007/s10900-018-0482-4>.

Liamputtong, P. (2011). *Focus Group Methodology: Principles and Practice*. SAGE Publications Ltd. <https://doi.org/10.4135/9781473957657>

McQuillan, G., Kruszon-Moran, D., Markowitz, L. E., Unger, E. R., & Paulose-Ram, R. (2017). Prevalence of HPV in Adults Aged 18-69: United States, 2011-2014. *NCHS Data Brief*, 280, 1–8.

- Meites, E., Szilagyi, P. G., Chesson, H. W., Unger, E. R., Romero, J. R., & Markowitz, L. E. (2019). Human Papillomavirus Vaccination for Adults: Updated Recommendations of the Advisory Committee on Immunization Practices. *MMWR. Morbidity and Mortality Weekly Report*, 68(32), 698–702.
<https://doi.org/10.15585/mmwr.mm6832a3>
- Reasons for not receiving the HPV vaccine among eligible adults: Lack of knowledge and of provider recommendations contribute more than safety and insurance concerns—Fokom Domgue—2020—Cancer Medicine—Wiley Online Library.* (n.d.). Retrieved February 3, 2022, from <https://onlinelibrary.wiley.com/doi/full/10.1002/cam4.3192>
- Rosen, B. L., Shepard, A., & Kahn, J. A. (2018). US Health Care Clinicians' Knowledge, Attitudes, and Practices Regarding Human Papillomavirus Vaccination: A Qualitative Systematic Review. *Academic Pediatrics*, 18(2S), S53–S65.
<https://doi.org/10.1016/j.acap.2017.10.007>
- Spencer, J. C., Calo, W. A., & Brewer, N. T. (2019). Disparities and reverse disparities in HPV vaccination: A systematic review and meta-analysis. *Preventive Medicine*, 123, 197–203. <https://doi.org/10.1016/j.ypmed.2019.03.037>
- Thompson, E. L., Wheldon, C. W., Rosen, B. L., Maness, S. B., Kasting, M. L., & Massey, P. M. (2020). Awareness and knowledge of HPV and HPV vaccination among adults ages 27-45 years. *Vaccine*, 38(15), 3143–3148.
<https://doi.org/10.1016/j.vaccine.2020.01.053>
- Vaccination Coverage Among US Adults, NHIS, 2016 | CDC.* (2021, January 20).
<https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/pubs-resources/NHIS-2016.html>

Watkins, D. C. (2017). Rapid and Rigorous Qualitative Data Analysis: The “RADaR” Technique for Applied Research. *International Journal of Qualitative Methods*, 16(1), 1609406917712131. <https://doi.org/10.1177/1609406917712131>

Woodyatt, C. R., Finneran, C. A., & Stephenson, R. (2016). In-Person Versus Online Focus Group Discussions: A Comparative Analysis of Data Quality. *Qualitative Health Research*, 26(6), 741–749. <https://doi.org/10.1177/1049732316631510>

TABLES

Table 1. Focus Group Interview Guide

Section Topic	Questions
Knowledge/Beliefs about HPV	What do you think of when you hear HPV? Probes: How does one get HPV? Who can get HPV? How serious of a threat is HPV? What kind of health conditions can be caused by HPV?
Knowledge/Beliefs about HPV vaccines	What have you heard about HPV vaccines? Probes: Where did you hear about it? Who can get the vaccine? What's it for? Are adults eligible for the vaccine? Has a doctor or health professional ever recommended the HPV vaccine to you?
Attitudes toward HPV vaccination	What do you think about being vaccinated against HPV? Probes: What reasons would you have for being vaccinated? What reasons would you have for not being vaccinated? What concerns do you have about vaccinating yourself? What information could help you make a decision about being vaccinated? How could being vaccinated against HPV help you? How could being vaccinated against HPV harm you?

Table 2. Demographics of the Sample (N=34)

Variable	N [Mean]	% [Range]
Age	[32.32]	[27-41]
Household income, 2019	[81,612]	[0-150,000+]
Education		
<Bachelor's degree	11	32.35
Bachelor's degree	12	35.29
Graduate/professional degree	11	32.35
Race-ethnicity		
Black	8	23.53
Hispanic	15	44.12
White	7	20.59
Other/mixed races-ethnicities	4	11.75
Marital status		
Married/domestic partnership	13	38.24
Single/divorced/separated/widowed	21	61.76
Sexual orientation		
Heterosexual	25	75.53
Lesbian or bisexual	9	26.47
Health insurance status		
Has health insurance	28	82.35
Has no known health insurance	6	17.65
Received provider recommendation		
No	23	88
Yes	3	12
Family member is vaccinated		
No	29	85.29
Yes	5	14.71

Table 3: Themes, Subthemes, and Exemplary Quotes

Themes and Sub-Themes	Exemplary Quotes
<i>Awareness and Knowledge about HPV and HPV Vaccination</i>	
<i>General Knowledge about HPV and HPV vaccination</i>	“I think of sexual transmitted diseases caused by a virus.” - 30, <i>Black, graduate/professional degree</i> “I think if most people were told about cancer in the future, they would want to be tested for HPV and get vaccinated. More commercials, and more information coming from the medical communities on the importance of this vaccine.” - 41, <i>Hispanic, <bachelor's degree</i>
<hr/> <i>HPV is a “Women’s Only” Disease</i>	
	“I don’t know about cancer in men, but it seems like it’s more dangerous for women.” - 28, <i>Hispanic, graduate/professional degree</i> “In females [HPV] can cause cancer. Males can give it [HPV] with no symptoms unless tested to verify negative results.” - 33, <i>White, <bachelor's degree</i>
<hr/> <i>Embarrassment and Stigma Surrounding Vaccination</i>	
	“I’m more concerned with people primarily finding out that I received the vaccine. Also, reasons against would probably be because of embarrassment [from family and doctors].” - 41, <i>Asian, graduate degree</i> “They [family] would probably think I am sexually active with a bunch of people.” - 41, <i>Hispanic, <bachelor’s degree</i>
<hr/> <i>Perceived Personal Risks of HPV</i>	
<i>Monogamous Relationships</i>	“I have been told I should get the HPV shot. However, I refused because I never thought of a reason to get it. I am sexually active but only

with one person.”

- 27, *mixed race-ethnicity, <bachelor's degree*

“Why would I justify the full price of \$400 for this one [HPV vaccine] if I’m in a committed relationship? not doing sex with fandoms for work.”

- 33, *White, <bachelor's degree*

Practicing Safe Sex

“I will look for an alternative prevention mechanism [practice safe sex] before I settle for vaccination.”

- 30, *Black, graduate/professional degree*

"I'm not so worried about me, I couldn't handle the possibility of giving it to a partner and them developing cancer because of me." - 34, *White, <bachelor's degree*

Concerns About Vaccine Risks

Concerns about the Unknown

“We don't know how many years it will take for these side effects to emerge. It can cause long term side effects to some of the people.”

- 28, *Black, <bachelor's degree*

“There are a lot of symptoms on the ads I have seen, they seem worrying if it is so ‘safe’. Why does it have so many caveats compared to other vaccines I have heard of.”

- 31, *Hispanic, bachelor's degree*

Infertility, Sterility, and Birth Defects

“Stereotypes I have heard about the HPV vaccine is that it can make you infertile.”

- 30, *White, graduate/professional degree*

“Has it been out long enough to know long-term side effects such as sterility or impotence, or any links to birth defects?”

- 37, *mixed race-ethnicity, graduate/professional degree*

Healthcare Providers are Trusted Sources of Information

“My own personal reason [for not taking the vaccine] is because my doctor has not recommended it to me yet and I merely trust anything that's posted on these social media sites.” - 30, *Black, bachelor's degree*

“I would read a bit more [HPV vaccine information] but really I trust my primary care doctor to give advice and I will ask during my next appointment.” - 30, *mixed race-ethnicity, bachelor's degree*

Table 4 . Participants' Questions about HPV and HPV Vaccination

Topic	Exemplary Questions
<i>HPV Transmission</i>	<p>“Can HPV be prevented with the use of condoms like HIV/ etc.?” - 27, <i>mixed race-ethnicity, <bachelor's degree</i></p> <p>“Do condom packages say they prevent HPV too?” - 28, <i>Hispanic, graduate/professional degree</i></p>
<i>HPV testing</i>	<p>“If someone has it and it is undetected how long he/she can stay with it?” - 28, <i>Black, <bachelor's degree</i></p> <p>“If HPV is serious, then why is it not tested during regular STD tests?” -29, <i>mixed race-ethnicity, <bachelor's degree</i></p>
<i>Virus Etiology</i>	<p>“Does the vaccine prevent ALL 100 strains of HPV ?” - 40, <i>White, <bachelor's degree</i></p> <p>“That's something I've never understood. How does a virus cause cancer?” - 30, <i>White, <bachelor's degree</i></p>
<i>Vaccine Eligibility</i>	<p>“What if you are already exposed to the virus or infection before being vaccinated?” - 30, <i>Black, bachelor's degree</i></p> <p>“Is the vaccine administered to both genders?” -34, <i>Black, bachelor's degree</i></p>
<i>Vaccine Safety</i>	<p>“So the risk is 0.0000% from the vaccine? by 0%, I mean contacting the virus through the vaccine itself.” - 33, <i>White, <bachelor's degree</i></p>

“Ok some vaccines expire or may be affected by the temperature and this may cause death surely it's one of the biggest concern. If I may ask how long should it be in hospitals before vaccinating people?” - 28, *Black, <bachelor's degree*

Vaccine Accessibility

“Is it [HPV Vaccine] accessible in any medical facility”? - 30, *Black, bachelor's degree*

“Is it [HPV vaccine] free?” - 34, *Black, bachelor's degree*

“Are there any counterfeit vaccines?” - 30, *mixed race-ethnicity, graduate/professional degree*
