UNIVERSITY OF CALIFORNIA,
IRVINE

“Let’s talk about it”: Peer sexual health and HPV vaccine communication among Vietnamese American young adults

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Public Health

by

Huong Duong

Dissertation Committee:
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DEDICATION

To

My parents (Trang & Mai Van), who taught me that education is one of the most valuable gifts I can give to myself and my community. They inspired me to keep going, prayed for me, and sacrificed their time to take care of my son so I could continue my studies.

My husband (Minh), who supported me through the thick and thin, life changes, and milestones throughout the past six years. I could not have done any of this without his love, patience, understanding, and encouragement.

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ABSTRACT OF THE DISSERTATION

"Let's talk about it": Peer sexual health and HPV vaccine communication among Vietnamese American young adults

By

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Doctor of Philosophy in Public Health

University of California, Irvine, 2022

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Background: The Human Papillomavirus (HPV) can cause different types of cancer including cervical cancer. Disaggregate data show that cervical cancer among Vietnamese American (VA) women remains high (9.5 per 100,000) relative to other Asian American subgroups. While the HPV vaccine is widely available, uptake rates vary by both gender and ethnicity. Research suggests that sexual health conversations with parents during adolescence can influence decisions like vaccination in adulthood, however, sexual conversations are taboo in many Asian families. Consequently, young adults may turn to peers for support. **Purpose**: We sought to better understand how culture and gender may influence peer communication about the HPV vaccine, and in turn HPV vaccination uptake. **Methods**: We collected online surveys and interviews from Vietnamese Americans who received the HPV vaccination as an adult between the age of 18-26, or were currently unvaccinated. We used a) confirmatory factor analysis to validate a scale of received peer supportive communication (RSC-HPV) and perceived supportive communication about HPV vaccination (PSC-HPV), b) path analysis to assess whether sexual communication frequency and supportive communication explain gender differences in vaccination status, and c)

qualitative interviews to better understand culture-centric sexual health and HPV vaccine communication narratives. **Results**: In study 1, a 3-factor measurement model (informational, emotional, and instrumental) was identified. Only perceived instrumental support in the PSC-HPV scale was significantly associated with HPV vaccination. In study 2, men and women had similar rates of vaccination; thus, peer communication did not explain gender differences in vaccination status. Among those who had discussed the HPV vaccine with their peers, informational SC and a higher communication frequency of "pleasure" topics were associated with vaccination status. Among those who had not discussed HPV vaccination, women more frequently discussed topics related to "sensitive" and "values." Perceived instrumental SC and less discussion of "risk" topics were also related to vaccination. In study 3, culture-centric sexual health communication narratives included silence and shame, maturity, and peer comfort. HPV vaccine decision narratives comprised of protection narratives among the vaccinated and network influences among the unvaccinated. Peer communication about the HPV vaccine emerged after vaccinating, receiving an HPV diagnosis, discussing it with doctors, and partners. Non-discussion narratives occurred due to a lack of knowledge, cultural stigma, and lack of confidence in bringing up conversations. **Discussion**: Findings suggest that peers do communicate with each other about sexual health and HPV vaccination, but there are structural, cultural, and interpersonal factors that can also contribute to vaccine uptake. In practice, we recommend a multilevel approach utilizing network influences and culture-centric messages to increase HPV vaccine uptake among Vietnamese American young adults.

CHAPTER 1: INTRODUCTION

The Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States (U.S.) (CDC, 2019). The majority of new HPV infections each year occur in young adults and are often asymptomatic (Meites, 2019). This is concerning because high-risk HPV infection can persist for many years and if left untreated, it can lead to cervical, vaginal, and vulva cancer in women, penile cancer in men, and anal, oropharyngeal cancer in both men and women (NCI, 2017a). As of 2019, the Advisory Committee on Immunization Practices (ACIP) recommends a catch-up vaccination as primary prevention for young adult men and women up to age 26 (Hung et al., 2019; Meites, 2019). Both women and men can also receive the vaccine up to age 45 if requested, but shared decision-making between clinicians and patients is encouraged to decide whether to vaccinate after age 26 (Meites, 2019; Oshman & Davis, 2020). Recently, in light of the COVID-19 pandemic, the National Cancer Institute has urged physicians, cancer centers, parents, and young adults to put HPV vaccinations "back on track" since HPV vaccination initiation and completion rates have dropped significantly (Gilkey et al., 2020). This is a pressing time where despite vaccine safety and effectiveness, hesitancy to vaccinate has increased significantly and trust in vaccines has decreased (Konstantinou et al., 2021; Toh et al., 2021). Despite this, several studies have found that social networks and peers can influence vaccine decision-making processes (Fu et al., 2019; Konstantinou et al., 2021).

Focus and Scope

In the United States between 2013 to 2018, the percentage of young adults aged 19-26 who received the recommended number of doses of the HPV vaccine increased from 13.8% to 21.5% (Boersma & Black, 2020); however, disparities exist by ethnicity and gender. While there has been increasing usage of prevention measures (HPV vaccine and cervical cancer screening), some Asian American subgroups are still disproportionately affected by HPV-related cancers. The total cervical cancer incidence rate for Asian Americans is lower compared to the national average (6.5 per 100,000 vs. 7.4 per 100,000 respectively) (NCI, 2020a); however, disaggregated data show that incidence rates among Vietnamese American (VA) women remain one of the highest (9.5 per 100,000) compared to other Asian subgroups (e.g., 4.5 for Chinese, 5.8 for Japanese, 7.5 for Koreans) (American Cancer Society, 2016).

Cervical cancer can take between 20 to 30 years to develop in an otherwise healthy woman (Zelkowitz, 2009). Therefore, the majority of cervical cancer cases are detected in the older, first-generation immigrant VA women population (Nghiem et al., 2016). Age disparities reflect a life course perspective, in which a delayed diagnosis may be due to delayed screening (Fang et al., 2011) or delayed sexual initiation in the Asian American population compared to the U.S. average (Trinh et al., 2014; Hahm et al., 2012; Chris et al., 2006). Disaggregated data by subgroup are not available for VA men, but oropharyngeal cancer among Asian American men is lower compared to all other racial groups (1.3 per 100,000 vs. 4.3 per 100,000) (NCI, 2017b). It is important to note that men may carry HPV, which can cause cervical cancer in women (Saraiya et al., 2015), but can also develop HPV-related cancers. Overall, HPV-related infection over many years to develop; therefore, it is

vital for both VA men and women to vaccinate early on as primary prevention in order to be protected from developing HPV-related cancers later in life (NCI, 2020b).

Relevance and Research Problem

HPV vaccine disparities exist by ethnicity and gender. A recent vaccine coverage report from the Centers for Disease Control and Prevention (CDC) indicated that the HPV vaccination rate for Asian American young women ages 19-26 is 45.2% in comparison to non-Hispanic Whites at 57.4% (Hung et al., 2019). Prior research has also shown that Asian American young adult women age 19 to 26 years are the least likely to receive the HPV vaccine compared to other minority groups (Williams et al., 2017). National HPV vaccination rates for Asian American men are not available due to small sample sizes; however, among all racial groups, there is a significant gender gap in vaccination uptake where men have lower vaccination rates than women (Boersma & Black, 2020; Hung et al., 2019). Asian Americans are a heterogenous population; however, incidence and vaccination data are often presented in an aggregate manner grouped in "Asian" or "other ethnicity" categories. Lack of disaggregated data can mask the unique cultural and socioeconomic issues that Asian American subgroups experience (Srinivasan & Guillermo, 2000; Budhwani & De, 2017).

To date, there have been a small number of studies that seek to understand factors associated with young adult HPV vaccination uptake in Asian American populations. Even less is known about specific Asian American subgroups and uptake factors among Asian American men. Among studies that include Asian Americans young adults, vaccination barriers have largely been due to gaps in HPV knowledge/awareness (Gor et al., 2011; Hopfer et al., 2017), and low HPV vaccine literacy (Hee Y. Lee et al., 2015; Becerra et al.,

2020). Among Vietnamese American women, knowledge and proficiency in spoken and written English are significantly associated with HPV vaccination (Yi et al., 2013). Furthermore, drawing from prior research work, VA women perceived men as being influenced by peer social norms in their decision to vaccinate. Among VA women, their experiences with parental silence and stigma around sexual health was a major barrier to vaccinating even as a young adult. While many women are motivated to vaccinate to protect themselves, women expressed that their family's conservative religious Vietnamese environment led to lack of sexual health discussions that was seen as a barrier to vaccinating (Hopfer et al., 2017).

In many Asian American families, the topic of sex and sexual health are not typically discussed (Hopfer et al., 2017; Kim & Ward, 2007). Prior research has found that Asian American men and women typically have little experience discussing reproductive health issues with their parents during adolescence (Kim & Ward, 2007). In turn, as young adults, Asian American women have less self-efficacy to initiate conversations about sexual health concerns with their health care providers and are less likely to seek prevention behavior (Okazaki, 2002; Romo et al., 2011). One recent study on family factors and HPV vaccination found that in all groups including Asian Americans, greater parental monitoring was associated with greater likelihood of college-age young adults having decided against HPV vaccination and may be related to higher family religiosity and intent to vaccinate (Quinn & Lewin, 2019). Additionally, Asian American young adults were less likely to receive the HPV vaccination and more likely to be "decided against" vaccination compared to Whites (Quinn & Lewin, 2019). While the literature shows that lack of sexual health conversations with parents during adolescence may influence likelihood of vaccination in adulthood, no

studies have yet explored how peers play a role in buffering the effect of parental silence around sexual health.

During emerging adulthood, the transition between adolescence and adulthood (Willoughby & Arnett, 2013), health information-seeking processes among young adults change as individuals begin to become more independent of their parents around health decisions like the HPV vaccination (Hopfer et al., 2017). Independence from parents and silence from parents may lead to heavier reliance on sources of information outside of the family such as peers, school, and online resources (Lai et al., 2017; Woodall et al., 2006). While young adults do not often discuss sexual health topics such as sexually transmitted infections, sexual relationships, and sexuality with their parents, they do discuss these topics with their peers (Trinh & Kim, 2021; Trinh et al., 2014). Vietnamese young adults communicate with peers about sexual health and are more comfortable talking about it with their peers because they have similar experiences (Nguyen, 2021; Trinh & Kim, 2021). One qualitative study found that young adult Vietnamese Australian women talk about sexual health with their close Vietnamese peers and that women desired culturally relevant sexual health education (Rawson & Liamputtong, 2010); however, little is known about how and the context in which these conversations arise among peers and whether this leads to conversations about HPV vaccine.

These types of close peer relationships have not yet been extensively studied in the context of sexual health information seeking and HPV vaccination disclosure. There is little known about what facilitates HPV vaccination among Vietnamese Americans during young adulthood. Prior literature has mainly focused on parent-child and patient-provider relationships, but there is reason to believe these approaches may not be as appropriate

during adulthood (Alber et al., 2018; Benavidez et al., 2020). Peer networks may be a source of support in young adults' social networks that can be leveraged to support HPV vaccination among Vietnamese American young adults.

A specific dimension of interest in this study is supportive communication, which is an emerging subset of social support. Currently, there are several definitions of supportive communication and types of supportive communication depending on the discipline. Supportive communication in the communication perspective is defined as both supportive verbal communication and supportive non-verbal or behavioral communication that provides assistance to others needing aid (MacGeorge et al., 2011). Supportive communication differs from the sociological and psychological perspective of social support in that there is a central role in *communication*. A feature of supportive communication is that there is purpose in the act of communication to improve the health and well-being of another person. This study seeks to understand the role of peer supportive communication about the HPV vaccine and vaccination uptake, whether peer supportive communication and sexual communication frequency can explain gender differences in vaccination status, and how culture impacts conversations around sexual health and HPV vaccine among peers.

Research Aims and Objectives

The overall aim of this study is to better understand whether peers are a source of supportive communication for HPV vaccine behavior. Furthermore, we sought to investigate whether this differs by gender and how culture contributes to HPV vaccine conversations. This dissertation seeks to:

- Develop and validate a measure of peer supportive communication about the HPV vaccine,
- Determine whether peer supportive communication about HPV vaccination and sexual communication frequency can help to explain gender differences in HPV vaccination, and
- Elicit culture-centric peer sexual health and HPV communication narratives among Vietnamese American young adults.

This study is innovative in its integration of peer communication, social support theory, and narrative communication theory to examine how sexual health conversations among peers can be leveraged to engage young adults in cancer prevention conversations (e.g., the HPV vaccine). This research is a stepping stone to understanding the potential relationship between peer communication and HPV vaccination. Findings inform the future development of a peer vaccine intervention that can be used to reduce HPV-related morbidity and mortality that disproportionately impact Vietnamese Americans.

Structure of Dissertation

This dissertation is structured to include three studies. Chapter 2 is a review of the currently existing literature and theoretical frameworks guiding this study. An overall dissertation conceptual model is presented at the end of the chapter. Chapter 3 seeks to validate a scale of peer supportive communication about HPV vaccination using confirmatory factor analysis. Chapter 4 assesses gender differences in peer HPV vaccine communication, sexual communication, and HPV vaccine uptake among Vietnamese American men and women. Chapter 5 contributes qualitative findings from interviews with VA young adults to better understand culture-centric sexual health communication

narratives and peer HPV vaccine narratives. Chapter 6 includes a conclusion of findings and theoretical implications for public health practice.

CHAPTER 2: LITERATURE REVIEW

This literature review provides an overview of HPV-related morbidities, HPV vaccination disparities by ethnicity and gender, and HPV vaccination barriers. Secondly, it argues for the pressing need to study Asian American subgroups as a way to improve cancer disparities in subpopulations. Finally, it offers a framework for incorporating peers as a culturally relevant approach to understanding how peer supportive HPV vaccine communication and sexual communication frequency impacts HPV vaccination uptake among Vietnamese American young adults.

HPV-related Morbidities and Vaccination Rates among Asian American Young Adults

The Human Papillomavirus (HPV) is one of the most common sexually transmitted infections, with HPV infection often occurring soon after first sexual activity (Markowitz et al., 2014). In the U.S., it is estimated that over 84% of women and 91% of men who have at least one sexual partner will acquire HPV by the age of 45 (Chesson et al., 2014). Furthermore, young adults under 24 years of age account for the majority of new infections in the U.S. (Meites, 2019). Data show that each year, 79 million people are infected with HPV, with over 50% of cases occurring before the age of 24 (Satterwhite et al., 2013). Since the development of the HPV vaccine in 2006, there has been evidence of the decreased prevalence of high-risk cancer types in vaccinated individuals, particularly among women aged 21-30, but still remains high among unvaccinated women (Berenson et al., 2017; Dickson et al., 2015). Likewise, among men, the prevalence of overall HPV infection was lowest in males age 18-22 at 28.9% also possibly due to early vaccination; however, genital HPV infection peaks among men between ages 28 to 32 (50.8%) and a second higher peak

among men of age 58-59 years (Han et al., 2017). If persistent HPV infection is left untreated, high-risk HPV infection can develop into cancer (NCI, 2020a).

HPV causes nearly 80% of all HPV-attributable cancers each year. Oropharynx cancer impacts approximately 19,000 men and women each year. Furthermore, cervical cancer is one particular disease that highly impacts more than 12,000 women in the U.S. Asian American men have the lowest incidence rates of oropharynx compared to the national average (1.3 per 100,000 vs. 4.3 per 100,000) (NCI, 2017b). Overall trends show that oropharyngeal and penile cancer cases are overall rising among men (NCI, 2017b). It is important to note that men can serve as reservoirs for HPV transmission, which can cause cervical cancer in women (Saraiya et al., 2015) . Data from the National Cancer Institute's Surveillance, Epidemiology, and End Results Program (SEER) show that although the total cervical cancer incidence rate for Asian American women is lower compared to the national average (6.5 per 100,000 vs. 7.4 per 100,000 respectively), (NCI, 2020a); a closer look at disaggregated data show that age-adjusted incidence rates among Vietnamese American (VA) women remain one of the highest (9.5 per 100,000) compared to other Asian subgroups (6.5 per 100,000) (American Cancer Society, 2016).

Cervical cancer is typically diagnosed later in life because it can take up to 30 years develop (Zelkowitz, 2009). Asian American women are often diagnosed later than all other racial groups except for American Indian/Alaska Natives (NCI, 2020a). Southeast Asian women specifically are diagnosed at a later age relative to non-Hispanic whites (53.6 vs. 50.1) (Nghiem et al., 2016). Age disparities in diagnosis may be due to delayed screening (Fang et al., 2011) or potentially due to delayed sexual debut among Asian American young adults (Chris et al., 2006; Hahm et al., 2012; Trinh & Kim, 2021). From a life course

perspective, periods of exposure and vulnerability are important windows of opportunity to intervene with primary prevention measures that can help to mitigate infection and cancer that may occur later in life (Santelli et al., 2013). Therefore, it is vital for both VA men and women to engage in primary prevention measures like vaccination in order to prevent HPV-related cancers later in life (Chen et al., 2021; NCI, 2020a).

Ethnic and Gender Vaccine Disparities among Asian American Young Adults

While HPV vaccination remains a national priority for adolescents prior to age 18, efforts to increase catch-up vaccination among young adults between 18-26 is still an important area of intervention (Adjei Boakye et al., 2021; Chen et al., 2021; Mix et al., 2022; Thompson et al., 2016). Furthermore, due to the COVID-19 pandemic, vaccination rates have dropped significantly. In 2020, the National Cancer Institute put forth a call to get HPV vaccination back on track (Gilkey et al., 2020). The Advisory Committee on Immunization Practices (ACIP) recommends a catch-up vaccination for young adult men and women up to age 26 if not previously vaccinated as an adolescent (Barrow et al., 2020; Hung et al., 2019; Meites, 2019). Women and men can also receive the vaccine up to age 45 if requested, but ACIP recommends shared decision-making between clinicians and patients to decide whether to vaccinate between age 27-45 (Hurley et al., 2021; Meites, 2019; Oshman & Davis, 2020). Three doses are recommended be completed within 6 months (Meites, 2019). The cost of the vaccine is covered by most public and private health insurance plans up to age 26; however, there is a vaccine assistance program offered through Merck, the manufacturer of the HPV vaccine, if a patient does not have insurance or cannot afford the vaccine (American Cancer Society, 2018). National vaccine rates indicate that the percentage of adults between age 18-26 who received the recommended number of doses

increased from 13.8% in 2013 to 21.5% in 2018 (Boersma & Black, 2020). Of those who received the vaccination in 2018, 21.4% of adults who had ever received one or more doses reported receiving it at age 18-26 (Boersma & Black, 2020). Although vaccine uptake has increased throughout the past decade, vaccine uptake disparities still exist by gender and ethnicity.

Gender vaccination disparities exist due to the "femininization" of the HPV vaccine since it was placed on the market in 2006 (Daley et al., 2017; Daniel & Atkins, 2021). In 2018, among young adults age 18-26, 35.3% of women in the U.S. received the recommended number of doses compared to 9% of men in the U.S (Boersma & Black, 2020). Nationwide, there is a significant gender gap in vaccination uptake where men have lower vaccination rates compared to women (Boersma & Black, 2020; Hung et al., 2019). Recent studies have found that older males who identify as Asian American are less likely to vaccinate compared to their counterparts (LaJoie et al., 2018; D. A. Quinn & Lewin, 2019; Tung et al., 2019). The first study to explore HPV knowledge and attitudes among a specific Asian subgroup of Chinese college students in the U.S. found that only 14.5% of males had received the HPV vaccination compared to 55.1% of females in their sample (Tung et al., 2019), which may be similar in other Asian subgroups. Although cervical cancer has the highest HPV-related burden of disease, HPV-related head and neck cancers such as oropharyngeal cancer in men are becoming more common (Chaturvedi et al., 2018; Schmeler & Sturgis, 2016; Serrano et al., 2018). Thus, HPV vaccine has been targeted for women; however, several studies have shown that including HPV vaccination for boys and men is cost-effective and would help further decrease the burden of HPV-related disease (Damgacioglu et al., 2022; Elbasha & Dasbach, 2010; Schmeler & Sturgis, 2016).

While national data for Asian American males is unavailable due to small sample sizes, there is data on vaccination rates among Asian American women. A recent CDC vaccine coverage report using data from the National Health Interview Survey (NHIS) indicated that the HPV vaccination rate for Asian American young women ages 19-26 is 45.2% in comparison to non-Hispanic Whites at 57.4% (Hung et al., 2019; McElfish et al., 2021). Another recent study using NHIS data revealed that even in the era of the Affordable Care Act (ACA), Asian American young adult women between 18-31 years of age had significantly lower adjusted odds of initiating (OR=0.51) and completing (OR = 0.46) the vaccine relative to white women (Agénor et al., 2020; McElfish et al., 2021). In this study, neither socioeconomic factors nor health care access explained the observed vaccination disparities between young adult Asian women and white women. Socioeconomic, psychosocial, and health care factors may affect some Asian subgroups more than others; therefore, disaggregated data by Asian subgroup is needed to better understand vaccination behavior.

A case for studying Vietnamese American young adults

Vaccine disparities research often ignores the heterogeneity of subpopulations, particularly among Asian American subpopulations (Budhwani & De, 2017). State and national surveys may not be ideal for capturing adequate subgroup data due to low response rate by subgroup, differences in Asian subgroup size, and absence of subgroup data collection (Korngiebel et al., 2015). As a result, evidence is drawn from aggregated data. Each Asian subgroup has its own unique cultures, language, histories, all of which are important social determinants of health to consider when studying vaccine disparities

(Agénor et al., 2020; Becerra et al., 2020; Korngiebel et al., 2015). Consequently, this data aggregation can make smaller communities "invisible" and can mask important health disparities (Korngiebel et al., 2015). As epidemiological data are important for funding, policy decisions, and health care priorities, it is important to study subpopulations to better understand the nuances of experiences and needs around vaccine disparities research.

Vietnamese American Young Adults in the U.S.

Vietnamese Americans represent the sixth-largest foreign-born group in the U.S. (Alperin & Batalova, 2018). According to the 2020 U.S. Census Bureau American Community Survey (ACS) estimates, there were approximately 2.1 million Vietnamese Americans living in the U.S., which accounts for 9.5% of Asians in the U.S. (U.S. Census Bureau, 2020). ACS data show that 43% are U.S. born and 57% are foreign-born (Pew Research Center, 2021). Overall, older first-generation Vietnamese Americans tend to be foreign born while the younger second generation are predominantly U.S.-born. Young adults between ages 18-39 comprise of approximately 31% of the Vietnamese American population and make up 42% of all U.S- born Vietnamese Americans and 25% of all foreign-born Vietnamese Americans (Pew Research Center, 2021).

The majority of Vietnamese Americans reside in California, followed by Texas, Washington, and Georgia (Pew Research Center, 2021). The largest enclaves are in California, specifically in Orange County and San Jose (Alperin & Batalova, 2018). According to the 2020 California Health Interview Survey (CHIS), there were approximately 650,000 Vietnamese Americans living in California, making up approximately 31% of the Vietnamese population in the U.S. (UCLA Center for Health Policy Research & UCLA Fielding

School of Public Health, 2020). Nearly half of the Vietnamese American population in California live in Orange County and Los Angeles. Young adult Vietnamese Americans ages 18-45 make up approximately 18% of the Vietnamese population in California. Data show that nearly 75% of Vietnamese young adults living in California speak English very well while (UCLA Center for Health Policy Research & UCLA Fielding School of Public Health, 2020). Furthermore, nearly 90% of individuals reported currently having health insurance. Unlike the first generation, the second generation is generally highly educated compared to their immigrant parents given the number of opportunities growing up in America (UCLA Center for Health Policy Research & UCLA Fielding School of Public Health, 2020). Overall, there are very few studies about the health of second-generation Vietnamese Americans compared to the first-generation Vietnamese immigrant population, which is a significant gap in research that needs to be addressed.

Predictors of HPV vaccination among Vietnamese American young adults

Among Vietnamese American young adult women, there are significant predictors to HPV vaccination that have contributed to disparities in this group. As previously mentioned, there is a lack of disaggregated data by Asian subgroup and HPV vaccine data among men; therefore, the majority of research reviewed will focus on the experiences of Asian American women.

A recent study indicated that despite the widespread insurance coverage of the Affordable Care Act (ACA), which covers vaccinations recommended by ACIP, Asian American women still have a lower adjusted odds of initiating (OR=0.51) and completing (OR=0.46) the HPV vaccination series compared to white women (Agénor et al., 2020; Raymond et al., 2021). These findings suggest that barriers may not be financial, but rather

embedded in psychosocial and/or sociocultural mechanisms. In the vaccine literature, there are several psychosocial variables that impact vaccination outcomes. Some studies have suggested that higher HPV literacy, knowledge, and attitudes (Becerra et al., 2020; Blake et al., 2015; Cui et al., 2010; Krakow et al., 2015; Sherman & Nailer, 2018; Yi et al., 2013), fear/worry of cancer (Agénor et al., 2020; Hopfer et al., 2017), mother's communication about sex during adolescence (Roberts et al., 2010; Romo et al., 2011), mother's approval of vaccination (Hopfer et al., 2017; Hopfer & Clippard, 2011), provider communication/ recommendation (Gilkey et al., 2016, 2020), and peer social communication about HPV (Casillas et al., 2011; Konstantinou et al., 2021) are likely to be associated with HPV vaccine outcomes among young adult women. On the other hand, higher religiosity (Krakow et al., 2015; D. A. Quinn & Lewin, 2019), lack of sexual parental communication/influence (Gibson et al., 2019; LaJoie et al., 2018; D. A. Quinn & Lewin, 2019; Thompson et al., 2016), stigma around sexual morality and promiscuity (Foster et al., 2021; Jeudin et al., 2014; Krakow et al., 2015), being foreign-born (Cofie et al., 2018), and having lower English proficiency (Becerra et al., 2020) are associated with a lower likelihood of vaccination. In a study eliciting HPV vaccine decision narratives among Vietnamese American women, additional barriers expressed by the women included themes of trust in their partners' HPV status and family silence about sexual health (Hopfer et al., 2017). While these are the trends among Asian American women, less is known about psychosocial mechanisms among Asian American men.

Among men, there are mixed findings regarding the psychosocial variables that impact vaccination behavior. A few cross-sectional studies among college students have shown that older age, male gender, Asian ethnicity have been associated with a lower

likelihood of vaccination compared to younger ages, females, or white racial group (LaJoie et al., 2018; D. A. Quinn & Lewin, 2019; Tung et al., 2019). One small community study comparing HPV knowledge and awareness among Asian subgroups found that Vietnamese men reported the lowest awareness about cervical cancer, cervical cancer screening, and HPV (50%) compared to Koreans (63%) and Filipinos (100%) (Gor et al., 2011), which may lead to low HPV vaccination uptake (D. A. Quinn & Lewin, 2019). Another study found that HPV knowledge was not associated with vaccination, but the odds of vaccinating increase when men have positive attitudes, high subjective norms, and perceived behavioral control toward the vaccination (Ratanasiripong, 2015). In another study, researchers found that higher parental income, a higher number of partners, attending a doctor's visit recently, and higher levels of sexual activity were associated with higher vaccination completion (H. Lee et al., 2018). Our previous narrative study found that Vietnamese women perceived their brothers, partners, and male friends would receive the vaccination if they knew it was a social norm among peers (Hopfer et al., 2017); however, another qualitative study focusing on the male perspective of HPV vaccination found that men are hesitant to seriously discuss sexual health with their friends for fear of judgment, and expressed parental discomfort when talking about sex (Sledge et al., 2019). There may be many variables that play a role in determining likelihood of vaccination; however, peer communication about HPV vaccination remains understudied among both men and women.

Parental Communication about Sexual Health and HPV vaccination

While the HPV vaccination has been framed as a cancer prevention measure, there are still concerns around the vaccine leading to sexual promiscuity because of its

association with sexual behavior (Foster et al., 2021; Krakow et al., 2015). Among non-Asian populations, mother and/or parent communication about sex during adolescence has consistently been associated with higher confidence to discuss HPV vaccination with their healthcare provider and the likelihood of seeking sexual health services as a young adult (Gibson et al., 2019; Okazaki, 2002; Romo et al., 2011). Asian American young adult women and men are less likely to report receiving frequent and open communication about sex from their parents (Hopfer et al., 2017; J. L. Kim & Ward, 2007; Okazaki, 2002; D. A. Quinn & Lewin, 2019; Romo et al., 2011; Trinh et al., 2014; Trinh & Kim, 2021) and are more likely to perceive less comfort discussing sexuality with their mothers (Romo et al., 2011). If parents do discuss sexuality, abstinence is discussed more so than any other topic related to sexuality or sexual health (J. L. Kim & Ward, 2007; Trinh et al., 2014; Trinh & Kim, 2021).

The lack of parental communication stems from cultural influences and oftentimes, language barriers between parent and child (J. L. Kim & Ward, 2007). Communication is also heavily influenced by Asian cultural characteristics such as the priority of family, collective values, and emphasis on proper social codes (Okazaki, 2002). As a result of growing up with conservative cultural influences, Asian American women have less self-efficacy to discuss sexual health concerns with their providers as adults (H. Rawson & Liamputtong, 2009; Romo et al., 2011). A life-course approach to prevention recognizes that risk-buffering processes taking place earlier in life may have the ability to positively influence health and decision-making later in life (Santelli et al., 2013). In the case of HPV vaccination, less sexual communication during adolescence may downplay the importance of vaccinating and be associated with low sexual health communication comfort (Guzman et al., 2003, p. 203), low self-efficacy to seek sexual health preventive services (Okazaki,

2002; Romo et al., 2011), and fear around perceived sexual promiscuity (Krakow et al., 2015; D. A. Quinn & Lewin, 2019). This lack of family communication and persistent silence around sexuality has been found to be a socio-cultural barrier to receiving the HPV vaccination, especially among Vietnamese American young adult women (Hopfer et al., 2017).

In the literature on sexual communication in Asian American cultures, there are two findings that emerge consistently: (a) Parents minimally discuss sexual health with their Asian American adolescents (Hopfer et al., 2017; J. L. Kim & Ward, 2007; Trinh et al., 2014; Trinh & Kim, 2021) and (b) Asian Americans report later sexual initiation and less sexual risk-taking during adolescence (Cavazos-Rehg et al., 2009; Chris et al., 2006; Santelli et al., 2013). Overall, the likelihood for sexual debut for Asian men and women by age 16 is considerably lower (<20%) relative to all other ethnic groups. Furthermore, the probability of sexual debut by the 17th birthday is < 35% for Asians compared to <60% for Caucasians (Cavazos-Rehg et al., 2009; Trinh et al., 2014). These results suggest that sexual debut occurs later in life (potentially during emerging adulthood), which points to the need for understanding with who young adults discuss sexual health as a young adult.

Peer Sexual Health Communication and HPV Vaccination

While Asian American young adults are less likely to receive sexual health education from their parents, they do receive sexual information from other sources such as doctors, college/university settings, peers (friends), and peer family members (cousins, siblings, relatives) (Gibson et al., 2019; Hopfer et al., 2017; C. Lee et al., 2013; H. Rawson & Liamputtong, 2009; Wong et al., 2019). The peer sexual health literature acknowledges

peers as "influential sexual socialization agents," but the magnitude of influences can vary by gender and ethnicity (Trinh et al., 2014; Trinh & Ward, 2016). A recent study found that Asian American young adults are often raised in a conservative family environment, but engage with more sexually open/ permissive peers when seeking sexual health information (Trinh & Kim, 2021). Topics of discussion are also often heavily gendered. For example, Asian American women are more likely to receive messages promoting abstinence, traditional sex roles, and sex as important to a relationship while males are more likely to receive messages that are more accepting of casual sex, more sexual partners, and the sexual experience (Trinh et al., 2014). Other past research has found that being female is associated with greater sexual communication and may be more likely to discuss sexual health with peers because women have more relevant life event triggers like menstruation, gynecology visits, birth control, and pregnancy concerns (Diiorio et al., 1999; Murray Horwitz et al., 2018; Porter et al., 2019; Trinh & Ward, 2016).

As HPV vaccine is related to sexual health concerns, the topic may arise in the context of conversations around sexual health. Prior literature has indicated that peer communication from family and friends about HPV vaccination among women influences the perception of vaccine efficacy and uptake (Casillas et al., 2011; Harper et al., 2014). Furthermore, some studies suggest that supportive messages from peers about HPV affect the way women make decisions about their health, particularly whether or not to vaccinate (Harper et al., 2014; Hopfer & Clippard, 2011; Miller-Ott & Durham, 2011). For example, friends are likely to contribute experiential support, informational support, and emotional support when it comes to HPV vaccination support (Miller-Ott & Durham, 2011). Although peer networks may play an important role in sexual communication during young

adulthood, there is little understanding of how these conversations arise and whether they can impact vaccination behavior. While studies have found that Asian Americans may be more open to discussing sexual health information with their peers, little has been done to further understand how cultural upbringing may influence comfort around conversations and stigma around vaccine acceptance among peers. Peers are in a unique position to disseminate positive vaccine messages; thus, it is important to understand how culture and peer support/ communication may impact decision making among young adults.

Theoretical Frameworks and Constructs to Understand HPV Vaccine Outcomes

This section provides an overview of a blending of theoretical frameworks from several disciplines that may help to orient the research questions for this dissertation. It will discuss how social networks can impact health behaviors, explain how narratives can be used to capture cultural cues, depict the role of gender in HPV vaccine communication and behavior, and introduce the concept of supportive communication to increase HPV vaccination uptake. The overarching conceptual model is presented for understanding peer HPV vaccine communication among Vietnamese American young adults.

Social Networks and Health

Berkman et al. (2000)'s conceptual framework on how social networks impact health suggests social networks are embedded in larger upstream factors including sociocultural contexts, which influence downstream factors including psychosocial processes and behavioral pathways to health. Applying this framework to the current study, culture and gender are sociocultural conditions that shape peer relationships and communication processes (Berkman et al., 2000). Peer communication then provide

opportunities for social support of which may be manifested through supportive or unsupportive conversations or behaviors. These psychosocial mechanisms then impact health through pathways including HPV vaccination attitudes, HPV vaccination subjective norms, HPV vaccination perceived behavioral control, intention, and eventually behavior (Berkman et al., 2000). The following theories inform each aspect of the overarching conceptual framework.

Socio-structural Conditions: Culture and Gender

Capturing cultural processes through Narrative Engagement Theory. Narrative Engagement Theory (NET) is a useful tool for informing prevention behavior change by grounding promotion programs in cultural and young adult experiences (Hecht & Krieger, 2006; Larkey & Hecht, 2010; Miller-Day & Hecht, 2013). Narratives are a familiar part of daily life and is grounded in storytelling, a basic type of human thought and interaction (Kreuter et al., 2007), which has particularly been useful to address HPV vaccination with minority populations (Lee et al., 2016). This culture-centric approach prioritizes an in-depth understanding of the target audience's conceptualization of the health problem and provides cultural cues for motivating behavior change (Clandinin & Rosiek, 2007; Hopfer, 2012a; Kreuter et al., 2007; H. Y. Lee et al., 2016; Miller-Day & Hecht, 2013). NET argues that narratives have the potential to substantially impact behavior change when prototypical narratives reflect beliefs, values, and culturally specific cues to act on a behavior (Hecht & Krieger, 2006).

NET has been used in various capacities to inform HPV vaccination intervention design. Prior studies have used NET to elicit Vietnamese American and Latina women's

vaccine decision stories (Hopfer et al., 2017) in an effort to design a culturally tailored intervention targeting minority women. Culture-centric narrative/storytelling interventions have also been developed for Korean American college women and found to be significant in increasing vaccination (M. Kim et al., 2019). This theory and methodology prioritize the lived stories of individuals as relevant data. In turn, the sexual health and vaccine narratives will provide an in-depth understanding of young adults' experiences of Vietnamese American cultural values, cultural norms, and context in which conversations arise. NET as a methodology is helpful to understanding the cultural cues of family and Vietnamese American values portrayed in sexual health and HPV communication narratives. Identifying Vietnamese young adult sexual health communication and HPV vaccine communication narratives will inform the design of culturally resonant messages for Vietnamese American young adults.

Gender Role Theory. Gender Role Theory can help explain the differences between how males and females communicate about health. This theory suggests that males and females tend to occupy socially ascribed roles and tend to be judged for how they ought to behave. Consequently, males and females will develop skills and attitudes around the ascribed roles (Shimanoff, 2009). Prior research has identified gender socialization to be the main reason why women tend to seek health information while men avoid information until there is a diagnosis (Manierre, 2015; Tabaac, 2016). One explanation is that women are socialized to tend to their bodies more often than men, which indicates a gendered reactivity to illness (Gustafsod, 1998; Manierre, 2015). Another explanation is that women are more likely to perceive their risk for getting sick (Gustafsod, 1998). On the other hand, men are also likely

to exhibit or conform to masculine norms, which leads to less perception of risk and less help-seeking behavior when it comes to cancer prevention (Cameron & Bernardes, 1998; Gustafsod, 1998) In relating gender role to HPV vaccine, the responsibility of prevention behavior has leaned on the woman despite the fact that men can contribute to transmission of HPV and are therefore eligible for the HPV vaccination. In a similar vein, gender might also impact the level of communication between peers, which may influence vaccine behavior (Trinh et al., 2014). Thus, gender roles can lead to disparities in communication, health information seeking behavior, and prevention behavior.

Psychosocial Mechanisms: Supportive Communication about HPV vaccination

There are two types social support that can be adapted for understanding social support processes HPV vaccination behavior: enacted support and perceived support. Enacted support reflects assistance through specific supportive actions while perceived support is the subjective judgment that family and friends would provide assistance during a stressor (Barrera, 1986; Lakey & Drew, 1997). In the context of the HPV vaccine, support can manifest in three main ways: informational support (e.g. giving advice, guidance, or useful information), emotional support (e.g. offering empathy, concern, encouragement), and instrumental support (e.g. provision of financial assistance, material, or services) (Albrecht & Adelman, 1987; House et al., 1988).

An extension to the concept of social support is "supportive communication," which has been defined as both supportive conversations (verbal) and supportive behaviors (non-verbal) that provide assistance to others needing aid (MacGeorge et al., 2011). Supportive communication promotes health by providing health-relevant information, motivating

healthy behavior, promoting self-esteem and self-care, and reducing emotional distress. Supportive communication from people in a peer network who care about the individual can encourage or persuade people to participate in prevention behavior (Lewis & Rook, 1999; Pauley & Hesse, 2009).

Applying the definitions of social support to HPV vaccination behavior, peers may provide supportive communication via informational support (e.g. giving advice, guidance, or useful information about the HPV vaccination verbally or by sending information), emotional support (e.g. offering to attend a doctor's visit with the individual or expressing verbal encouragement to obtain the HPV vaccination), and instrumental support (e.g. provision of financial assistance to offset the cost of the vaccination if needed or providing transportation to get vaccinated). Some qualitative studies have found that young adults are likely to accept the HPV vaccination if they receive social support from their family members, medical provider, peers, and partners (Hopfer & Clippard, 2011; Miller-Ott & Durham, 2011). Therefore, the current study seeks to understand how supportive and unsupportive communication between peers can potentially influence an individual's health including utilization of health care services, compliance with vaccine recommendations, and health-promoting or compromising behaviors and decision to seek preventative care (Vangelisti, 2013).

Peer HPV Vaccine Communication Framework

Figure 2.1 visually displays a blending of several theoretical frameworks and conceptual models explained. The overarching framework of how social networks impact health offers a sociological perspective that peer networks are embedded in a larger social-structural condition (e.g., cultural and gender influences) that may impact psychosocial and

health behavioral pathways. Narrative Engagement Theory (Larkey & Hecht, 2010; Miller-Day & Hecht, 2013) offers a unique culture-centric lens to understand how Vietnamese culture and values can impact HPV vaccine communication. Gender Role Theory (Shimanoff, 2009) suggests a conceptualization of how larger socialization processes among female/male gender roles may differentially impact HPV vaccination uptake and sexual communication among peers members. Furthermore, supportive communication (MacGeorge et al., 2011) may contribute to HPV vaccination behavior. This framework is intended to depict the focal variables of interest presented in the three studies (Chapters 3-5) detailed in this dissertation.

Tables & Figures

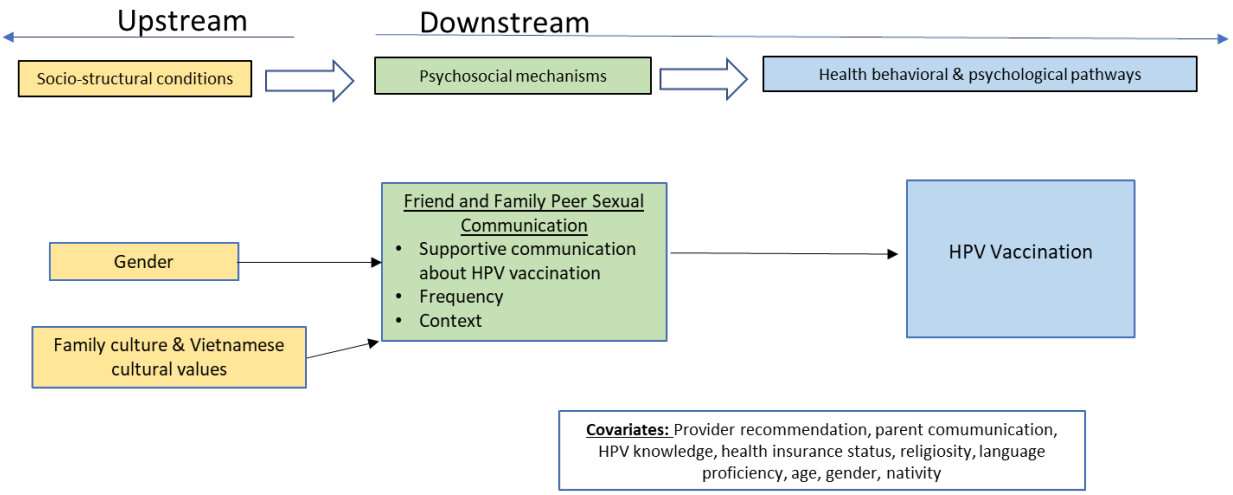

Figure 2.1 Dissertation conceptual framework

CHAPTER 3: DEVELOPMENT AND FACTORIAL VALIDATION OF A PEER SUPPORTIVE COMMUNICATION ABOUT HPV VACCINATION SCALE AMONG VIETNAMESE AMERICAN YOUNG ADULTS

Background: Prior research shows that sexual conversations with parents during adolescence can encourage HPV vaccination in adulthood. However, sexual conversations are taboo in many Asian families. Supportive communication among peers may influence vaccine behavior among Vietnamese American young adults. To our knowledge, there are no scales of supportive communication about the HPV vaccine that exists. **Purpose:** The purpose of this study was to develop and validate a scale of peer received supportive communication scale (RSC-HPV) and a peer perceived supportive communication about the HPV vaccine (PSC-HPV) among Vietnamese American young adults. **Methods:** Participants (N=260) were Vietnamese American young adults who self-identified as Vietnamese American, were between ages 18-45, were vaccinated as a young adult (age 18+), or were currently unvaccinated. Participants who had discussed HPV with peers responded to the RSC-HPV scale (n= 136) and those who had not discussed HPV with peers responded to the PSC-HPV scale (n=124). Confirmatory factor analysis was used to test the factorial structure of the RSC-HPV and PSC-HPV scales. Structural equation modeling was used to test associations between the latent variables and HPV vaccination uptake. **Results:** A 3-factor measurement model was identified for both scales with the following dimensions: informational, emotional, and instrumental supportive communication. The measurement model was not strongly associated with HPV vaccination for the RSC-HPV, but instrumental supportive communication was associated with HPV vaccination for the PSC-HPV scale. **Discussion:** Findings support the factorial validation of a peer supportive communication scale and suggest that peer supportive communication may not be strongly associated with vaccination behavior, but perceived instrumental supportive communication may be related to vaccination status.

Background

The Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States (U.S.) (CDC, 2019). The majority of new HPV infections occur in young adults and are often asymptomatic (Meites, 2019). Persistent HPV infection may lead to cervical, vaginal, and vulva cancer in women, penile cancer in men, and anal, oropharyngeal cancer in both men and women (NCI, 2020b). Cervical cancer disproportionately impacts minority women in the U.S. While the total cervical cancer incidence rate for Asian Americans is lower compared to the national average (6.5 per 100,000 vs. 7.4 per 100,000 respectively), disaggregated data show that incidence rates among Vietnamese American women remain one of the highest (9.5 per 100,000) compared to other Asian subgroups (American Cancer Society, 2016).

The HPV vaccine is recommended to prevent HPV infection and ultimately decrease HPV-related cancers. The Advisory Committee on Immunization Practices (ACIP) currently recommends the HPV vaccination to adolescents, but also a catch-up vaccination as primary prevention for young adult men and women up to age 26 (Hung et al., 2019; Meites, 2019). Women and men can also receive the vaccine up to age 45 if requested, but ACIP recommends shared decision-making between clinicians and patients to decide whether to vaccinate between age 27-45 (Meites, 2019; Oshman & Davis, 2020). In addition, both public and private health insurance plans cover the cost of vaccines recommended by ACIP; however, uptake rates are still subpar in Asian American populations (Agénor et al., 2020; Meites, 2019). Given the financial assistance of available for the HPV vaccine covered under the Affordable Care Act, exploring psychosocial factors

among Asian American groups may provide a better understanding of HPV vaccine disparities (Agénor et al., 2020). More importantly, disaggregate data are missing from this body of research, which limits our understanding of cultural and psychosocial nuances that can impact vaccine uptake by ethnicity.

Vaccine disparities research often ignores the heterogeneity of subpopulations, particularly among Asian American subpopulations (Budhwani & De, 2017). Every Asian subgroup has its unique history, language, and culture (Srinivasan & Guillermo, 2000). Much of what is known in both vaccine disparities research has been analyzed using aggregated data on Asian Americans; however, this often masks important health disparities and can exacerbate health inequities. For example, a study on HPV literacy among Asian American women in California shows that there are differences in HPV literacy among Asian subgroups (e.g. Korean, Chinese, Japanese, Vietnamese) with Vietnamese Americans having lower HPV literacy compared to other Asian subgroups (Becerra et al., 2020). This result brings to light the need for targeted HPV research by Asian subgroup. Even though disaggregating data by subgroups often means having to conduct research in small populations, this approach helps reveal health disparities and encourages framing problems from a lens of social determinants of health (Korngiebel et al., 2015). Thus, this study draws from research among Asian Americans but focuses on Vietnamese Americans.

Sexual Health and HPV Conversations with Parents and Peers

Prior studies have identified mother-daughter communication about sexual health during adolescence and provider recommendation as the two important predictors of HPV

vaccination during young adulthood (Gilkey et al., 2016; McRee et al., 2011; Romo et al., 2011; Rosenthal et al., 2011). The topic of HPV has been used among mothers of adolescent daughters to initiate conversations about sexual health, but these conversations mainly occur among non-Hispanic White populations (McRee et al., 2011). Sexual health is an uncomfortable topic in most cultures, but especially so in Asian culture. Family silence is typical around sexual health Asian families because the culture emphasizes conservative values and propriety (M. Kim et al., 2017; J. L. Kim & Ward, 2007; Okazaki, 2002; Hopfer et al., 2017). Asian American women have many cultural barriers to cancer prevention behaviors including communicating with their mothers about sexual and gynecological problems, less openness about sexuality, and less prevention orientation (Okazaki, 2002; H. A. Rawson & Liamputtong, 2010; H. Rawson & Liamputtong, 2009; Tang et al., 1999). Asian culture, religious beliefs, and lack of quality parent-adolescent communication about sex reflects more conservative attitudes and behaviors among young adult women (Hopfer et al., 2017; Okazaki, 2002; H. Rawson & Liamputtong, 2009). As a result, Asian American women are less likely to initiate conversations with their doctor or seek sexual health-related cancer prevention during adulthood (Gibson et al., 2019; Okazaki, 2002; Romo et al., 2011).

Research suggests that Asian American young adult women are more likely to receive HPV education from sources such as from school or peers (Hopfer et al., 2017; Lee et al., 2013). In addition, peer messages that normalize the receipt of the vaccine can be identified as a type of supportive communication about HPV, which nudges important others or peers to potentially act on the behavior (Hopfer & Clippard, 2011). Peer

communication from family and friends about HPV vaccination among women has been found to influence the perception of vaccine efficacy and uptake (Konstantinou et al., 2021; Harper et al., 2014; Casillas et al., 2011). Some studies suggest that supportive messages from peers about HPV affect the way women make decisions about their health, particularly whether or not to vaccinate (Hopfer & Clippard, 2011; Miller-Ott & Durham, 2011). While peer influence has been found to be influential on vaccination outcomes, less is known about whether Vietnamese American young adults utilize peer networks and communicate sexual health-relevant information like the HPV vaccine that could support or discourage HPV vaccination uptake in adulthood.

Defining Peer Supportive Communication for Health Behavior Change

Supportive communication is an emerging subset of social support. Currently, there are several definitions of supportive communication and types of supportive communication depending on the discipline. Supportive communication in the communication perspective is defined as both supportive verbal communication and supportive non-verbal or behavioral communication that provides assistance to others needing aid (MacGeorge et al., 2011). Supportive communication from people in a peer network who care about the individual can encourage or persuade people to participate in prevention behavior (Lewis & Rook, 1999; Pauley & Hesse, 2009). Supportive communication differs from the sociological and psychological perspective of social support in that there is a central role in *communication*. A feature of supportive communication is that there is purpose in the act of communication to improve the health and well-being of another person. Another unique attribute of this communication perspective is its focus on

the peers' responses to their peers' perceived needs. For example, if a peer was in need of HPV vaccination, they would communicate support to help them vaccinate. Furthermore, the quality of support and communication are the main focus rather than the quantity of those constructs. Finally, supportive communication not only positively impacts social integration or perceived support availability but also affects health (MacGeorge et al., 2011). Specifically looking at the relationship between supportive communication and health, there is much evidence that shows that supportive communication promotes health by a) providing health-relevant information, b) motivating healthy behavior, c) promoting self-esteem and self-care, and d) reducing emotional distress (Lewis & Rook, 1999; MacGeorge et al., 2011).

Measurement

To date, there have been no scales of supportive communication about the HPV vaccine in the literature. There is very little uniformity in measuring supportive communication. Some examples of past health-related supportive communication studies were focused on its effects on psychological wellness during disasters or academic stress (Aloia & McTigue, 2019; Macgeorge et al., 2005), adherence to adolescent diabetes treatments (Goethals et al., 2020), and gestational diabetes during COVID-19 (Wang et al., 2021). Supportive communication measurements have been defined in multiple ways. Drawing from the social support literature is perhaps the most direct way of studying supportive communication (MacGeorge et al., 2011). Some studies have emphasized emotional and informational supportive communication as the most important types of supportive communication (McGeorge et al., 2005). Others, however, have focused on

different constructs like emotional, esteem, network, and informational support (High & Buehler, 2019). Furthermore, other disciplines define supportive communication as behaviors like effective listening, displaying care, showing empathy (Tian & Solomon, 2020). Drawing from the health-related social support constructs and past HPV vaccination research, the current study focused on informational, emotional, and instrumental supportive communication as the types of support one might receive from their peers when deciding to vaccinate.

Methods

Participants and study design

This was a cross-sectional study. We collected self-reported survey data through an online questionnaire from a sample of Vietnamese American young adults living in Southern California, but extended the opportunity to Vietnamese American young adults in other states to increase participation. This study was conducted during the COVID-19 pandemic from April 2021 to December 2021; thus, online recruitment and data collection methods were used. The online survey was conducted through Qualtrics and took participants approximately 25-30 minutes to complete. A purposive sample of participants were recruited from various locations including university departmental listservs, club organizations like Vietnamese American Student Association across college campuses, Vietnamese-serving community-based organizations, religious youth groups, and social media groups/ Vietnamese young adult-specific pages.

Scale Development & Measures

We designed a scale of supportive communication about the HPV vaccine to assess whether this would influence vaccine behavior. No studies to our knowledge have designed and/or tested a supportive communication scale about the HPV vaccine. Supportive communication measures were adapted from prior health-related social support measures used in an adult diabetes management study among Vietnamese American adults (α=0.95) (August & Sorkin, 2011). The supportive communication measures were developed based on an extensive review of the literature of the relationship between social support and HPV vaccination outcomes (Esaggoff et al., 2019; Hopfer & Clippard, 2011). We developed survey items that included elements of informational, emotional, and instrumental supportive communication for vaccination behavior among peers. In total there were 11 questions asked, but upon evaluating the theoretical dimensions of social support, we decided to drop two items (q1: My peer was supportive of me getting the HPV vaccine & q2: My peer encouraged me to get vaccinated for HPV) since they did not map on theoretically into the dimensions of social support such as informational, emotional, and instrumental support. Therefore, the final analyses included nine items.

In the survey, participants were asked to convey whether they had ever discussed HPV vaccination with a peer with response, "yes" and "no." If they selected "yes," they were directed to a set of peer supportive communication about HPV vaccine questions. If they selected "no," they were directed to a similar set of questions that asked about their *perceived* peer supportive communication about the HPV vaccine. According to the social support literature, received support and perceived support for health outcomes have only

been found to be moderately related and are inherently different constructs (Uchino et al., 2011). Therefore, in this study, they were treated as separate constructs and models.

Data Analysis

STATA 16.0 was used to conduct the analyses. The analyses proceeded in two steps: Confirmatory Factor Analyses (CFA) and then a structural model. In the preliminary phase, Cronbach's alpha was conducted to assess internal consistency of the scale and constructs. Then, we conducted a more rigorous assessment using a series of confirmatory factor analyses (CFAs) to assess competing measurement models of the scale. Beginning with one latent variable (Supportive Communication) with all nine scale items, we assessed model fit. Then, three latent variables (informational, emotional, and instrumental supportive communication) were also tested for model fit. Models were compared using multiple data-model fit information, such as Chi-square (non-significant value = good fit), Comparative Fit Index (CFI, >0.90= adequate fit and >0.95 = good fit), Tucker-Lewis Index (TLI, >0.90 = adequate fit, > 0.95 = good fit), Root mean square error of approximation (RMSEA, <0.08 = adequate fit and <0.05 good fit) (Acock, 2013). We considered model adjustments if modification indices were substantial and theoretically meaningful.

After the first phase, the selected measurement model was embedded within a structural model that included vaccination outcomes, covariates including age, gender, provider recommendation, parent communication, health insurance, knowledge, religiosity, and language. For every model, full information maximum likelihood estimation was used to accommodate missingness. Decisions to keep or eliminate items following the analyses were informed by fit indices as well as by theorizing from the literature.

Results

Sample Characteristics

After data cleaning and accounting for missingness, a total of 258 participants were included in the final sample. By scale, 136 participants responded to the supportive communication scale and 124 participants responded to the perceived supportive communication scale. The majority of participants (70%) were female. The average age was 24 years of age (*SD*=5.4) Approximately 51% of our sample reported having a bachelor's degree. Sixty-seven percent reported having received a vaccine recommendation from their doctor. The majority (65%) were vaccinated for HPV as an adult. Ninety-six percent reported having health insurance. This sample was relatively representative of the national population. For example, nationwide approximately 92% of U.S. born VA young adults report having health insurance and 66% report having a bachelor's degree or higher (Harjanto & Batalova, 2021; Pew Research Center, 2021). Table 3.1 shows descriptive statistics of the total sample and by supportive communication or perceived supportive communication.

Preliminary Model Testing of 11-items

The scales initially included 11 items in total. When we tested a full-scale reliability coefficient was α=0.88 for the SC-HPV scale and α=0.90. Then a four-dimension model was tested including latent variables of General, Informational, Emotional, and Instrumental Supportive Communication. The two items "My peer was supportive of me getting the HPV vaccine" and "My peer encouraged me to get the HPV vaccine" were highly correlated with

each other on the received supportive communication (RSC-HPV) scale (r=0.65) and on the perceived supportive communication (PSC-HPV) scale (r=0.73). Furthermore, model fit indices did not change drastically when testing the model with and without the two items, which indicates potential overlap between items and a lack of contribution of the model. Theoretically, the two items do not represent communication or acting to help peers vaccinate (based on the definition presented earlier). While items loaded high onto the "General Supportive Communication" latent variable, this latent variable is not a type of social support in current existing literature and items did not fit into any other latent supportive communication variables. Thus, those two items were dropped from the scale. We continued the analysis with 9 items that represented informational, emotional, and instrumental supportive communication.

Peer Received Supportive Communication about HPV Vaccination (RSC-HPV) Scale

Confirmatory analysis of 1-factor scale

We used a confirmatory factor analysis to assess the measurement properties of the peer supportive communication scale. The full-scale reliability coefficient was α=0.88, which was considered acceptable. Our nine initial items all loaded significantly on a single received supportive communication dimension, but the model fit was quite poor: χ^2 (27) =163.78, $p < 0.001$, RMSEA=0.19, CFI = 0.80, TLI=0.74. Standardized factor loadings for the 1-factor scale ranged from 0.38 to 0.92.

Confirmatory analysis of 3-factor scale

The 3-factor model included three dimensions identified from the literature: Received Supportive Informational Communication, Received Emotional Supportive Communication, and Received Instrumental Supportive Communication. The "Received Informational Supportive Communication" dimension consisted of two items related to having received information from peers about the vaccine and receiving information about the importance of the vaccine from peers (overall α=0.65; factor range was between 0.67 to 0.73). The second factor, "Received Emotional Supportive Communication" comprised of three items related to motivating behavior and efforts to verbally praise them for vaccinating (overall α: 0.75; factor range was between 0.50 to 0.77). The third factor, "Received Instrumental Supportive Communication" included items relating to tangible actions that their peer did to support them vaccinating (overall α =0.91, factor range from 0.40 to 0.89). The 3-factor model fit the data significantly better than the 1-factor model: χ^2 (24)=71.76, p<0.001, RMSEA=0.12, CFI=0.93, TLI=0.90.

The modification indices indicated several possible changes for improving our model. Question 11 (My peer helped motivate me to get vaccinated even when I did not want to go) was allowed to cross load on received emotional supportive communication and received instrumental supportive communication dimensions given that motivating a peer to vaccinate may come in the form of emotional support or instrumental actions. Furthermore, the errors for questions 6 (driving peer to doctor's visit) & 7 (offering to pay for vaccine) were allowed to correlate because they are closely related as instrumental support actions. After adding the cross loading and correlated error, the model fit was slightly improved more: χ^2 (22)=50.93, p<0.001, RMSEA= 0.08, CFI= 0.96, TLI=0.94. The

model fit indicators suggest that the final model fits reasonably better than approximately 96% of other null models. Final standardized factor analysis results are presented in Figure 3.1 and Table 3.2.

All factors in the three-factor scale correlated in the expected direction. Received Informational Supportive Communication and Received Emotional Support were very strongly positively correlated (r=0.73, SE=0.09). Received Informational Supportive Communication and Received Instrumental Supportive Communication were also positively strongly correlated (r=0.54, SE= 0.09). Received Emotional Supportive Communication and Received Instrumental Supportive Communication were strongly positively correlated as well (r=0.51, SE= 0.09).

Relationship between received supportive communication and HPV vaccination status

We tested the performance of the final measurement model in a predictive model between the 3-factor received supportive communication scale and HPV vaccination status without covariates. Results showed that this model was an adequate fit: $\chi^2(28)=59.92$, $p<0.001$, RMSEA=0.09, CFI=0.96, TLI=0.93, but none of the latent variables were significantly associated with HPV vaccination status. With covariates in the model, the results showed that the overall model was also an adequate fit: $\chi^2(46)=94.47$, $p<0.001$, RMSEA=0.08, CFI= 0.94, TLI=0.90), but only provider communication was significantly associated with HPV vaccination status.

Peer Perceived Supportive Communication about HPV (PSC-HPV) Scale

Confirmatory analysis of 1-factor scale

We used a confirmatory factor analysis to assess the measurement properties of the peer perceived supportive communication scale. The full-scale reliability coefficient was α=0.89, which was considered acceptable. Our nine initial items all loaded significantly on a single supportive communication dimension, but the model fit was quite poor: $\chi^2(27)=$ 141.64, $p < 0.001$, RMSEA=0.18, CFI=0.81, TLI=0.75. Standardized factor loadings for the 1-factor scale ranged from 0.53 to 0.82.

Confirmatory analysis of 3-factor scale

The 3-factor model included three dimensions: Perceived Informational Supportive Communication, Perceived Emotional Supportive Communication, and Perceived Instrumental Supportive Communication. The perceived supportive communication scale asked participants about their perceived peer support if they were to discuss the HPV vaccination with peers. The "Perceived Informational Supportive Communication" dimension had two items related to their perception of receiving information from peers about the vaccine and messages about the importance of the vaccine from peers (overall α=0.81; factor range was between 0.80 to 0.84). The second factor, "Perceived Emotional Supportive Communication" comprised of three items related to perceptions of motivating behavior and perceived efforts for emotionally support their vaccination behavior (overall α: 0.86; factor range was between 0.78 to 0.80). The third factor, "Perceived Instrumental Supportive Communication" included items relating to tangible actions that their peer did to support them vaccinating (overall α =0.82, factor range from 0.63 to 0.84). The 3-factor model (without cross loadings or correlated errors) fit the data significantly better than the 1-factor model: χ^2 (24)=56.38, $p<0.001$, RMSEA=0.11, CFI=0.94, TLI=0.92.

Modification indices also showed some potential room for improvement in the model, but changes were only made if they were theoretically justified. A correlated error was allowed between q4 (peer offering to attend doctor's visit) & q8 (doing something to help the person stick to their vaccine schedule) and q9 (peer praising friend for efforts to vaccinate) & q10 (peer showing that they understood importance of vaccination) because a peer offering to attend their peer's doctor's visit is an example of doing something to help a person stick to their vaccine schedule. Likewise, praising their friend for their vaccination efforts is an example of a peer showing that they understood the importance of vaccination. Modification indices also showed that the model would improve if q6 (My peer would drive me to the doctor to get the HPV vaccine) was adjusted, however, we could not justify theoretically eliminating this variable because factor loadings were significant and R^2 were not low enough to warrant dropping items. The final model improved after adding correlated errors and was a good fit with the data: χ^2 (22)=35.83, p=0.03, RMSEA= 0.07, CFI= 0.98, TLI=0.96. These model fit indicators suggest that the model with four dimensions fits reasonably better than approximately 98% of other null models. Final standardized factor analysis results are presented in Figure 3.2 and Table 3.

Perceived Informational Supportive Communication and Perceived Emotional Supportive Communication were highly correlated (r=0.85, SE=0.05). Perceived Emotional Supportive Communication and Perceived Instrumental Supportive Communication were also positively and highly correlated (r=0.72, SE=0.06). Perceived Informational Supportive Communication and Perceived Instrumental Supportive Communication were also positively correlated (r=0.65. SE=0.07).

Relationship between perceived supportive communication and HPV vaccination status

Lastly, we tested a predictive model between the perceived supportive communication latent variables and HPV vaccination status. We found that while the model was a good fit χ^2 (28)=42.13, p=0.04, RMSEA= 0.04, CFI= 0.98, TLI=0.96. The final measurement model was also included in a model to test its performance with other variables. When embedded in a regression model along with covariates, instrumental supportive communication was significant as predictor of vaccination status (B=0.14, β=0.27, p=0.04). Parental communication and doctor communication remained significant in this model as well. The model continued to be a good fit with the data: χ^2(45)=54.80, p=0.15, RMSEA=0.04, CFI= 0.98, TLI=0.97. Final standardized results for the PSC-HPV final model are presented in Figure 3.2 and Table 3.3.

Discussion

The Peer Received Supportive Communication about HPV Vaccination (RSC-HPV) Scale and Peer Perceived Supportive Communication about HPV Vaccination (PSC-HPV) Scale offer efficient measures of supportive communication among peers regarding the HPV vaccine. Our scale best fit the data when it was divided into three factors assessing informational, emotional, and instrumental supportive communication. These supportive communication factors correspond to the types of support often found in the social support literature related to health behavior and peers' involvement in health behavior change (Albrecht & Adelman, 1987; August & Sorkin, 2011; Barrera, 1986; Miller-Ott & Durham, 2011; H. J. Oh et al., 2013). We found that the RSC-HPV scale measures fit the data adequately and the PSC-HPV scale measures were a good fit with the data.

Strengths of this study include the use of a sample of Vietnamese American young adults to better understand the relationship between supportive communication and vaccination status. Supportive communication about health has emerged more prominently in the literature among many disciplines as a subset of social support within the past decade (MacGeorge et al., 2011). In general, there is a lack of supportive communication scale validation studies around health behavior. Furthermore, studies on supportive communication have failed to include ethnic minorities or even attempts at parsing out differences by racial group/ethnicity (Aloia & McTigue, 2019; Goethals et al., 2020; Tian & Solomon, 2020). The lack of research in this area limits our understanding of how theories may apply to ethnic minority populations. Thus, we adapted measures from health-related social support scale (August & Sorkin, 2011) that did capture Vietnamese American adults. This approach helped us to further our understanding of how well-established social support theory can be applied to a construct of supportive communication and a Vietnamese American young adult population for vaccination behavior. The CFA confirmed that the health-related social support theories used in these RSC-HPV and PSC-HPV scales fit the data in a sample of Vietnamese American young adults.

Scale Design Considerations

Upon further study of the latent variables, we learned that the informational supportive communication dimensions had a lower reliability than other dimensions. Furthermore, higher error variance may have been attributed to the fact that there were only two measures included in the informational support dimension. In CFA, at least three indicators per dimension is usually recommended to increase power although having

multiple latent variables with two indicator variables is acceptable (Kline, 2016; Levine, 2005). From a theoretical perspective, informational support measures perhaps were not as strong in contributing to peer supportive communication because young adults expect health information to come from their doctors. In line with our past work, young adults might seek health information from many sources, but doctor recommendation is typically the most trusted source of health information (Gilkey et al., 2016; Goethals et al., 2020; Hopfer et al., 2021).

Relationship between Supportive Communication and HPV Vaccination

Another key finding from this study was that none of the supportive communication latent variables were significantly related to HPV vaccination uptake both with and without controlling for confounding. The non-significant relationship suggests that the peer supportive communication construct may not be strong enough to predict vaccine uptake. Culturally, *asking* for support may be seen as an inconvenience that can break down harmony in peer relationships (H. S. Kim et al., 2008; MacGeorge et al., 2011). Consistent with the literature, provider recommendation is most likely to predict vaccination behavior (Gilkey et al., 2016), followed by parent communication (Gibson et al., 2019; Romo et al., 2011). There could also be other ways to support decision making through peer relationships aside from communication like peer subjective norms that could influence vaccination behavior (Pan et al., 2020; Rimal & Real, 2016). While young adults are likely to vaccinate after receiving multiple messages from providers, parents, and peers, time of recommendation may also impact this relationship.

Among those who did not discuss HPV vaccination with peers (PSC-HPV scale participant)s, we found a significant relationship between perceived instrumental supportive communication and HPV vaccination uptake. We argue that perceived instrumental supportive communication may be related to HPV vaccine uptake because although asking for support might not be culturally acceptable, the perception that others might give financial support, transportation, or take time to visit the doctor with a peer would facilitate support for vaccination behavior (H. S. Kim et al., 2008). Prior research has shown that perceptions of support can be more protective and health-promoting than actually receiving support (Uchino et al., 2011). In Asian culture, *asking* for support might be stigmatized (H. S. Kim et al., 2008; MacGeorge et al., 2011), but perceiving that other people in your network would be open and willing to helping with a large task like providing financial support, attend a doctor's visit, or provide transportation may contribute to normalizing vaccination behavior. Although they did not receive direct communication from their peers, perceived support may be influential in facilitating social norms and vaccine decision making processes (Casillas et al., 2011; Rimal & Real, 2016; Stout et al., 2020).

Future Improvements

Peers have been shown to reinforce HPV-specific vaccine messages and behavior in other minority populations (Casillas et al., 2011; Konstantinou et al., 2021). Thus, we had hypothesized that peers would be more likely to discuss HPV vaccination with each other and support each other in the vaccine decision-making process (H. A. Rawson & Liamputtong, 2010; Trinh & Kim, 2021). While this may be true, discussing HPV vaccination

does not necessarily mean that peers seek support from each other regarding the vaccination. Vietnamese Americans are part of a collectivistic culture, which means they might be less likely or more reluctant to seek social support, creating less opportunities for supportive communication to occur (H. S. Kim et al., 2008; MacGeorge et al., 2011). In future studies, participants should be asked: "Did you seek help or support from your peer when you discussed the HPV vaccination?" to capture support seeking as a precursor for supportive communication rather than if they had ever discussed HPV vaccine with a peer. People who seek support might be more likely to expect supportive communication, which might influence vaccination uptake (Rains et al., 2020). In our survey, we asked participants to answer supportive communication questions based on whether or not they had ever discussed the HPV vaccine with a peer. In future studies, asking participants whether they *actively sought* vaccination support from peers may show a stronger relationship between peer supportive communication and vaccination behavior (MacGeorge et al., 2011). Culture-related HPV vaccination support items may also be considered to measure quality of supportive communication as there may be cultural nuances not captured in the current items.

Limitations

There are several limitations to this study. First, the study may be limited in generalizability as the sample only included Vietnamese Americans and was drawn from a convenient sample (Etikan et al., 2015; Jager et al., 2017). Findings may also only represent a subgroup of Vietnamese American young adults whose parents had not vaccinated them during adolescence as the eligibility criteria only included young adults who were either

vaccinated as adults or were unvaccinated. Though we used cross-sectional data among a specific group of Vietnamese Americans in the U.S. and suggests an acceptable fit to the data, the study points to a direction in which we might study supportive communication for health behaviors like vaccination uptake. Despite this, there is merit in studying the Vietnamese American subpopulation to better understand how peer support for health behaviors is offered across cultures (Korngiebel et al., 2015).

Furthermore, the sample size for each scale was less than 200. SEM models typically recommend a sample size >200, but the construct dimensionality added power to the study despite small sample sizes for each scale (Kline, 2016). Additionally, many more women participated in the survey (70%) compared to men (30%), which may introduce gender bias and social desirability bias into the study especially since women tend to communicate more about health issues than men (Gustafsod, 1998; Krumpal, 2013). The format of the study (online survey) may have also have introduced selection bias into the study, especially because we were purposely recruiting based on vaccination status (Bethlehem, 2010). The results are also subject to recall bias because it asks participants to recall a specific conversation about HPV that they have had with their peers and whether supportive communication moments occurred (Althubaiti, 2016). Future studies would benefit by including more diverse samples, age groups, and/or clinical populations to strengthen understanding of how peers can provide supportive communication influence vaccine behavior in their networks.

Conclusion

In this chapter, we offer a way in which researchers can measure peer supportive communication about HPV vaccination using health-related social support dimensions. We can conclude that the final model adequately fits the data, and is a starting point for measuring supportive communication though it can be improved with additional questions and/or additional theoretical backing around peer social support, culture, and norms. Finally, this scale can also be adapted to understand supportive communication for other types of vaccination.

Tables and Figures

Table 3.1 Sample Characteristics

Variables	Full Sample		Supportive Communication Scale		Perceived Supportive Communication Scale	
	n=260		n=136		n=124	
Gender						
Female	182	(70%)	98	(72%)	84	(68%)
Male	78	(30%)	38	(28%)	40	(32%)
Age						
18-23	133	(51%)	59	(43%)	74	(60%)
24-29	78	(30%)	48	(35%)	30	(24%)
30-35	36	(14%)	22	(16%)	14	(11%)
36-41	9	(3%)	4	(3%)	5	(4%)
42-45	2	(1%)	1	(1%)	1	(1%)
Vaccination Status						
Yes	167	(64%)	104	(76%)	63	(51%)
No	93	(36%)	32	(24%)	61	(49%)
Health Insurance						
Yes	249	(96%)	133	(98%)	116	(94%)
No	11	(4%)	3	(2%)	8	(6%)
Doctor HPV Vaccine Recommendation						
Yes	174	(67%)	106	(78%)	68	(55%)
No	86	(33%)	30	(22%)	56	(45%)
Parent HPV Vaccine Communication						
Yes	96	(37%)	73	(54%)	23	(19%)
No	164	(63%)	63	(46%)	101	(81%)

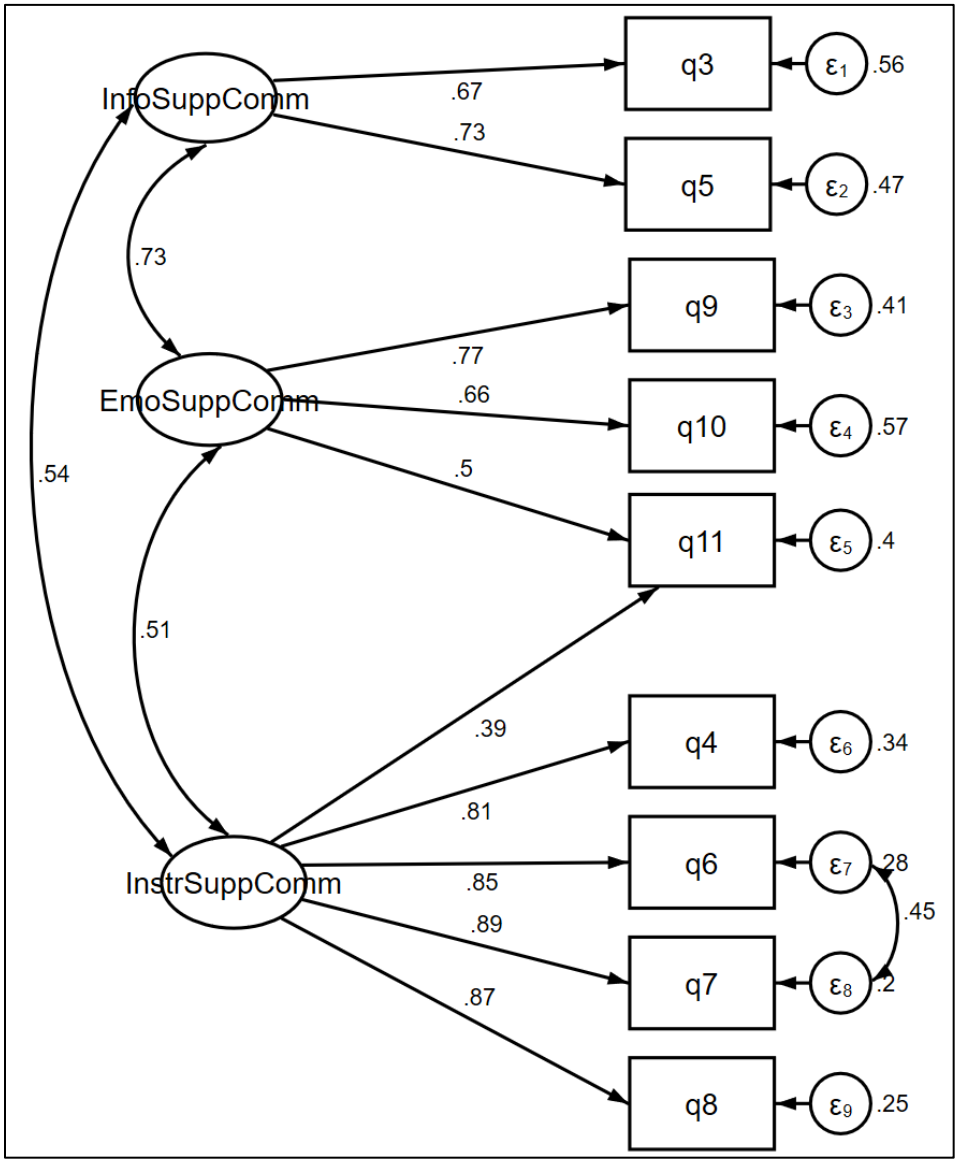

Figure 3.1 Peer Received Supportive Communication about HPV (RSC-HPV) Scale Final Model

Table 3.2 Peer Received Supportive Communication about HPV Vaccine (RSC-HPV) Scale Final Model Standardized and Unstandardized Factor Loadings

Observed Variable	Latent Construct	β	*B*	*SE*
q3: My peer gave me information about the HPV vaccine.	Informational SC	0.67**	1	
q5: My peer discussed with me importance of getting the HPV vaccine.	Informational SC	0.73**	1.21	0.23
q9: My peer praised me for my efforts to go get vaccinated.	Emotional SC	0.77**	1	
q10: My peer showed that they understood the importance of me getting vaccinated.	Emotional SC	0.66**	0.83	0.13
q11: My peer motivated me to get vaccinated even when I did not want to go.	Emotional SC, Instrumental SC	.5**, 0.40**	0.63, 0.43	0.14, 0.10
q4: My peer offered to attend the doctor's visit with me.	Instrumental SC	0.81**	1	
q6: My peer drove me to the doctor to get the HPV vaccine.	Instrumental SC	0.85**	1.02	0.09
q7: My peer offered to help pay for the vaccine for me.	Instrumental SC	0.89**	1.04	0.09
q8: My peer did something to help me stick to my vaccine schedule.	Instrumental SC	0.87**	1.05	0.09

significant at $p<0.001$ level, **β: Standardized beta coefficient, ***B****:* unstandardized beta coefficient

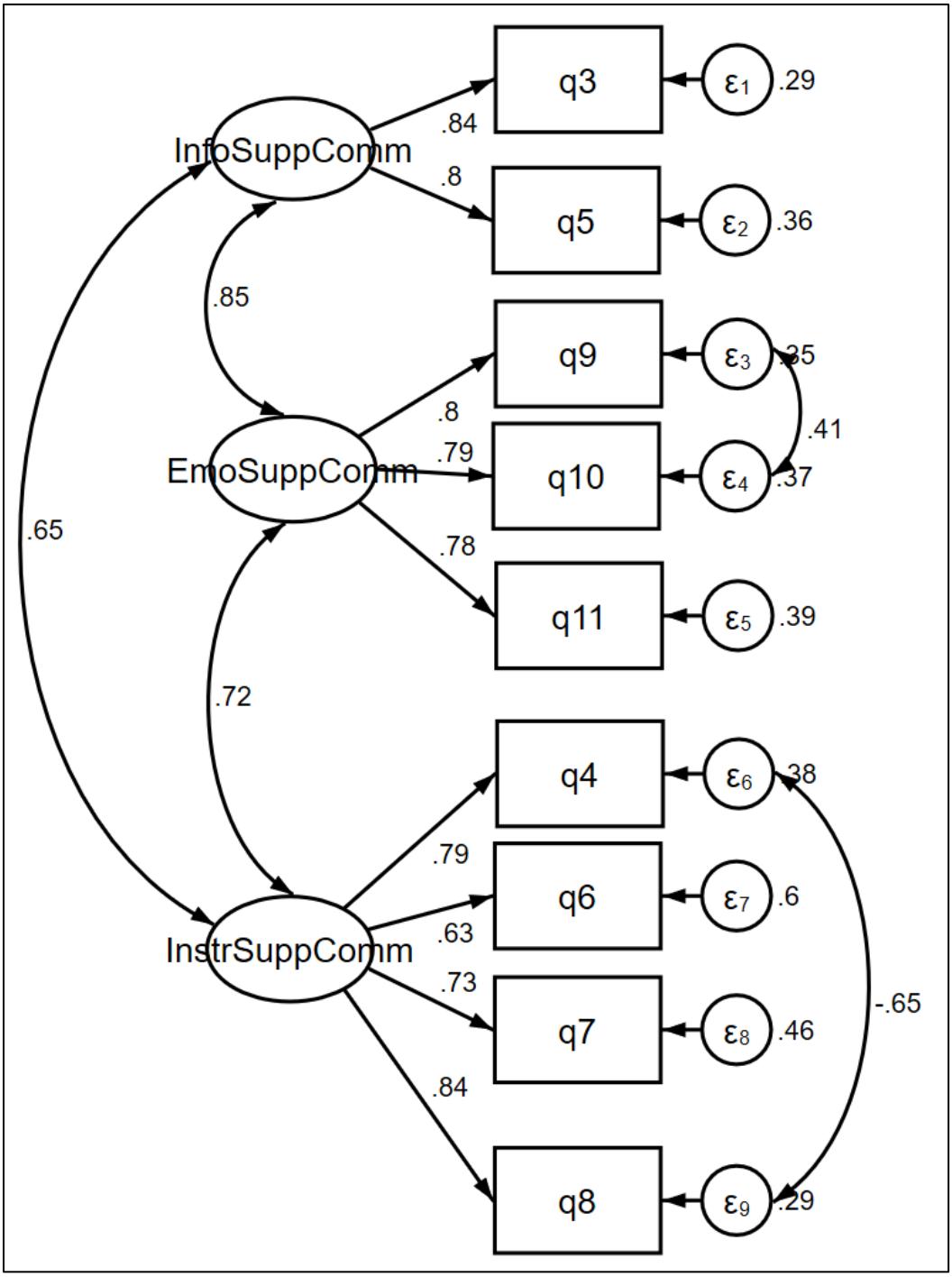

Figure 3.2 Peer Perceived Supportive Communication about HPV Scale (PSC-HPV) Final Model

Table 3.3 Peer Perceived Supportive Communication about HPV Vaccine (PSC-HPV) Scale Final Model Standardized and Unstandardized Factor Loadings

Observed Variable	Latent Construct	β	*B*	SE
q3: My peer would give me information about the HPV vaccine.	Informational SC	0.84**	1	
q5: My peer would discuss with me importance of getting the HPV vaccine.	Informational SC	0.80**	0.92	0.10
q9: My peer would praise me for my efforts to go get vaccinated.	Emotional SC	0.80**	1	
q10: My peer would show that they understood the importance of me getting vaccinated.	Emotional SC	0.79 **	1.03	0.09
q11: My peer would motivate me to get vaccinated even when I did not want to go.	Emotional SC	0.78**	1.08	
q4: My peer would offer to attend the doctor's visit with me.	Instrumental SC	0.79**	1	
q6: My peer would drive me to the doctor to get the HPV vaccine.	Instrumental SC	0.63**	0.76	0.12
q7: My peer would offer to help pay for the vaccine for me.	Instrumental SC	0.73**	0.92	0.13
q8: My peer would do something to help me stick to my vaccine schedule.	Instrumental SC	0.84**	1.03	0.14

significant at $p<0.001$ level, **β: Standardized beta coefficient, ***B:*** unstandardized beta coefficient

CHAPTER 4: GENDER DIFFERENCES IN PEER SEXUAL COMMUNICATION, HPV VACCINE COMMUNICATION, AND HPV VACCINE UPTAKE AMONG VIETNAMESE AMERICAN YOUNG ADULTS

Background: The catch-up HPV vaccine is recommended for young adult men and women; however, however, HPV vaccine disparities exist by gender and ethnicity. Differences in peer communication may explain differences in vaccination status among Vietnamese American young adults. **Purpose:** The purpose of this study was to a)assess gender differences in vaccination status, b) investigate gender differences in supportive communication and sexual communication, c) test whether differences in communication explain differences in vaccination by gender. **Methods:** Online surveys were administered among Vietnamese American young adults (N=260) who self-identified as Vietnamese American, were between ages 18-45, were vaccinated as a young adult (age 18+), or were currently unvaccinated. **Results:** In our sample, we found no differences in vaccination status by gender. We also found that women received less supportive communication overall compared to men, specifically less instrumental supportive communication. Among participants who had discussed HPV vaccine with their peers, we found that informational supportive communication and higher frequency of discussing "pleasure" topics were associated with vaccination status. Among those who had not discussed HPV vaccination with peers, findings indicate that women discuss more frequently topics related to "sensitive" and "values." Perceived instrumental supportive communication and less discussion of "risk" topics were also related to vaccination status. Communication variables did not explain gender differences in vaccination status. **Discussion:** The vaccination gap between men and women may be slowly closing. Participants who discussed HPV vaccine with peers compared to those who did not may be culturally different from each other. Future studies should delve deeper in understanding the relationship between sexual activity, sexual conservatism/ values, cultural influences and vaccination status.

Background

The Advisory Committee on Immunization Practices (ACIP) currently recommends the HPV vaccination for adolescents, but also a catch-up vaccination as primary prevention for young adult men and women up to age 26 (Hung et al., 2019; Meites, 2019). Women and men can also receive the vaccine up to age 45 if requested, but ACIP recommends shared decision-making between clinicians and patients to decide whether to vaccinate between age 27-45 (Meites, 2019; Oshman & Davis, 2020). While the vaccine is available for both men and women, HPV vaccine disparities exist by gender. Young adult men are less likely to receive the HPV vaccination compared to women due to the "feminization" of the vaccine, which has historically been marketed toward women as the ones who bear the burden of disease (Daley et al., 2017). In 2018, among young adults age 18-26, 35.3% of women in the U.S. received the recommended number of doses compared to 9% of men in the U.S (Boersma & Black, 2020). Nationwide, there is a significant gender gap in vaccination uptake where men have lower vaccination rates compared to women (Boersma & Black, 2020; Hung et al., 2019).

In addition to gender disparities, there are ethnic disparities in vaccination as well, particularly among Asian subgroups. Each Asian subgroup has its own unique culture, language, histories, all of which are important social determinants of health to consider when studying vaccine disparities (Agénor et al., 2020; Becerra et al., 2020; Korngiebel et al., 2015). Recent studies have found that older men who identify as Asian American are less likely to vaccinate compared to their counterparts (LaJoie et al., 2018; Quinn & Lewin, 2019; Tung et al., 2019). The first study to explore HPV knowledge and attitudes among

Chinese college students in the U.S. found that only 14.5% of men had received the HPV vaccination compared to 55.1% of women in their sample (Tung et al., 2019). Another study that focused on Asian subgroups found that Vietnamese men reported the lowest knowledge/ awareness about cervical cancer, cervical cancer screening, or HPV (50%) compared to Koreans (63%) and Filipinos (100%) (Gor et al., 2011). There has been a lack of research among men regarding the HPV vaccine. Little is known about how young adult men perceive the vaccination and how they make the decision to vaccinate if at all. Thus, the current study focuses on gender differences in sexual communication, HPV vaccine communication, and vaccine uptake among Vietnamese American young adults.

Gender Differences in Sexual Health and HPV Vaccine Communication

Sexual health is an uncomfortable topic in most cultures, but especially so in Asian culture. Family silence is typical of sexual health Asian families because the culture emphasizes conservative values and propriety (M. Kim et al., 2017; J. L. Kim & Ward, 2007; Okazaki, 2002; Hopfer et al., 2017). Prior studies have shown that Asian American women have many cultural barriers to cancer prevention behaviors including communicating with their mothers about sexual and gynecological problems, less openness about sexuality, and less prevention orientation (Okazaki, 2002; H. A. Rawson & Liamputtong, 2010; H. Rawson & Liamputtong, 2009; Tang et al., 1999). Asian culture, religious beliefs, and lack of quality parent-adolescent communication reflect more conservative attitudes and behaviors among young adult women (Hopfer et al., 2017; Okazaki, 2002; H. Rawson & Liamputtong, 2009). As a result, they are less likely to initiate conversations with their doctors or seek

sexual health-related cancer prevention during adulthood (Gibson et al., 2019; Okazaki, 2002; Romo et al., 2011).

Recent studies indicate that Asian American young adults are often raised in a conservative family environment, but engage with more sexually open/ permissive peers when seeking sexual health information (Trinh & Kim, 2021). While Asian American young adults are less likely to receive sexual health education from their parents, they do receive sexual information from other sources such as school settings, their doctors, and peers (Rawson & Liamputtong, 2010; Lee et al., 2013; Hopfer et al., 2017; Gibson et al., 2019). The literature shows that Asian American young adults (both men and women) frequently discuss sexual topics with their peers rather than their parents (Trinh et al., 2014). In addition, the topics of conversation are heavily gendered. For example, Asian American women are more likely to receive messages promoting abstinence, traditional sex roles, and sex as important to a relationship while men are more likely to receive messages that are more accepting of casual sex, more sexual partners, and sexual experience (Trinh et al., 2014).

Gender Role Theory

Gender Role Theory can help explain the differences between how men and women communicate about health in the peer context. This theory suggests that men and women tend to occupy socially ascribed roles and tend to be judged for how they ought to behave. Consequently, men and women will develop skills and attitudes around the ascribed roles (Shimanoff, 2009). Prior research has identified gender socialization to be the main reason why women tend to seek health information while men avoid the information until there is

a diagnosis (Manierre, 2015; Tabaac, 2016). One explanation is that women are socialized to tend to their bodies more often than men, which indicates a gendered reactivity to illness (Gustafsod, 1998; Manierre, 2015). Another explanation is that women are more likely to perceive their risk for getting sick (Gustafsod, 1998). On the other hand, men are also likely to exhibit or conform to masculine norms, which leads to less perception of risk and less help-seeking behavior when it comes to cancer prevention (Cameron & Bernardes, 1998; Gustafsod, 1998). In relating gender role to the HPV vaccine, the responsibility of prevention behavior has leaned toward the role of the woman despite the fact that men contribute significantly to cervical cancer. Thus, gender roles can lead to disparities in communication, health information-seeking behavior, and prevention behavior.

Gendered sexual communication may be related to HPV vaccine disparities among men and women. For the HPV vaccine, vaccine policy and communication campaigns have over-emphasized reducing cervical cancer and disregarded the fact that HPV is also prevalent in men (Daley et al., 2017). Developed initially for women and only later approved for men, the historical framing of HPV as a woman's disease and the vaccine as a woman's responsibility has been linked to the "feminization" of HPV and the HPV vaccine (Daley et al., 2017). All of this has led to low knowledge, lack of norms, and disparities in vaccination uptake particularly among men (Daley et al., 2017). Further exacerbating these disparities, much of the research on HPV vaccination has focused on understanding vaccination predictors and outcomes among women, and less on men (Vu et al., 2020). Given that HPV and the vaccine are related to sexual topics, which may be discussed in a peer conversation, young adult peers may be in a unique position to encourage and

normalize the vaccine with other peers. Currently, there are only two HPV studies that include peers as a potential sphere of influence among Asian American women (H. Y. Lee & Lee, 2017; Zhao et al., 2014). There still remains a gap in knowledge about the relationship between peer support, communication, and HPV vaccination among young adults.

Peer Supportive Communication about HPV Vaccination

Peer communication from family and friends about HPV vaccination among women has been found to influence the perception of vaccine efficacy and uptake (Konstantinou et al., 2021; Harper et al., 2014; Casillas et al., 2011). Some studies suggest that supportive messages from peers about HPV vaccine can influence decision making around the vaccine among women (Hopfer & Clippard, 2011; Miller-Ott & Durham, 2011). Research suggests that Asian American young adult women are more likely to receive HPV education from sources such as from doctors, school, or peers (Hopfer et al., 2017; Lee et al., 2013). While peer influence has been found to be influential on vaccination outcomes, it is not clear in the literature whether Vietnamese American young adult women and men communicate with peers about sexual health-relevant information like the HPV vaccine that could support or discourage HPV vaccination uptake in adulthood.

Supportive communication is an emerging subset of social support that can be used to understand peer support for vaccine behavior. Supportive communication in the communication perspective is defined as both verbal and non-verbal communication that provides assistance to others needing aid (MacGeorge et al., 2011). Supportive communication from people in a peer network who care about the individual can encourage or persuade people to participate in prevention behavior (Lewis & Rook, 1999;

Pauley & Hesse, 2009). Supportive communication differs from the sociological and psychological perspective of social support in that there is a central role in *communication*. A feature of supportive communication is that there is purpose in the act of communication to improve the health and well-being of another person. Another unique attribute of this communication perspective is its focus on the peers' responses to their peers' perceived needs. Furthermore, the quality of support and communication are the main focus rather than the quantity of those constructs. Specifically looking at the relationship between supportive communication and health, there is much evidence that shows that supportive communication promotes health by a) providing health-relevant information, b) motivating healthy behavior, c) promoting self-esteem and self-care, and d) reducing emotional distress (Lewis & Rook, 1999; MacGeorge et al., 2011). Peers may provide supportive communication via informational support (e.g., giving advice, guidance, or useful information about the HPV vaccination verbally or by sending information), emotional support (e.g., offering to attend a doctor's visit with the individual or expressing verbal encouragement to obtain the HPV vaccination), and instrumental support (e.g., provision of financial assistance to offset the cost of the vaccination if needed or providing transportation to get vaccinated).

The current study seeks to understand how peer supportive communication and sexual communication can potentially influence an individual's health including utilization of health care services, compliance with vaccine recommendations, and health-promoting or compromising behaviors decision to seek preventative care (Vangelisti, 2004). This study is significant because results may help with identifying how gender can impact

communication and vaccination behavior among Vietnamese American young adults. Figure 4.1 shows the conceptual model testing the mediation of communication variables between gender and vaccination status.

Research Questions and Hypotheses

RQ 1: How does supportive peer communication about HPV vaccination differ by gender?

- **H1:** Young adult women will have higher levels of supportive communication about HPV compared to young adult men.

RQ 2: How does peer sexual communication frequency differ by gender?

- **H2:** Young adult women will have higher frequency of sexual communication compared to young adult men.

RQ 3: How does HPV vaccination differ by gender?

- **H3:** Young adult women will have a higher likelihood of vaccinating compared to young adult men.

RQ 4: Does supportive peer communication about HPV vaccination explain differences in HPV vaccination by gender among Vietnamese American young adults?

- **H4:** Supportive peer communication about HPV vaccination will partially explain differences in HPV vaccination by gender among Vietnamese American young adults.

RQ 5: Does peer sexual communication frequency explain differences in HPV vaccination by gender among Vietnamese American young adults?

- **H5**: Peer sexual communication frequency will partially explain differences by gender among Vietnamese American young adults.

Methods

Data Collection

A cross-sectional online survey was administered via Qualtrics. Participants were asked to respond to a supportive peer communication scale about HPV vaccination, frequency of sexual communication scale, and HPV vaccination uptake questions.

Participants & Recruitment

Young adults were eligible to participate if they identified as Vietnamese American, received the HPV vaccination as an adult between the age of 18-26, *or* were unvaccinated and currently between the age of 18-26. Those who knowingly received the vaccination as an adolescent (before the age of 18) were not eligible to participate. Eligibility screening questions were built into the survey to eliminate any ineligible participants. Those who completed the survey were given a $5 Amazon.com gift card. They were also given an additional $5 gift card to Starbucks if they submitted verification of their vaccination status such as a de-identified image of their vaccination record card or online health portal records.

Sampling

Purposive and snowball sampling were used to reach the Vietnamese American young adults. Participants were recruited from various locations including academic departmental listservs and various club organizations at multiple campuses in Southern California (e.g., UC Irvine, UC Los Angeles, CSU Fullerton, CSU Long Beach, University of

Southern California, Orange Coast College). Furthermore, local Vietnamese serving community-based organizations such as the Vietnamese American Cancer Foundation, VietRainbowOC, and religious groups posted on their private social media groups and/or sent out the advertisement via email.

Since the survey was online, we connected with national organizations as well. For example, the National Vietnamese Student Association and Vietnamese Student Association (VSA) groups across the U.S. advertised the study opportunity to their members. Social media channels were also used to recruit participants social media channels including large Facebook and Instagram pages with a large number of Vietnamese Americans. The survey advertisement was also posted on Facebook groups such as Subtle Viet Traits with 111,000 followers and Modern Asian Moms with 11,000 followers. On Instagram, the survey was posted on the groups GrowinupViet with 132,000 followers, and VietRainbowOC with 1,300 followers. A public research Instagram account for the study was also published to help potential participants easily contact the researcher in case there were questions about the study. Finally, the lead researcher used personal contacts to recruit participants and encourage social network dissemination as well.

Consenting Procedures Participants were given a study information sheet and asked to give their consent to participate in the survey in order to move to the next part of the

survey. If participants selected, “no,” they were redirected to the end of the survey indicating they were not eligible to participate.

Survey Instrument & Measures

A 72-item online survey instrument (Appendix A: Survey Questions) was administered to participants using Qualtrics. The survey included questions about (a) received and perceived supportive peer communication about HPV vaccine, (b) HPV vaccine outcomes, (c) peer sexual communication frequency. Demographic variables included age, gender, parent communication about HPV vaccine, provider HPV vaccine recommendation, health insurance, HPV vaccine knowledge, English language proficiency, and religiosity.

Supportive peer communication about HPV vaccination

Supportive peer communication measures were adapted from prior health-related social support measures used in diabetes management studies (D. H. Sorkin et al., 2018; D. H. Sorkin, 2020) and health-related social support on social networking sites (Oh et al., 2013). These items sought to address 3 dimensions of social support: informational, emotional, and instrumental support and were validated using a confirmatory factor analysis approach prior to survey dissemination. Responses were rated using a 5-point Likert scale ranging from 1= Strongly disagree to 5= Strongly agree. Participants were asked if they had ever discussed HPV vaccination with their peers. If they answered “yes,” they were asked to participate in the received supportive communication about HPV vaccination (RSC-HPV) scale. If they answered “no,” they were directed to a separate set of questions that asked them to respond to a perceived supportive peer communication about

the HPV (PSC-HPV) vaccination scale. Questions were similar to the supportive communication questions but were centered on whether they thought their peers would engage in supportive communication. The RSC-HPV scale and PSC-HPV scale questions are listed in Table 4.1.

Peer sexual communication frequency

To assess the frequency of communication, an adapted version of the 20-item Family Sexual Communication Scale (FSCS) (Isaacs, 2012) was used to assess the frequency of peer sexual communication. The questions included topics related to sexual risk, values, pleasure, and sensitive topics. Sexual communication topics and response options for the FSCS measure are presented in Table 4.1.

HPV vaccination

HPV vaccine behavior was measured as a self-report dichotomous variable: Have you received the HPV vaccination? The responses will be yes, no, and "I don't know." Participants were also given the option to verify their vaccination or non-vaccination status by uploading a de-identified photo as proof of vaccination status. Approximately 20% of participants uploaded their vaccination cards to verify their vaccination status.

Gender

Gender was measured using three options including: "Male," "Female," Other." The "Other" category was open-ended so that participants can write in their preferred gender if they do not identify as "Male" (coded as 0) or "Female" (coded as 1).

Control Variables

Control variables included age (number of years), parent communication about HPV vaccination (yes/no), provider HPV vaccine communication/recommendation (yes/no), health insurance status (yes/no), HPV vaccine knowledge (7 questions scored from 0 to 35), and religiosity (scale from 0 to 10).

Data Analysis

STATA 16.0 was used to analyze the data. After cleaning and recoding data, univariate descriptive statistics including frequencies, means, and standardized deviations were used to summarize all the responses. Shapiro-Wilk tests (p<0.001) indicated that the data were non-normal. We then conducted bivariate analyses to test for differences by gender using Pearson's chi-square test for independence and Mann-Whitney U-test (non-parametric test). Structural equation modeling (SEM) techniques were used and are considered advantageous to other traditional methods because they can take into account measurement error (Kline, 2016). Since less than 5% of responses were missing, those missing observations were dropped (Tabachnick et al., 2019). Full information maximum likelihood estimation was used to accommodate missingness and non-normal data.

Confirmatory factor analyses were conducted to assess a measurement model of latent mediating variables (peer supportive communication about the HPV vaccine, peer perceived supportive communication about the HPV vaccine, and peer sexual communication frequency). Then, SEM multiple-group comparison techniques were used to test H1 and H2—whether peer supportive communication, peer perceived supportive communication and peer sexual communication frequency differed by gender (Acock, 2013). Factor scores were derived using the "predict" command in STATA that creates

factor scores for latent variables that are equivalent to regression scoring (Devlieger & Rosseel, 2017; DiStefano et al., 2009). Then, path analysis was used to assess relationships between communication variables and vaccination status (Devlieger & Rosseel, 2017).

Unstandardized solutions are reported for multiple-group comparisons as the unstandardized parameters reflect the form of the relationship, while standardized solutions may confound unstandardized comparisons by adding the relative variances of the variables (Acock, 2013). The most restrictive model that still provides a good fit was selected as the best fitting model to compare means. For all other models, standardized coefficients are reported. Models were compared using multiple data-model fit information, such as Chi-square (non-significant value = good fit), Comparative Fit Index (CFI, >0.90= adequate fit and >0.95 = good fit), Tucker-Lewis Index (TLI, >0.90 = adequate fit, > 0.95 = good fit), Root mean square error of approximation (RMSEA, <0.08 = adequate fit and <0.05 good fit) (Acock, 2013). We considered model adjustments if modification indices were substantial and theoretically meaningful.

Results

Sample Characteristics

The majority of the participants identified as female (70%). The average age was 24 (*SD*=5.36) years of age. The majority of participants reported being vaccinated, having health insurance, receiving an HPV vaccine recommendation from their doctor, not discussing HPV vaccination with their parents, and having discussed HPV vaccination with their peers. Over half of the participants (52%) reported discussing HPV vaccination with their peers compared to 48% of participants who did not discuss HPV vaccination with

their peers. The majority of participants reported low to medium religiosity with women being less religious than men. The majority of the sample (98%) spoke English very well. This sample was seemingly representative of national demographics. For example, 92% of U.S. born VA young adults report having health insurance and 90% have high English language profiency (Harjanto & Batalova, 2021; Pew Research Center, 2021).

Participants in this sample also reported being most comfortable discussing sexual health topics with their friends (40%), followed by partners/spouses (35%), peer family members such as siblings and cousins (10%). The remainder either felt most comfortable discussing with older family members such as mothers, fathers, aunts, uncles (5%), or not discussing sexual health at all with anyone (9%). Table 4.2 shows sample characteristics and significance tests assessing gender differences for demographic and communication variables.

Bivariate Associations by Gender

Gender and HPV Vaccination

In our sample of Vietnamese American young adult men and women, results showed no significant differences in vaccination status by gender. Although findings were not significant, more women than men were vaccinated (68% vs. 42%). Although this difference was not statistically significant based $p<0.05$ threshold, ($\chi^2=2.97$, $p=0.08$), these results points to a potential difference in gender and vaccination status in the expected direction we had hypothesized in RQ 3. Furthermore, our sample results showed there were no significant gender differences in HPV vaccine knowledge (z=-1.60, $p<0.11$).

Gender and Communication Variables

Gender differences by provider recommendation, parent communication, and peer communication about HPV vaccination were also examined. We found that men received fewer doctor recommendations relative to women (59% vs. 70%). Although the observed difference was not significant, it was in the expected direction and approached significance (χ^2=3.18, p= 0.08). Seventy percent of women reported receiving a provider recommendation compared to 59% of men. Interestingly, both men and women reported parent communication at similar frequencies where 37% of men and women reported discussing HPV vaccination with their parents and 63% reported not discussing HPV vaccination with their parents. Participants also reported similar frequencies for peer communication about the HPV vaccination (women: 54% vs. men: 51%).

Measurement Models and Multiple Group Comparisons

Peer Received Supportive Communication about HPV Vaccination (RSC-HPV)

The supportive communication about the HPV vaccination scale included 3-factors identified from the literature: Informational, Emotional, and Instrumental Supportive Communication. The item "My peer helped motivate me to get vaccinated even when I did not want to go" cross loaded on emotional supportive communication and instrumental supportive communication dimensions given that motivating a peer to vaccinate may come in the form of emotional support or instrumental actions. The final model fit adequately fit the data: χ^2 (22)=50.93, p<0.001, RMSEA= 0.08, CFI= 0.96, TLI=0.94. Figure 4.2 Peer Received Supportive Communication about HPV (RSC-HPV) Scale Final Model shows a visual display of the RSC-HPV final model.

The model fit the structure of the data better for men χ^2 (22)= 25.51, p=0.27 that for women χ^2 (22)=65.01, p<0.001. To assess mean differences between men and women, we restricted the model to equal loadings and intercepts. We found no significant difference in means between men and women for supportive communication based on a p<0.05 threshold. The beta coefficients for women's supportive communication variables were all negative, suggesting that women overall receive less supportive communication about HPV vaccination than men. The mean for Instrumental Supportive Communication approached significance (B=-0.33, p=0.06), which potentially suggests women may receive less instrumental supportive communication compared to men. This contradicts our hypothesis that women receive more supportive communication compared to men. These results contradict Hypothesis #1—women do not receive more peer supportive communication about the HPV vaccine compared to men.

Peer Perceived Supportive Communication about HPV Vaccination (PSC-HPV)

The perceived supportive communication scale included similar dimensions. The 3-factor model included three dimensions identified from the literature: Perceived Informational, Emotional, Instrumental Supportive Communication. Correlated errors were allowed between "peer offering to attend a doctor's visit" and "doing something to help the person stick to their vaccine schedule" as well as "peer praising friend for efforts to vaccinate" and "peer showing that they understood the importance of vaccination". The final model yielded a good fit with the data: χ^2 (22)=35.83, p=0.03, RMSEA= 0.07, CFI= 0.98, TLI=0.96. Final standardized factor analysis results for the PSC-HPV scale are presented in Figure 4.3.

The model without constraints fit better for women χ^2 (22)= 30.93, p=0.10 compared to men χ^2 (22)=41.96, p=0.006. Upon testing for invariances between men and women, we found no mean differences in perceived informational, emotional, and instrumental supportive communication by gender. These results also do not provide support for Hypothesis #1. Women do not receive more perceived HPV vaccine communication compared to men.

Peer Sexual Communication Frequency (SCF)

The peer sexual communication frequency scale was a 4-factor model that included dimensions "Risk", "Values", "Pleasure" and "Sensitive Topics" previously identified in an exploratory factor analysis (Isaacs, 2012). We allowed several correlated errors because there were items that were closely related to each other. The CFA indicated that resisting sexual pleasure(scommfreq8) and the enjoyment/fun/pleasure of sexual relationships (scommfreq11) had small and non-significant loadings on the "Values" variable and were dropped from that variable. Thus, the final model included 19-items. The final model was a good fit with the structure of the data: χ^2 (140)=247.42, p=0.000, RMSEA= 0.05, CFI= 0.96 TLI=0.96 (Figure 4.4).

Model fit for this SCF measure was the same for men and women. Using the most restrictive model that still provided an adequate fit (equal loadings, variances, and intercepts), we found that there was no significant difference between male and women between frequency of communication around risk, values, pleasure, and sensitive at the p=0.05 threshold. Despite this, the p-values for the means of "Values" (p=0.06) and "Sensitive" (p=0.09) suggest significance. This may indicate that women discuss more

frequently topics related to values and sensitive topics compared to men. Table 3 shows a summary of mean differences for all measurement models and model fit statistics.

Factor Score Path Analysis: Communication and Vaccination Status

Focal relationship: Gender and vaccination status

Bivariate analyses indicated a small, positive relationship between gender and vaccination status, but was not significant at the $p<0.05$ threshold. In this particular sample, there were no significant differences in gender and vaccination status, which show that that Hypothesis #3 was not confirmed, but does point in the direction of significance ($p=0.08$). In SEM, the lack of a significant bivariate relationship between the variables of focus does not necessary mean there is no mediation occurring (Acock, 2013; Kline, 2016). Thus, we proceeded with estimating the hypothesized mediating models (supportive communication and sexual communication frequency).

Factors directly affecting HPV vaccination status

Path analysis results showed that for all models, gender and vaccination status were not significantly associated based on a $p<0.05$ threshold (B=0.12, β=0.12, $p=0.08$). Individual mediator models showed that among those who had discussed HPV vaccination with peers (RSC-HPV participants), informational (B= 0.17, β =0.19, $p= 0.03$) and emotional (B=0.16, β=0.19, $p=0.04$) supportive communication about HPV vaccination were significantly associated with HPV vaccination status, but did not differ by gender. When including all supportive communication variables to the model and controlling for covariates (Figure 4.5), only doctor recommendation (B= 0.55, β = 0.55, $p<0.001$) and

health insurance (B= 0.65, β = 0.24, p<0.001) remained a significant predictor of HPV vaccination status. Informational supportive communication was the only communication variable that approached significance (B= 0.18, β = 0.24, p=0.08). For all models, instrumental supportive communication was not significantly associated with HPV vaccination status.

Among those who had not discussed the HPV vaccination with peers (PSC-HPV participants), perceived informational supportive communication (B=0.15, β=0.27, p<0.001), emotional supportive communication (B=0.17, β=0.26, p<0.001) , instrumental supportive communication (B=0.14, β=0 .27, p<0.001) were all individually associated with HPV vaccination status. When adding all perceived supportive communication variables to the model with covariates (Figure 4.6), only perceived instrumental supportive communication (B=0.13, β=0.24, p=0.04) remained significant along with provider recommendation (B=0.40, β = 0.40, p<0.001) and parent communication about HPV vaccination (B=0.31, β=0.24, p<0.01). There were no significant differences by gender for this path analysis.

Furthermore, when testing peer sexual communication frequency and HPV vaccination status, we found that risk (B= 0.04, β=0.05, p=0.40), values (B=0.07, β=0.09, p=0.14), pleasure (B= 0.09, β=0.10, p= 0.09), sensitive (B= 0.07, β=0.05, p= 0.08) topics were not significantly associated with HPV vaccination. Only frequency of topics related to "sensitive" and "pleasure" topics for women seemed to be potentially different from men (though results not significant based on p<0.05 threshold). When testing all sexual communication topics and controlling for covariates (Figure 4.7), we found that higher

frequency of communication around "pleasure" topics (B = 0.26, β =0.31, p=0.04) was significantly related with HPV vaccination status along with provider recommendation (B=0.51, β =0.50, p<0.001) and parent communication (B = 0.12, β =0.12, p=0.03). When testing for group differences, we found that there were no significant differences by gender.

Lastly, we tested supportive communication and perceived supportive communication with sexual communication frequency in a full model. We found that among those who discussed HPV vaccine with their peers (RSC-HPV and SCF), informational support (B=0.21, β =0.28, p=0.04) and higher frequency of discussing "pleasure" topics (B=0.36, β =0.46, p=0.02) were significantly related to HPV vaccination status. Figure 4.8 shows a visual depiction of the pathways tested. Among those who had not discussed HPV vaccine with their peers (PSC-HPV and SCF), instrumental support (B=0.14, β =0.25, p=0.03) and less discussion of "risk" topics (B=-0.35, β=-0.49, p=0.02) were associated with HPV vaccination uptake. In the PSC-HPV and SCF model, we also found that women were more likely to discuss "sensitive" and "values" topics than men. Figure 4.9 shows the results of the path analysis.

Factors indirectly affecting HPV vaccination status

Our original hypotheses #4 and #5 had suggested that differences in supportive communication and sexual communication frequency would partially explain differences in HPV vaccination status, however, we were unable to confirm H4 and H5 hypotheses. We can conclude that while there may be some differences in gender by supportive communication and sexual communication frequency, the variables do not mediate the relationship between gender and vaccination status. This means there are other possible

communication variables outside of peer supportive communication and peer sexual communication frequency that explain gender differences in vaccination status.

Discussion

The purpose of this study was to assess gender differences in peer supportive communication about the HPV vaccination and sexual communication frequency. Furthermore, we examined differences in HPV vaccination status among a sample of Vietnamese American young adult living in the U.S. We had hypothesized that differences in peer communication about the HPV vaccine and sexual communication frequency would partially explain the current differences in vaccination status among men and female. This study showed that Vietnamese American young adult men and women may equally receive little to no communication from their parents, some communication from their peers, and perhaps differential recommendations from their providers. As this study focused on peer communication, we found that while there are some potential gender differences in peer communication about HPV and positive relationships between peer communication and vaccination status. In this study, peer communication does not explain differences in vaccination status among Vietnamese American young adults. Despite this, we still found support for the relationship between peer communication and HPV vaccination behavior. Our study is a novel contribution to the field because there has been limited research on the role of peers in relationship to the HPV vaccination and gender differences of vaccination status among Asian Americans groups. This is the first study to our knowledge that specifically focuses on understanding the role of peers' communication and includes a

sample of men when past studies have focused solely on parent and provider communication among women.

Gender and Vaccine Uptake

Our study suggests that while Vietnamese American women had a higher vaccination percentage in this sample, the difference was not significant. This finding contradicts current national patterns that men have lower vaccination rates compared to women (Kops et al., 2019; Meites, 2019). Prior local studies have also indicated that variation in vaccination rates among men and women may be due to provider recommendation more so than patient's preferences (Brown et al., 2017; Zimet & Rosenthal, 2010). This finding contributes to the HPV vaccine literature because there are very few studies that have assessed the recent vaccination rate of Vietnamese American young adult men in comparison to women in adulthood. In addition, prior studies have shown that men lack knowledge and awareness, but in our study, there were no significant differences in knowledge scores. These results may indicate that the awareness gap may be closing and that men are catching up (Preston & Darrow, 2019). Furthermore, since the vaccine has been in existence for over a decade at this point, it may more socially acceptable and normalized as an adult vaccine that is given if not previously received as an adolescent (Vu et al., 2020).

Gender Differences in Peer Communication

Regarding peer supportive communication, perceived supportive communication and sexual communication frequency, we found that overall, there were no significant differences in these communication variables by gender. However, for peer supportive

communication (those who had discussed HPV vaccination with peers), women seem to receive less supportive communication overall compared to men, and especially less instrumental supportive communication about HPV vaccination. We had expected women to receive more supportive communication compared to men since it has been widely established in the literature that women communicate more about health issues compared to men (Hibbard & Pope, 1983; Tabaac, 2016). It may be that perhaps women need less instrumental supportive communication from peers since the current vaccine systems (e.g. gender disparities in doctor recommendation, vaccine policies, insurance coverage) are structured to support women's vaccination (Daley et al., 2017). Thus, women would turn to peers for other types of support. This finding suggests that more resources need to be put into support vaccine behavior among men (Daley et al., 2017; Preston & Darrow, 2019). For sexual communication frequency, overall, there were no differences in frequency of communication by gender. Similar patterns have been found in broader Asian American populations, but quality of conversations may differ (Trinh et al., 2014).

Supportive Communication, Sexual Communication Frequency, and Vaccination

Among those who had discussed HPV vaccination before (RSC-HPV), informational communication remained associated with vaccination status after adding covariates to the model while emotional and instrumental supportive communication were not. These findings suggest that those who discussed HPV vaccination with their peers may have sought informational supportive communication (e.g., information on the vaccine or the importance of vaccinating) which may require less resources than instrumental support. Prior work indicates that young adult women tend to receive emotional and informational

support from peers while instrumental support is usually provided by parents and providers regarding the HPV vaccine (Miller-Ott & Durham, 2011).

From a cultural standpoint, non-informational support requires more self-disclosure and self-explanation (e.g., asking for help with paying for the vaccine or asking for emotional help) and therefore may not be a cultural norm. Although Vietnamese culture is a collectivistic culture, *asking* for instrumental support may be seen as an inconvenience that can break down harmony in peer relationships (H. S. Kim et al., 2008; MacGeorge et al., 2011). Furthermore, doctor recommendation and health insurance also significantly predicted vaccination status, which may suggest that participants in this subsample had the structural support from the health care system to vaccinate. This outcome parallels prior research that shows a doctor's recommendation is one of the strongest predictor of vaccination, but despite health insurance coverage, psychosocial factors continue to influence vaccination status (Agénor et al., 2020; Raymond et al., 2021).

In this group, higher frequency of discussion of "pleasure" topics was also related to HPV vaccination status among those who had discussed HPV vaccination with their peers. This was an interesting and unexpected finding that aligns with limited, but similar research that has found that acceptance for topics related to casual sex (an example of pleasure) were related to more sexual behaviors (Trinh & Kim, 2021, p. 2). Connecting some of our past work around vaccine decision narratives, young adult Vietnamese American women who were in relationships and sexually active decided to vaccinate in order to protect themselves from STIs (Hopfer et al., 2017). This also may suggest that the HPV vaccine is perceived as a sexual health-related vaccine. Perhaps being sexually active

during adulthood leads them to discuss more taboo topics and vaccinate for protection. These results may also propose that participants who had discussed HPV vaccine with peers before may be more comfortable with such conversations, have more permissive sexual values, but are cognizant of the need to protect themselves from disease (Hopfer et al., 2017; Trinh & Kim, 2021).

Perceived Supportive Communication, Sexual Communication Frequency, and Vaccination

Among those who had not discussed HPV vaccination with peers, only perceived instrumental supportive communication from peers was significantly related to HPV vaccination along with doctor recommendation and parent communication about HPV vaccination. We argue that the perception that others *would* do something for you is strongly related to vaccination status because of the collectivistic culture mentioned previously. Prior research has shown that perceptions of support can be more protective and health-promoting than actually receiving support (Uchino et al., 2011). In Asian culture, *asking* for support might be stigmatized (H. S. Kim et al., 2008; MacGeorge et al., 2011), but perceiving that other people in your network would be open and willing to helping with a large task like providing financial support, attend a doctor's visit, or provide transportation may contribute to normalizing vaccination behavior. Although they did not receive direct communication from their peers, perceived support may be influential in facilitating social norms and vaccine decision making processes (Casillas et al., 2011; Rimal & Real, 2016; Stout et al., 2020).

In this PSC-HPV subsample, we also found that women frequently discussed topics related to "sensitive" (e.g., menstruation, sexual trauma, abortion) and "values" (e.g., fidelity in relationships, gender-specific information like menstruation, parents' attitudes about sex) more than men. This finding is consistent with past research that women are socialized by parents early on, which leads them to discuss "relational" and "procreational" scripts with peers than men (Trinh & Ward, 2016). Additionally, less communication frequency of "risk" topics with peers along with provider and parent communication led to vaccination uptake. This may also perhaps hint to another camp of Asian American young adults represented in this sample who may be more sexually and culturally conservative and still heavily influenced by parent communication and provider recommendation (Trinh & Kim, 2021). It is possible that the intersection between culture and sexual stigma prevents young adults who may be more conservative to directly discuss vaccination with their peers (Foster et al., 2021).

Directions for Future Research

We found some support for peer communication and vaccination in this study, however, results also confirm that doctor's recommendation in all cases strongly predicts vaccination in this population (Gilkey et al., 2016) followed by parent communication (Gibson et al., 2019). While we did not find significant gender differences in vaccination status or peer communication, a doctor's recommendation or parent communication may be another communication variable that can account for gender differences in vaccination status, which could be tested in future studies. We recommend also collecting data on sexual activity, sexual conservatism/ values, and culture influences to empirically test those

relationships with HPV vaccination. Moreover, future research in this area should also further explore the source of recommendation, time of recommendation, and vaccine hesitancy status. Given the current times during this pandemic recovery period, vaccines are especially a sensitive topic of conversation. Therefore, understanding who is most trusted in an individual's personal network given possible vaccine hesitancy would provide insight into the best ways to intervene for increasing HPV vaccine and other important vaccines.

Limitations

There are several limitations to this study. First, the study was cross-sectional, which can only be used to interpret relationships and cannot predict causation or a temporal relationship between the variables being tested. Furthermore, participant responses (HPV vaccination status and past communication with their networks), which are subject to recall bias. To limit recall biases, the participation criteria included those who had recently (in their adulthood) received the HPV vaccine or were still unvaccinated. This criteria restriction also limits our ability to generalize the findings. Findings only represent a specific group of Vietnamese American young adults who were not vaccinated previously as an adolescent. We also asked participants to check their vaccination status and to optionally upload a verification card, but was optional. Despite these built-in checks, there still may have been participants who did not check their status and participated anyway. Selection bias and social desirability biases may have also been present in the study due to the nature of the topic of the study (Krumpal, 2013). As sexual health and HPV is often a

sensitive topic of conversation among Asian Americans, participants may have already been comfortable with these types of questions to motivate their participation in the survey.

Recruitment of participants during the COVID-19 pandemic proved to be very challenging, which led to limited sample size of male participants. Although we had an adequate sample size to detect differences by gender, the smaller sample of men particularly may have led to the inability to detect statistical differences between the two groups for further subgroup analysis by communication variables. Prior research has shown that Asian Americans compared to other racial ethnic groups in the U.S. are typically less willing to participate in health research (Liu et al., 2019) and men often participate less than women especially in research surveys. Although we strategically and purposively sampled male participants, there was still higher interest and participation among women. Although online recruitment through social media channels facilitated greater reach, participation remained less than expected due to a unique social and historical period where people are experiencing information overload and social media fatigue from the pandemic (Mohammed et al., 2022; Ngien & Jiang, 2021). Furthermore, online recruitment during this time presented additional, unexpected challenges throughout the data collection phase as we encountered thousands of false responses due to bot activity, which also slightly delayed collection (Uyheng & Carley, 2020).

Finally, there were methodological and statistical analysis limitations. Two variables that were unmeasured that may impact communication are current sexual activity and whether participants *asked* for support from peers to assist with vaccination behavior. Future studies may consider including these variables as they may be useful to our

understanding of sexual communication and HPV vaccine communication among peers. While SEM is a useful tool for assessing measurement error, a disadvantage of SEM is requiring a large sample size, especially when the model is complex (Devlieger & Rosseel, 2017; Kline, 2016). Due to a smaller sample size, we had to use regression factor scores to represent our latent communication variables instead because we encountered models that did not converge. We compared latent variable scores to factor scores and found them to be similar. Using regression-based factor scores are typically more reliable than using summative scores or mean scores because it optimally weights the items, however, is not an unbiased estimate (Acock, 2013; DiStefano et al., 2009).

Conclusion

This study sought to delve deeper into understanding how peers communicate about the HPV vaccine, whether this differed by gender, and how HPV vaccination is related. This study contributes to the literature in multiple ways such as understanding vaccination rates in a sample of Vietnamese American young adults (a subgroup disproportionately affected by cancer rates), including a comparison between men and women, identifying types of supportive communication that are relevant to vaccination status, and exploring how peer supportive and sexual communication contribute to HPV vaccination. This study provides a basis for more understand in this area of research between peer communication and vaccination status, all of which can contribute to better health outcomes for Asian American populations.

Tables and Figures

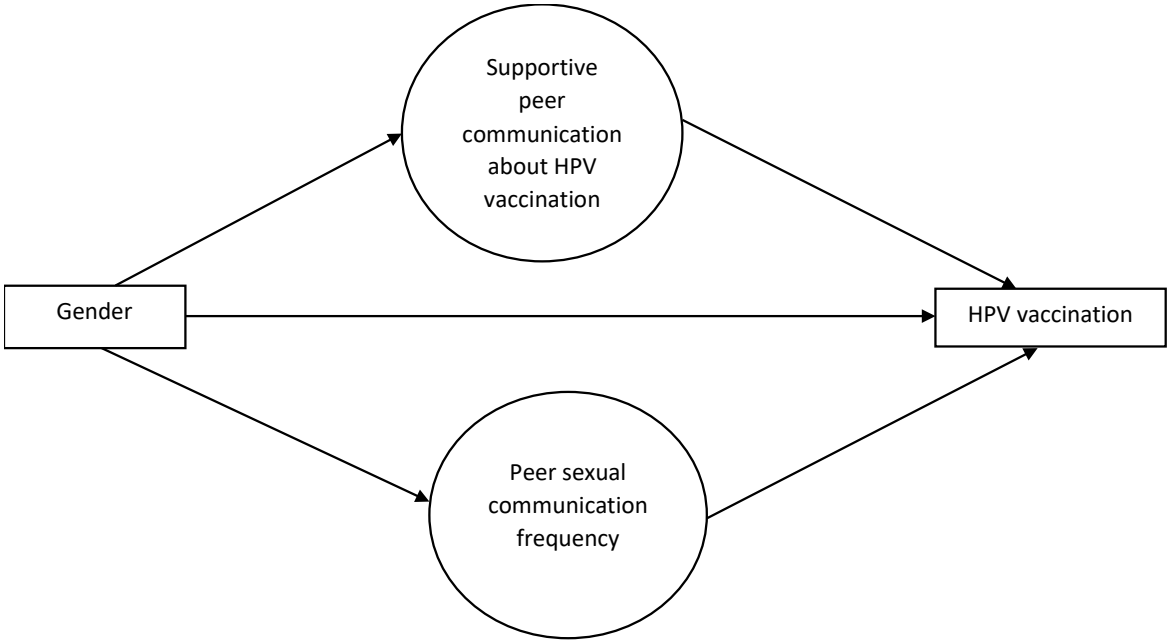

Figure 4.1 Conceptual model testing communication variables as mediators between gender and HPV vaccination

Table 4.1 Communication Measures (Supportive Communication, Perceived Supportive Communication, Sexual Communication Frequency)

Variables	Question	Response Categories
Measures for Supportive Communication about HPV Vaccine		
Informational Support	My peer gave me information about the HPV vaccine.	Strongly disagree (1) to Strongly agree (5)
	My peer discussed with me the importance of getting the HPV vaccine.	
Emotional Support	My peer praised me for my efforts to go get vaccinated.	
	My peer family member showed that they understood the importance of me getting vaccinated.	
	My peer motivated me to get vaccinated even when I did not want to go.	
Instrumental Support	My peer offered to attend the doctor's visit with me.	
	My peer drove me to the doctor to get the HPV vaccine.	
	My peer offered to help pay for the vaccine for me.	
	My peer did something to help me stick to my vaccine schedule.	
Measures for Perceived Supportive Communication about HPV Vaccine		
Perceived Informational Support	My peer would give me information about the HPV vaccine.	Strongly disagree (1) to Strongly agree (5)
	My peer would discuss with me the importance of getting the HPV vaccine.	
Perceived Emotional Support	My peer would praise me for my efforts to go get vaccinated.	
	My peer would show me they understood the importance of me getting vaccinated.	
	My peer would motivate me to get vaccinated even when I did not want to go.	
Perceived Instrumental Support	My peer would offer to attend the doctor's visit with me.	
	My peer would drive me to the doctor to get the HPV vaccine.	
	My peer would offer to help pay for the vaccine for me.	
	My peer would do something to help me stick to my vaccine schedule.	
Measures for Peer Sexual Communication Frequency Scale		

Please select how often you have talked with your peers about each of the following subjects…

Risk	STDs (other than HIV/AIDS)	0= Never Discussed; 1=Discussed Once; 2=Discussed a few times; 3= Discussed frequently
	HIV/AIDS	
	Condom Use	
	Unplanned pregnancies	
	Abortion	
Values	Abstinence	
	Resisting sexual pressure	
	Monogamy (having only one partner)	
	Fidelity (being faithful to a partner)	
	Parents' attitudes about me having sex	
	Non-sexual ways to show love	
Pleasure	Oral sex	
	The enjoyment/fun/pleasure of sexual relationships	
	Masturbation	
Sensitive Topics	Rape/molestation/sexual harassment	
	Resources available to help with family planning	
	Resources available to help deal with sexual trauma/rape	
	Statistics about sexually active young adults	
	Gender-specific information (menstruation, ejaculation)	
	Abortion	
	Sexual orientation	

Table 4.2 Sample Characteristics

Variables	Full Sample	Females	Males	Mann-Whitney U test or χ2	
	n=260	n=182	n=78	z-score or χ2	p-value
Age				-1.29	0.20
18-23	133 (51%)	89 (49%)	44 (56%)		
24-29	78 (30%)	55 (30%)	23 (29%)		
30-35	36 (14%)	27 (15%)	9 (12%)		
36-41	9 (3%)	8 (4%)	1 (1%)		
42-45	2 (1%)	1 (1%)	1 (1%)		
Mean age (SD)	24.35 (0.33)	24.59 (5.32)	23.80 (5.40)		
Religiosity				1.96	0.05*
Not religious at all	64 (25%)	48 (26%)	16 (21%)		
Low	90 (35%)	70 (38%)	20 (26%)		
Medium	77 (30%)	45 (25%)	32 (41%)		
High	25 (10%)	17 (9%)	8 (10%)		
Very religious	3 (1%)	2 (1%)	1 (1%)		
Mean religiosity score (SD)	3.02 (2.64)	2.8 (2.55)	3.56 (2.79)		

HPV Vaccine Knowledge							-1.6	0.11
Low	26	(10%)	16	(9%)	10	(13%)		
High	234	(90%)	166	(91%)	68	(87%)		
Mean knowledge score (SD)	4.80 (1.05)		4.86 (1.07)		4.65 (1.02)			
English Proficiency							-0.24	0.80
Low	3	(1%)	2	(1%)	1	(1%)		
High	255	(98%)	180	(99%)	75	(96%)		
Mean proficiency score (SD)	19.02 (2.35)		19.12 (2.02)		18.79 (3.0)			
Doctor Recommendation							3.18	0.08
Yes	174	(67%)	128	(70%)	46	(59%)		
No	86	(33%)	54	(30%)	32	(41%)		
Parent Communication about HPV vaccine							0.006	0.96
Yes	96	(37%)	67	(37%)	29	(37%)		
No	164	(63%)	115	(63%)	49	(63%)		
Peer communication about HPV vaccine							0.56	0.45

Yes	138	(53%)	98	(54%)	40	(51%)		
No	122	(47%)	84	(46%)	38	(49%)		
Vaccination Status							2.97	0.08
Yes	166	(64%)	123	(68%)	33	(42%)		
No	92	(35%)	59	(32%)	44	(56%)		
Health Insurance							0.22	0.63
Yes	249	(96%)	175	(96%)	74	(95%)		
No	11	(4%)	7	(4%)	4	(5%)		

Table 4.3 Comparison of Means

Model testing mean differences	Latent means for women	Chi-squared (df)	RMSEA	CFI	TLI
Perceived Supportive Communication Scale					
Equal loadings, Variances, & intercepts		101.37 (67)	0.09	0.94	0.94
Informational Supportive Communication	0.23				
Emotional Supportive Communication	0.08				
Instrumental Supportive Communication	0.13				
Supportive Communication Scale					
Equal Loadings & Intercepts		121.09 (57)	0.08	0.91	0.90
Informational Supportive Communication	-0.09				
Emotional Supportive Communication	-0.07				
Instrumental Supportive Communication	-0.33				
Sexual Communication Frequency Scale					
Equal loadings, Variances, & intercepts		523.2 (335)	0.07	0.94	0.94
Risk	0.02				
Values	0.17				
Pleasure	-0.12				
Sensitive	0.19				

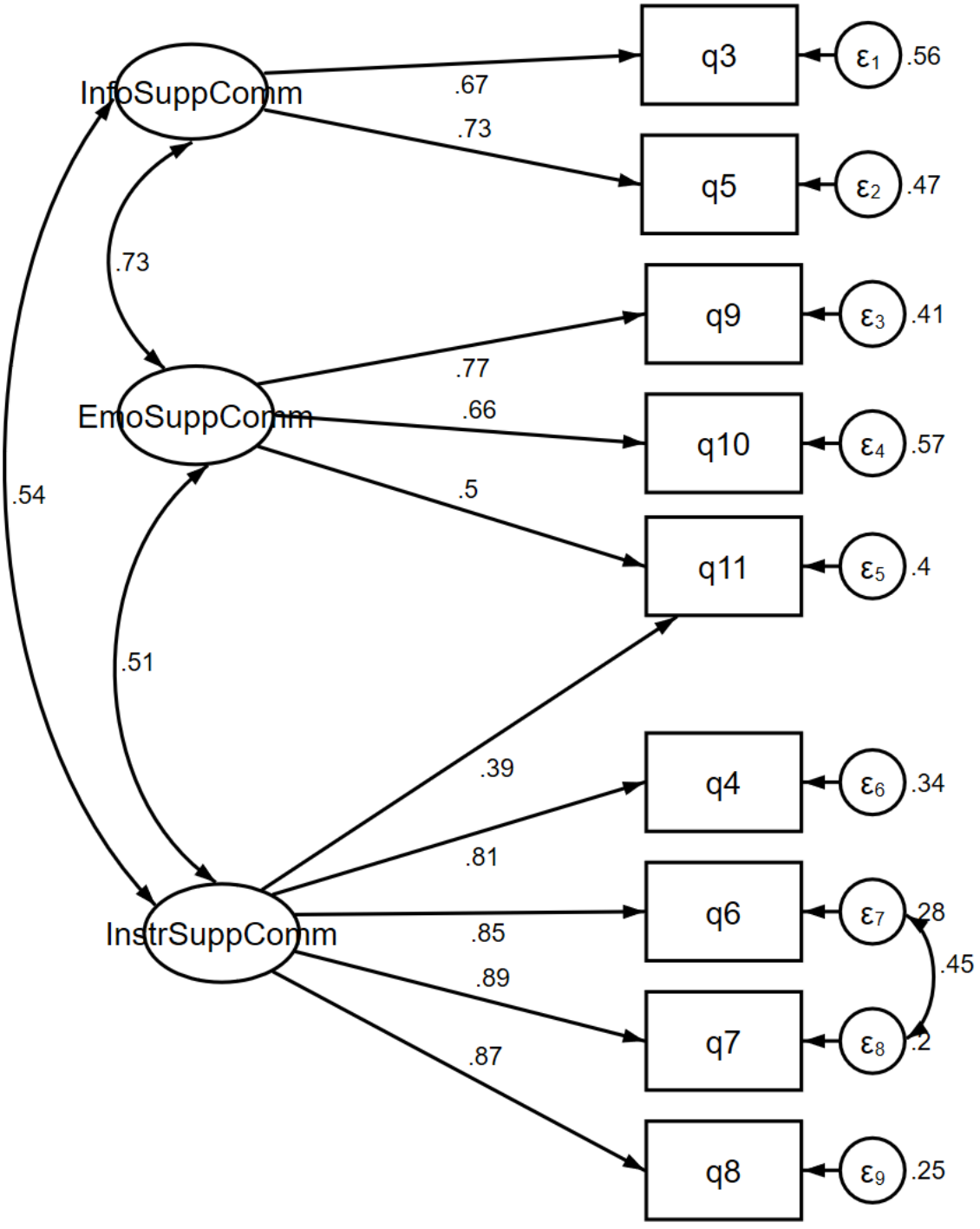

Figure 4.2 Peer Received Supportive Communication about HPV (RSC-HPV) Scale Final Model

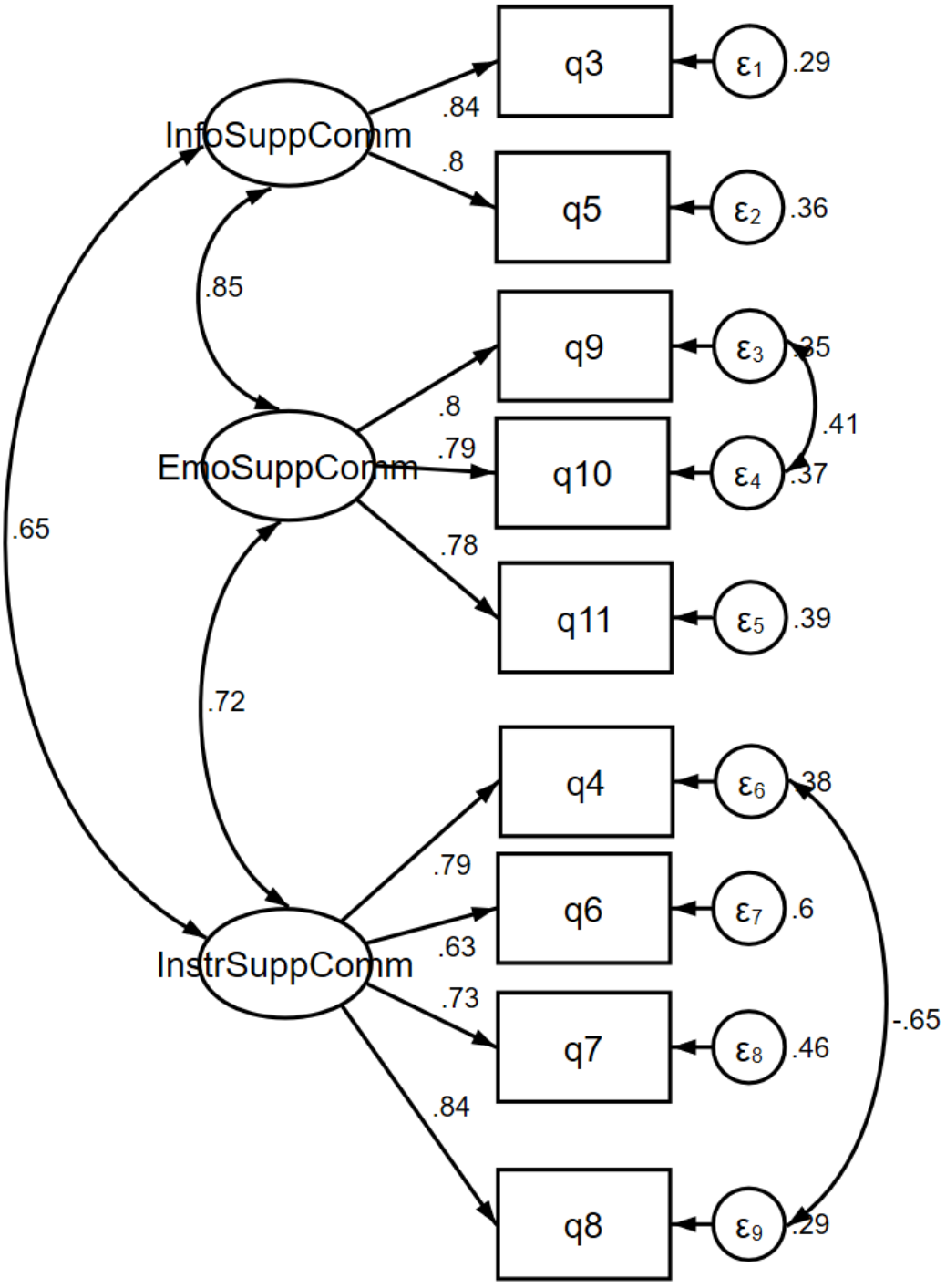

Figure 4.3 Peer Perceived Supportive Communication about HPV Scale (PSC-HPV) Final Model

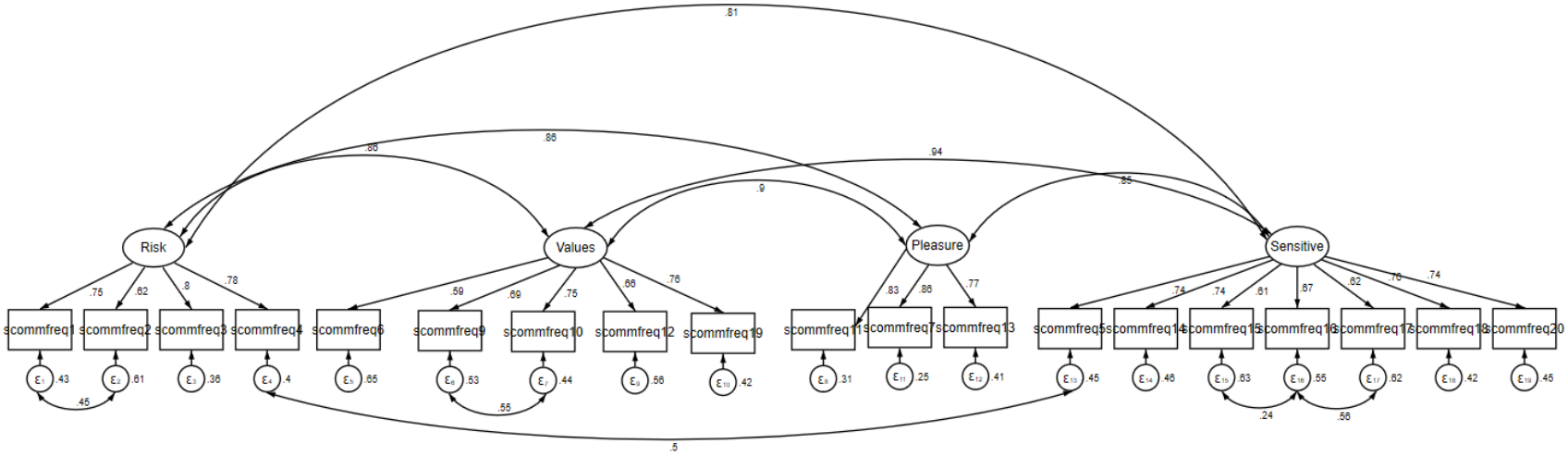

Figure 4.4 Sexual Communication Frequency (SCF) Final Model

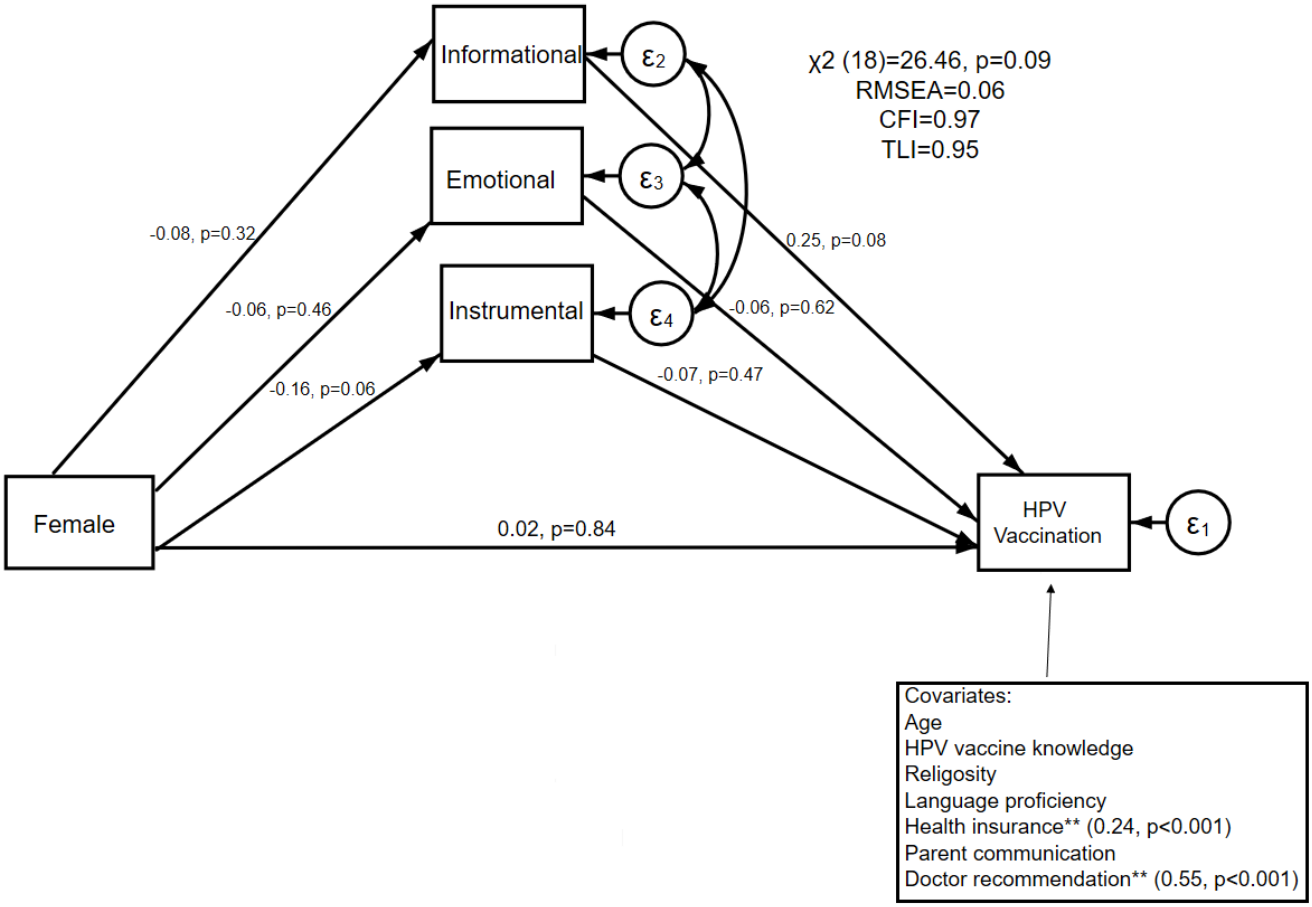

Figure 4.5. RSC-HPV Mediation Model Standardized Beta Coefficients

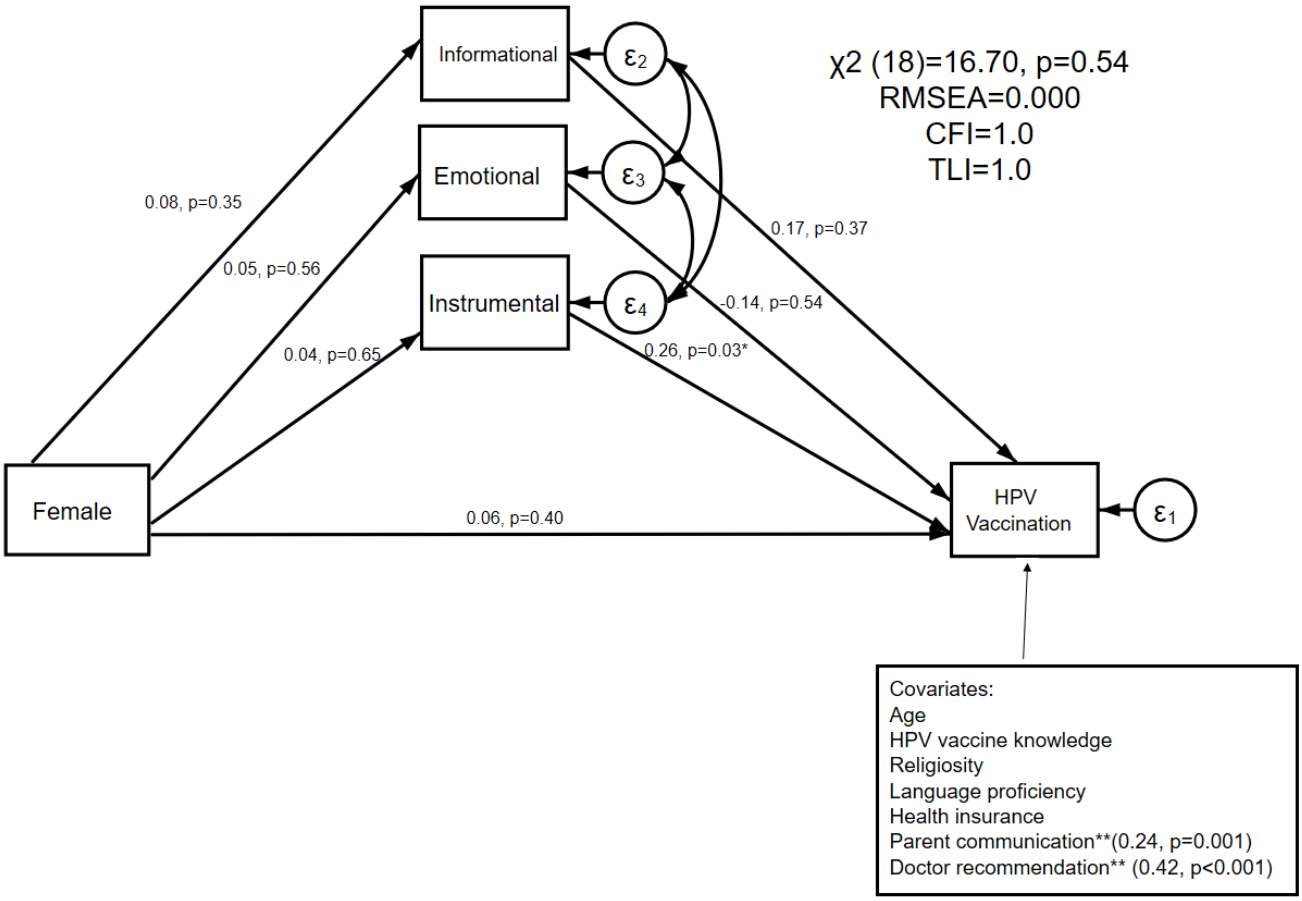

Figure 4.6. PSC-HPV Mediation Model Standardized Beta Coefficients

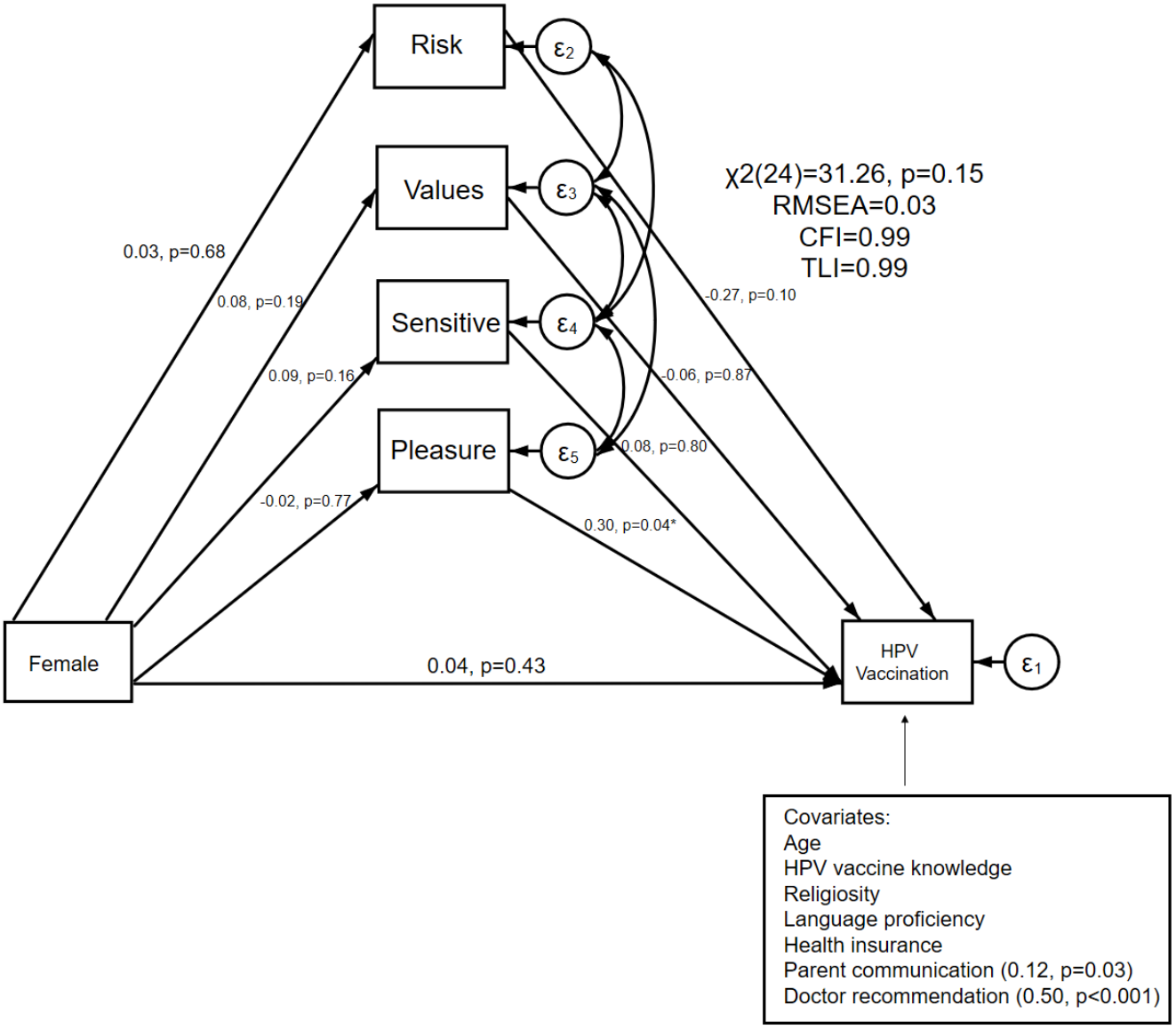

Figure 4.7. SCF Mediation Model Standardized Beta Coefficients

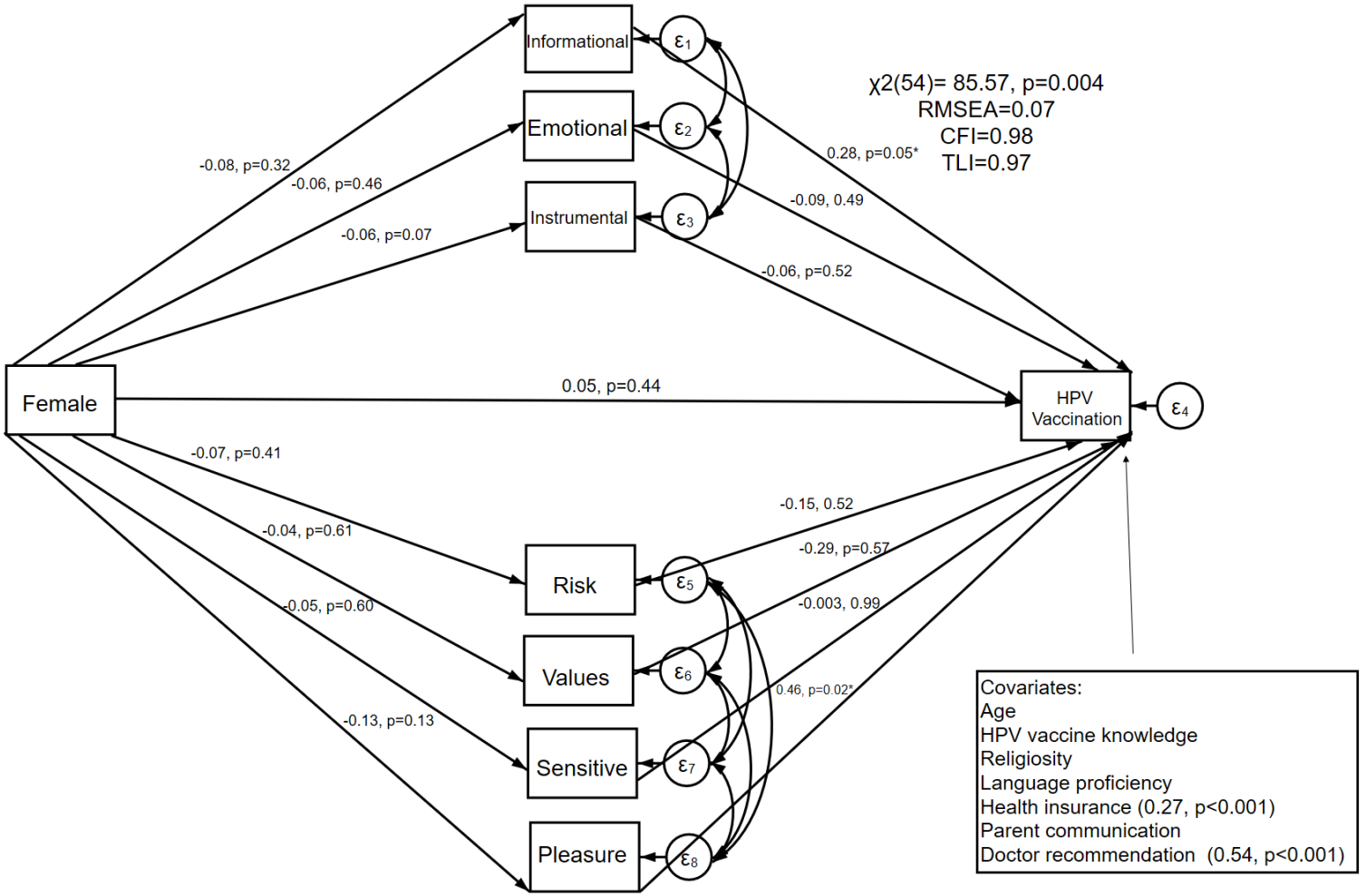

Figure 4.8 RSC-HPV and SCF Mediator Model Standardized Beta Coefficients

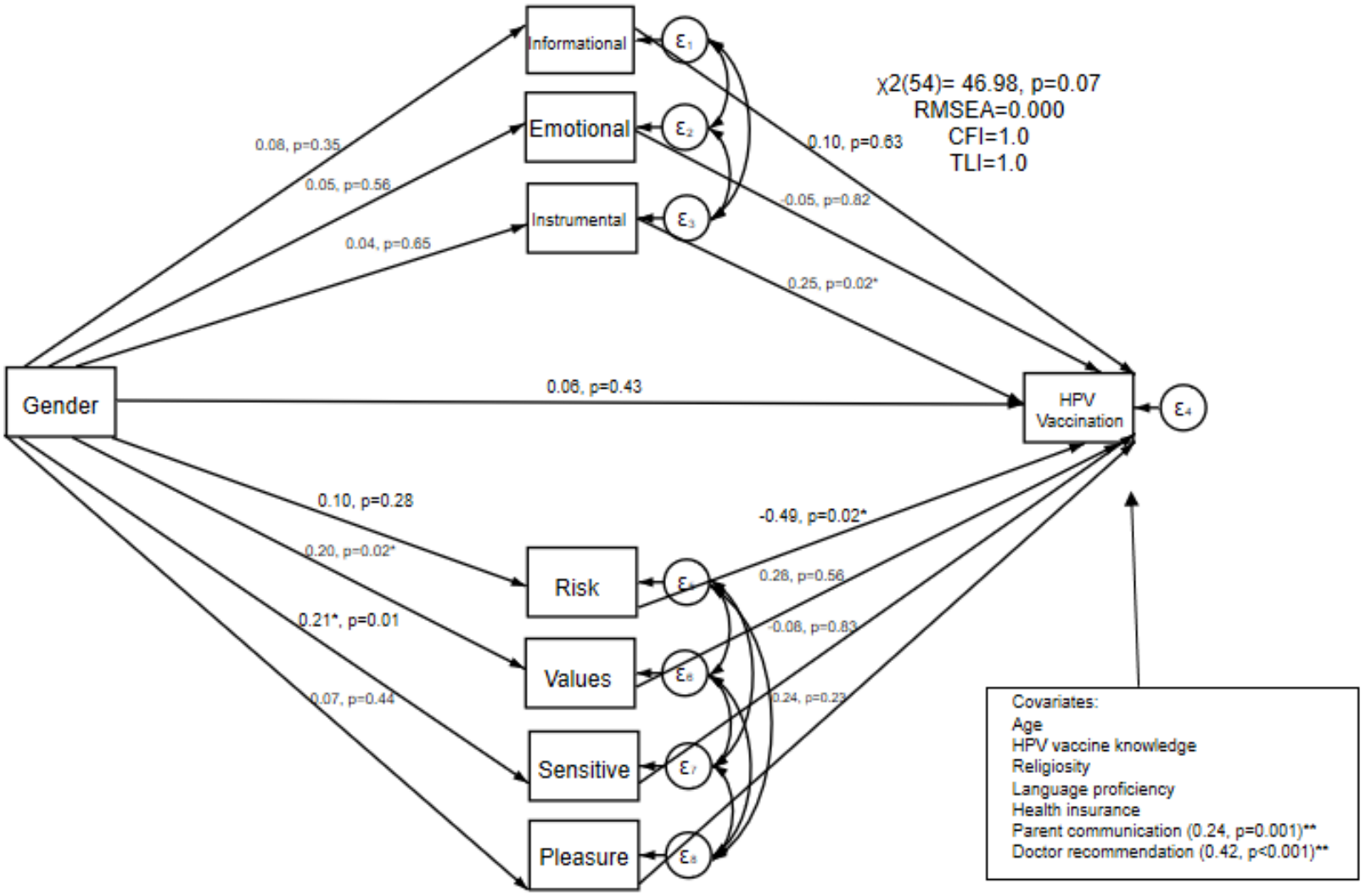

Figure 4.9 PSC-HPV and SCF Mediator Model Standardized Beta Coefficients

CHAPTER 5: CULTURE-CENTRIC PEER SEXUAL HEALTH AND HPV VACCINE COMMUNICATION NARRATIVES AMONG VIETNAMESE AMERICAN YOUNG ADULTS

Background: The Human Papillomavirus (HPV) can cause several cancers like cervical cancer (CC). Asian/ Pacific Islander (API) women have a lower incidence of CC compared to the national average (6.5 vs. 7.4 per 100,000), however, disaggregate data show that rates among Vietnamese American (VA) women remain high (9.5 per 100,000) relative to other API subgroups. The HPV vaccine is an effective cancer prevention tool, yet uptake rates among API young adults are subpar. Prior research shows that sexual conversations with parents during adolescence influence decisions like vaccination in adulthood. However, sexual conversations are taboo in many Asian families. Thus, young adults may turn to peers for information and support. **Purpose:** The purpose of this study was to elicit culture-centric sexual health communication, HPV vaccine decision, and peer HPV vaccine communication narratives. **Methods:** We conducted semi-structured interviews with 26 VA men and women aged 18-45 throughout the U.S. **Results:** Culture-centric sexual health communication narratives included stories of silence and shame, maturity, and peer comfort. HPV vaccine decision narratives comprised of protection narratives among the vaccinated and network influences among the unvaccinated. Peer communication about the HPV vaccine emerged after vaccinating, receiving an HPV diagnosis, discussing with doctors, and with partners. Non-discussion narratives occurred due to a lack of knowledge, cultural stigma, and lack of confidence in bringing up conversations. **Discussion:** Peers discuss sexual health information with each other which can influence vaccine behavior. Findings inform the development of a future culture-centric peer-led intervention to increase HPV vaccination.

Background

The Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States (CDC, 2020). Persistent HPV infection may lead to cervical, vaginal, and vulva cancer in women, penile cancer in men, and anal, oropharyngeal cancer in both men and women (NCI, 2020b). Cervical cancer specifically impacts minority women disproportionately. While the total cervical cancer incidence rate for Asian Americans is lower compared to the national average (6.5 per 100,000 vs. 7.4 per 100,000 respectively), disaggregated data show that incidence rates among Vietnamese American women remain one of the highest (9.5 per 100,000) compared to other Asian subgroups (American Cancer Society, 2016). In order to combat high cancer rates, vaccinating for HPV is recommended among adolescents and young adults to prevent HPV-related cancers.

Recently, the National Cancer Institute has urged physicians, cancer centers, parents, and young adults to put HPV vaccinations "back on track" since HPV vaccination initiation and completion rates have dropped significantly during the COVID-19 pandemic (Gilkey et al., 2020). As of 2019, the Advisory Committee on Immunization Practices (ACIP) has recommended a catch-up vaccination for young adult men and women up to age 26, but is also available up to age 45 based on risk and shared decision-making between clinicians and patients (Meites, 2019; Oshman & Davis, 2020). The age category recommendations come from the assumption that most sexually active young adults past the age of 27 likely have already been exposed to HPV at some point in their life; thus, the vaccine would be ineffective unless in a high-risk category (e.g., multiple partners). Although the vaccine is effective and safe, a recent CDC vaccine coverage report using data from the National Health

Interview Survey (NHIS) indicated that the HPV uptake rate for Asian American young women ages 19-26 is 45.2% in comparison to non-Hispanic Whites at 57.4% (Hung et al., 2019). Data are not available for Asian American men due to small sample sizes. Recent studies among Asian Americans suggest that low vaccination rates are not due to financial barriers since the majority of young adults have insurance coverage (Agénor et al., 2020), but rather psychosocial barriers (Krakow et al., 2015).

Focusing on Vietnamese Americans: Disaggregating Data

Vaccine disparities research often ignores the heterogeneity of subpopulations, particularly among Asian American subpopulations (Budhwani & De, 2017). Each Asian subgroup has its own unique cultures, language, histories, all of which are important social determinants of health to consider when studying vaccine disparities (Agénor et al., 2020; Becerra et al., 2020; Korngiebel et al., 2015). Consequently, this data aggregation can make smaller communities "invisible" and can mask important health disparities (Korngiebel et al., 2015). Currently, HPV vaccine research has focused mostly on Asian Americans, but given the high rates of cervical cancer among Vietnamese Americans, it is important to study this group specifically to better understand how cultural experience can impact sexual health conversations and the HPV vaccination.

Sexual Health Communication with Parents and Sexual Health Decision Making

Early sexual health communication among mothers and daughters during adolescence has been shown to have a protective effect on sexual health behaviors like participating in sexual health screening services and vaccinating for HPV later in adulthood (Gibson et al., 2019; Roberts et al., 2010; Romo et al., 2011). Asian American women,

however, are less likely to report having open and frequent conversations about sex with their mothers compared White women (Gibson et al., 2019). Regarding sexual communication in Asian American cultures, two findings emerge consistently: (a) Parents minimally discuss sexual health with their Asian American adolescents (Hopfer et al., 2017; J. L. Kim & Ward, 2007) and (b) Asian Americans report later sexual initiation and less sexual risk-taking during adolescence (Tosh & Simmons, 2007; Trinh et al., 2014). Overall, the probability for sexual debut by the 17th birthday is < 35% for Asians compared to <60% for Caucasians (Cavazos-Rehg et al., 2009; Trinh et al., 2014). These results indicate that sexual debut may occur later in life for Asian American young adults, which points to the need for understanding whom young adults discuss sexual health with during adulthood if conversations do not occur with parents. The current literature has heavily focused on the effects of parental communication on adolescent sexual health decision-making and less on young adults' decision-making processes.

Sexual Health Information Seeking during Emerging Adulthood with Peers

During emerging adulthood, the transition between adolescence and adulthood (Willoughby & Arnett, 2013), health information-seeking processes among young adults change as individuals begin to become more independent of their parents around health decisions like the HPV vaccination (Hopfer et al., 2017). Independence from parents may lead to heavier reliance on sources of information outside of the family such as peers, school, and online resources (Lai et al., 2017; Woodall et al., 2006). While young adults do not often discuss sexual health topics such as sexually transmitted infections, sexual relationships, and sexuality with their parents, they do discuss these topics with their peers

(Trinh & Kim, 2021; Trinh et al., 2014). Vietnamese young adults communicate with peers about sexual health and are more comfortable talking about it with their peers because they have similar experiences (Nguyen, 2021; Trinh & Kim, 2021). One qualitative study found that young adult Vietnamese Australian women talk about sexual health with their close Vietnamese peers and that women desired culturally relevant sexual health education (Rawson & Liamputtong, 2010); however, little is known about how and the context in which these conversations arise among peers. These types of close peer relationships have not yet been extensively studied in the context of sexual health information seeking and HPV vaccination disclosure. Given the high value of peer relationships in sexual health information exchange, it is important to study these as it relates to sexual health conversations.

The HPV vaccine literature suggests that HPV vaccinations are not a typical topic of conversation with Vietnamese parents during either adolescence or adulthood, particularly because of its relation to sexual health (Duong & Hopfer, 2021; Hopfer et al., 2017). Prior research, however, has found that messages combining peer and expert HPV narratives in the context of an intervention were most effective in increasing vaccination uptake among college women (Hopfer, 2012b). In addition, recent HPV vaccine research show that family and peers influence individuals' attitudes and vaccination uptake more so than other members of a social network like healthcare providers, particularly among ethnic minority populations (Casillas et al., 2011; Fu et al., 2019; Konstantinou et al., 2021). Little is known about whether and how conversations about HPV vaccination may come up among peers. Thus, having a better understanding of the cultural factors influencing general sexual health

conversations and how HPV vaccine conversations emerge may hint at how future interventions can be implemented to either introduce or reinforce norms around HPV vaccination uptake among Vietnamese young adults.

Guiding Theoretical Frameworks

The current study uses several guiding theories to understand a) the process in which young adults take to be comfortable in discussing sexual health topics in the context of their cultural experiences and b) how HPV vaccination information may be diffused in a peer network.

Social Networks and Health

Berkman et al. (2000)'s social networks and health conceptual framework suggests that larger upstream factors including sociocultural contexts and social network structures can influence downstream factors like psychosocial processes, and behavioral pathways that can ultimately impact health. Prior vaccination research suggest that word-of-mouth communication or talk in peer networks can reassure and advocate for vaccination after receiving an initial message about vaccination from either doctor or media (Compton & Pfau, 2009). Social networks play an important role in shaping both positive and negative attitudes about vaccination uptake. In the case of HPV vaccination, the vaccine was introduced and approved over a decade ago, however, there are still knowledge gaps between the vaccinated and unvaccinated (Cohen & Head, 2013), which may be filled through social networks. Using this framework, we seek to understand how culture and social networks play a role in young adults' sexual health information seeking processes,

their decision to vaccinate, and in what context HPV vaccination is discussed within social networks.

Narrative Communication Theory as Culture-Centric Health Promotion Tool

Narratives are useful tools for informing preventive behavior by grounding promotion programs in cultural knowledge and experiences of a specific group (Hecht & Krieger, 2006; Larkey & Hecht, 2010; Miller-Day & Hecht, 2013). They are a representation of events and characters that have an identifiable structure and reflect implicit or explicit messages about a specific topic. They are also a familiar part of daily life that is grounded in storytelling, a basic type of human thought and interaction (Kreuter et al., 2007). Culture-centric narratives embed messages within a cultural experience, events, characters, and culturally resonant language (Larkey & Hecht, 2010). Using a culture-centric narrative approach to health promotion, we focus on culture as a way to access sexual health narratives and be inclusive of the complexity of individuals' identities as well as their experiences (Larkey & Hecht, 2010). Vietnamese American young adults' identities are often intersectional. They are often Vietnamese American young adults raised in a conservative family environment, but also engage with more sexually open/ permissive peers when seeking sexual health information (Trinh & Kim, 2021). Thus, their experiences of sexual health communication are often influenced by cultural experiences and norms. The process young adults go through to become comfortable discussing sexual health with peers is unique to their cultural experiences, which may influence their comfort and willingness to discuss HPV vaccination with peers.

A culture-centric narrative approach was used to identify cultural sexual health communication narratives and HPV vaccine communication narratives that may be used in a future peer intervention. The purpose of collecting personal narratives was to identify in-depth experiences that are culturally nuanced and difficult to capture quantitatively. Young adults were asked to share personal stories of how sexual health topics come up with their peers, why conversations arise, how they perceive their family culture influencing their conversations, and how HPV vaccination conversations arise with peers.

Research Questions

- **R1:** What are culture-centric sexual health communication narratives among Vietnamese American adult men and women?
- **R2:** In what ways do peer HPV vaccine communication narratives emerge among both vaccinated and unvaccinated Vietnamese American young adults?

Methods

Participants

Eligible participants identified as Vietnamese American, age 18-45, had discussed sexual health within the last three months with their peers, and were either vaccinated as an adult or currently unvaccinated. Participants were purposively sampled from university and community-based settings in Orange and Los Angeles counties. On college campuses, Vietnamese Student Association (VSA) university campus groups across the U.S. were contacted specifically to advertise the study to their members. Participants were also recruited on social media through Facebook groups and Instagram accounts with a large

number of Vietnamese American followers such as Subtle Viet Traits, Modern Asian Moms, and GrowinupViet.

Participants completed a pre-interview survey about general sexual communication and HPV vaccination communication. At the end of the survey, participants were asked whether they would like to participate in a follow-up interview to discuss their experiences communicating with their peers about sexual health and HPV vaccination communication. Thirteen men and 13 women (total of 26) were purposively sampled by having discussed sexual health within the last three months with their peers. Literature suggests that at least twelve interviews among a homogeneous sample will likely suffice for data saturation (Guest et al., 2006; Tracy, 2019). Participants were given $50 as compensation for their time.

Interview Procedures

A 30-45-minute audio-recorded semi-structured interview was conducted to understand Vietnamese young adults' peer sexual health communication and peer HPV communication narratives. Participants were verbally asked if they consented to participate before the interview. The interviews took place using Zoom, an online conferencing tool, to facilitate a greater reach and accessibility for participants. A narrative inquiry interview technique was used to elicit culture-centric sexual health narratives and HPV vaccination communication narratives. Participants were asked to (a) tell a story of a time in which they discussed a sexual health topic with a peer, (b) convey how they perceive their family and/or Vietnamese culture impacting their sexual health communication (c) their HPV

vaccine decision story, and (d) tell a story of whether they had ever discussed HPV vaccine with their peers.

Interview Guide Development

Using the social networks and health framework (Berkman et al., 2000) and culture-centric narrative theory (Larkey & Hecht, 2010), the interview guide (Appendix B: Interview Guide) was developed to elicit culture-centric sexual health narratives and peer HPV communication narratives. Questions explored the contexts in which Vietnamese American peers talk about sexual health, their level of comfort discussing with peers, and how sexual health communication experiences relate to HPV vaccination decisions and conversations among peers.

The first section asked participants to recall previous sexual health conversations with their peers. This exercise was to help participants warm up to the conversation and remember a sexual health story. Participants were told that sexual health was defined as: "A state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships. Topics may include abstinence, sexual behaviors, sexually transmitted diseases, reproductive health, sexual violence, pregnancy, HIV/AIDS prevention, LGBT Health, etc." Sample questions in this section included: "Can you tell me of a time in which you discussed sexual health with your peers?", "How does the conversation come up?", "How comfortable did you feel about this conversation?"

The next section asked participants to describe who in their peer network they were most comfortable discussing sexual health with. Questions included, “Who in your peer network do you find most comfortable in discussing sexual health with?”, “Why do you feel most comfortable with this person?”, “Can you describe your relationship with this person?”, “How did you become comfortable discussing sexual health with your peers?”

The third section focused on cultural and family experiences with sexual health. This part explored how participants felt family/Vietnamese culture influences their sexual health conversations, how they see their Vietnamese American identity impacting their sexual health conversations, and how they became comfortable having sexual health conversations with peers. Sample questions in this section included: “How do you think your culture and/or family culture plays a role in your sexual health discussions with your peers?”, “How does your Vietnamese American cultural identity play a role if at all in sexual health conversations?”, “How do personal religious beliefs play a role in whether or not sexual health discussions occur?”

Finally, the last section focused on vaccine decision-making processes and HPV vaccine communication. Sample questions included: “Can you explain why you decided to get vaccinated (or did not decide to vaccinate)?”, “Have you ever discussed the HPV or the HPV vaccine with a peer?”, “How did the conversation come up?”

Demographic questions including age, location, vaccination status, primary care provider status, and health insurance status were also asked. Participants received the interview questions in advance to have a chance to reflect on their responses before the interview appointment. Prior pretesting of the questions was conducted with two

individuals outside of the study to ensure that the questions adequately covered the topic of sexual health narratives and HPV communication narratives (Morse, 2012). Upon pretesting the interview guide, we realized participants needed a clear definition of "sexual health." Therefore, we used the WHO definition to help participants remember and frame the conversation around types of sexual health topics they may have discussed in the past.

Data Analysis

Audio-recorded data from the interviews were transcribed verbatim. Pseudonyms replaced participants' names to protect their identity. Memos were documented and used for reflection during and immediately following the interviews (Charmaz, 2014). Participants were recruited until data saturation, which occurs when no new information emerges (Morse, 2015). Data analysis was analyzed using NVivo version 11 software. An inductive approach was used to analyze the data (Charmaz, 2014; Clandinin & Rosiek, 2007; Tracy, 2019). A codebook was developed during the coding process to organize codes.

Coding occurred in several phases including data immersion (reading transcripts), primary cycle descriptive coding, and secondary cycle interpretive coding. First, data immersion by reading transcripts and familiarization with the data occurred. Primary cycle descriptive coding involved reading transcripts line-by-line, tagging segments of data, and labeling with "nodes" in NVivo 11. The initial codes described "what is going on" (the who, what, where, when, and how). Some examples of initial codes were: "family/cultural stigma, saving face, avoiding conversation, growing up, confiding in friends, vaccine discouraged by

family, provider recommendation, HPV vaccine discussion, HPV disclosure, never discussed HPV."

Secondary cycle interpretive coding involved organizing/grouping codes into higher-order themes. This stage is meant to explain, theorize, and synthesize codes into larger themes and narratives (Tracy, 2019). We identified culture-centric sexual health narratives (silence and shame, maturity, peer comfort narratives), HPV vaccination decision narratives (protection, network influence narratives), and HPV vaccine communication narratives (peer communication, provider communication, and non-discussion narratives). Data were also analyzed by gender for sexual health communication narratives and across HPV vaccination status for HPV vaccine communication. Data were analyzed until no new themes emerged (Morse, 2015).

Results

Demographics

Twenty-six young adults participated in the virtual interviews using Zoom, a video conferencing tool. Thirteen (50%) identified as women and 13 (50%) identified as male (total of 26 participants). The average age of participants was 26 years, ranging from 19 to 39 years of age. The majority of participants (53%) lived in California with others living in Alabama, Florida, Oregon, Minnesota, Massachusetts, New York, Texas, and Washington. Twenty-four of 26 participants (96%) said that they had a primary care provider. Eighteen participants (70%) received at least one dose of the HPV vaccine as an adult. Among those who had received the vaccine, all had completed the vaccine except for one person who had side effects from the first dose, but was still willing to receive the next dose in the series.

Twelve participants (46%) mentioned that they had discussed either HPV or the vaccine with a peer before. Table 5.1 shows a summary of demographics. **Error! Reference source not found.** shows a summary of narrative results.

Culture-Centric Sexual Health Narratives

Participants described culture-centric narratives related to sexual health and the process that they took in order to become comfortable discussing sexual health with their peers. Culture-centric sexual health narratives included a) family silence and shame, b) maturity, and c) peer comfort narratives.

Family Silence and Shame

Many participants described not discussing sexual health topics with family members, which led them to seek information elsewhere. Of those who did discuss sexual health with their family at some point, they explained that conversations with their parents were often very negative and shameful. Being children of immigrants, but growing up in a Vietnamese American cultural environment, they did not learn about sexual health from their parents, but rather through outside sources like through school, the media, and peers. Furthermore, several participants conveyed that if they did discuss sexual health with their parents, it was often an uncomfortable conversation or heavily misinformed by cultural beliefs.

Katie, a 21-year-old vaccinated woman said: “I think my family culture has pushed me. [It is] literally the driving factor to why I’m so comfortable about it because I don't want to be like their generation.” Participants explained the extent to which sexual health was

taboo in their family. Those family experiences often made them uncomfortable to discuss it until they were older. Mary, a 24-year-old participant explained:

> I think [culture] plays a huge role [in my sexual health]. I never had any conversations with them or anybody in my family about sexual health…That's why I didn't really know to get the [HPV] vaccine until later on, because in my younger years I wasn't exposed [to these conversations]… I feel super taboo about it especially with my family. I feel very shy about it. [I can only talk about it] with friends I feel super comfortable with.

Minh, a 22-year-old vaccinated man said, "The general gist is yeah like they never taught me anything about sexual health they probably didn't want to… it's definitely just kind of like a "don't ask, don't tell" kind of culture." This culture of silence resonated with both men and women alike.

Of those who did discuss sexual health to some extent with parents, there were often accusations made from parents that made sexual health conversations feel shameful. Cara, a 27-year-old woman retold the story of how she started birth control to regulate her menstrual cycle and help with acne. She said:

> I remember leaving the doctor's office and telling my mom about it, because my friends are like, "You should be on [birth control]… it helped me with my acne." Of course, these are my white friends. My Asian friends, of course, are not on birth control. I told my mom and she said, "Why do you need to be on birth control? Are you trying to have sex?"

This participant felt shame from her mother because she wanted to use birth control. Even beyond the nuclear family, shaming among the extended family also occurred in some participants' experiences. Participants described a culture of shaming and saving face or protecting family reputation as highly regarded values in their family contexts. For example, Helen, a 25-year-old participant shared about her experience publicly posting a sensitive story on social media. She said:

> After I graduated college, I made this Facebook post and I detailed the struggles about being a first-generation college student. And then, I snuck in this part where I was raped by an ex-boyfriend. Then, my extended family members told my cousins, "Why would she post that? Like that's nobody else's business but hers. We don't need to know that." But they never said it to my face. They were like, "You're ruining your family's reputation." I actually felt really empowered because my younger cousins are now in college and [I wanted to share my story with them]. I'm just like, "F*** what [my aunts and uncles] think. I don't care about what they think, but I do care about my younger cousins." I don't really care about it anymore, but it's a very interesting dynamic between older family members and us.

The culture of silence and negative attitude toward any sexual health topic in the family context motivated both men and women to have these conversations with their peers. While the majority felt comfortable having these conversations with peers, there still a small number of participants who disclosed they were uncomfortable because they were just not used to discussing it. Even if they felt uncomfortable with the topic because of their upbringing, young adults were still open to having the conversations with their peers

because they felt safer and more comfortable with their peers, however, the level of comfort was not without a maturity process.

Maturity Narratives

Participants described the process in which they became comfortable having sexual health conversations with their peers. Although they were not originally having sexual health conversations with peers early on, this changed as they grew up in American society and gained more life experience. Some participants even mentioned being able to discuss sexual health with parents later in their young adulthood. Interestingly, women seemed to be comfortable discussing sexual health earlier than men (e.g., starting in high school with birth control). Many women expressed that based on their cultural experiences of not discussing sexual health with family members, in adulthood, sexual health conversations are more normal with peers.

Katie, a vaccinated 21-year-old young adult woman told her story about her experience growing up and how it led her to see sexual health as education, but labelled this knowledge as "rebellious." She said:

> I understand my mom doesn't really talk about [sexual health]. I never wanted to tell her when I got my birth control. She only found out because my dad told her…but basically it kind of showed her that I'm going to do what I want to do. I definitely was more rebellious than the normal Vietnamese American, which is why I probably feel so much more comfortable because I see [talking about sexual health] as education. I definitely didn't learn much from my parents. I learned it all from my friends.

Katie's story alludes to a common perception among participants that caring or talking about sexual health is "rebellious" or being "different" from others in Vietnamese culture. One participant, Tricia, felt like she needed to explain to her peers to justify her personal comfort level discussing sexual health. In her interview, she mentioned feeling "different" from other Vietnamese American peers. She said:

> Culture does come up in my conversations with my friends sometimes. Growing up in a Vietnamese American culture, I feel like things are really traditional. [Sexual health topics] are really taboo. That's an important part of my upbringing, that they should be aware of because I guess it like helps give them more insight as to why I'm so comfortable and confident talking about [sexual health].

On the flipside, some participants also told stories of experiences that occurred by chance that led to more open discussion with both parents and peers as they grew older. For example, Nancy, a 20-year-old participant said:

> I never told [my parents]. I never sat them down, and said, "Hey, I'm having sex." They found out on their own when they found my birth control. But ever since then, I have been a little more open to discussing like small things about sex with my mom... In the Vietnamese community, it's still a topic that a lot of people tend to be a little hesitant to discuss but with my friends and family, we've been a little more open... Now, [Sexual health is] nothing that we shy away from. It's something that [my best friend and I are] very comfortable discussing. Sexual health is very important to us, along with just general health.

Men also told stories of growth, learning, and maturity that led them to the point of being comfortable enough to discuss sexual health with their peers. They identified their college, graduate school, or their professional life as a turning point for them in terms of experiences dating/relationships, leading to maturity and more comfort with sexual health discussions. For example, Alan, a 26-year-old vaccinated man said:

> I would say just getting older, more life experiences, caring less about being shy about topic…When you're younger and doctors ask you, "Do you smoke?", or "Are you sexually active?" You're always like, "No."…even though they need to know. As you grow older you realize they're asking that because they need to determine your treatment plan so it's just knowledge and experience. That opens me up.

Additionally, Kyle, a 27-year-old vaccinated man described college as a specific time that led him to explore deeper relationships and conversations on sexual health with close peers. He said in his story:

> Through college, I started progressing, you know, especially as we're all getting a bit more freedom and [spending hours with friends]. That's when I had deeper conversation about relationships and sexual health in general…that's when [we would talk about] concerns for pregnancy, STDs, or unhealthy relationships.

Another participant, Peter, a vaccinated 27-year-old participant echoed this story from being shy about sexual health conversations to becoming more comfortable with it. He also described social/ racial stereotypes that may have impacted this level of comfort. He said:

> In the beginning, I was a little more shy or more nervous, but now it's a part of relationships and a part of life. It is a conversation where we have grown and matured… It's normal and it's not being afraid of getting heavy scrutiny or getting judgment. Over time, I have gotten more mature and reached that comfort level where I can talk about [sexual health]. I think it may be just an archetype of Asians, growing up more shy and less outgoing whereas Americans…they can talk about that type of stuff with ease early on.

This sentiment of "growing up" and fitting into American culture resonated throughout several interviews, especially among men who described their earlier years talking about sexual health as a "joke," then experiencing change through adulthood that led them to make decisions about vaccinating, pregnancy prevention, and preventing STIs. Women, however, were more comfortable discussing sexual health at a younger age. Overall, among all participants, there was some level of growth or maturity from being influenced by their parents and/or culture as a Vietnamese American and becoming independent, and becoming comfortable talking to peers about their sexual health issues. Interestingly, taking on a cultural identity of "silence" was relevant to many participants' stories, but many were open and willing to break the stereotype and discuss it with peers because they experienced growing up in American culture.

Peer Comfort Narratives

Participants described which peers they normally have sexual health conversations with and why they felt most comfortable discussing sexual health with them. Many explained that their peers whom they do discuss sexual health with are people they have

known for years, consider close friends, are open to such conversations, have gone through many important life experiences together, and are similar in personality or humor. Several women mentioned that discussing sexual health topics with their best female friends was easier than with a partner. For example, Kailey, a 27-year-old vaccinated woman mentioned:

> I find it a lot easier to talk about pregnancy and birth control [with friends] because I think we're all just like, 'Oh, we don't want to get pregnant' so then we just talk about what we're doing… it's kind of easier to get into it and then everyone just shares about what their method is. I feel very open and safe. [But with my boyfriend,] I usually feel nervous about bringing up [pregnancy and STIs]. But usually after we talk about it more and are comfortable with each other, then it's an open book.

Although women acknowledged that discussing these topics with friends was easier, the topic often also depended on the friend's level of comfort with the sexual health topic. For example, Sandra, a 25-year-old unvaccinated participant described that her friends' comfort levels are on a spectrum. She said:

> I do have friends who are very uncomfortable talking about [sexual health] and it's totally fine, but I think having friends who are uncomfortable talking about it puts up a barrier. Like obviously, I don't want to cross that barrier, but it makes it harder for me to want to talk to them about it so, then I have friends who are more informed, educated, and open. Those are the people I would go to for these conversations.

Some men described similar themes of friendship and relationship closeness that led them to feel comfortable discussing sexual health with their peers. More specifically, having similar experiences with family and ethnic identity cultivated a sense of comfort around the topic. Kenny, a 29-year-old participant said:

> To be honest, [I am comfortable with them] because I could relate to them. We all have similarities. We all met in a Vietnamese club, so there's a lot of big things that we could relate on: family, ethnicity, and age. I think those are what makes it so easy.

The way in which men discuss sexual health differed by relationship status. Men who were in relationships often described that they were more comfortable discussing sexual health with their partners rather than their peers. For example, Paul, a 34-year-old participant said: "[Sexual health conversations] are pretty casual it's pretty easy to talk to her about it. It doesn't feel awkward…You know, we can be honest with each other and it's pretty easy there's no like tension or anything like that at all." Men who were not in relationships, however typically said that discussing sexual health with their peers was usually awkward. If sexual health was discussed at all, it often occurred in a joking manner or in passing with their peers. For example, Alan, a 26-year-old participant said: "Only when we have a few beers, and we're kind of drunk then we'll start talking about [sexual health]. It's not really something where we just pop up say, 'Oh, how's your STD? How's your herpes?' (laughs)."

Participants chose to discuss topics with peers based on their relationship closeness and openness to sexual health conversations. Overall, women often confided in peers first and then turned to partners. The peer they chose to talk to depended on the relationship

and level of comfort. Furthermore, men in relationship often confided in their partners about sexual health issues. Those men who were not in relationships were less comfortable discussing sexual health with peers in the absence of a partner, but it would come up with friends as a joke or in an informal way. After describing the maturity process and identifying peers whom they were comfortable discussing sexual health, participants talked about their decision to vaccinate or not and explained reasons for doing so.

HPV Vaccine Decision Narratives

Vaccinating for HPV was an example of young adults displaying their maturity and independence to make health decisions for themselves. Among vaccinated participants, protection narratives emerged as the reason for vaccinating. Among unvaccinated participants, network influence narratives emerged as most prominent for not vaccinating.

Protection Narratives among Vaccinated

Many vaccinated participants shared about being proactive and accepting of HPV vaccination, which was a natural decision during young adulthood even if they had negative experiences around sexual health conversations in the past. Among participants who already knew about the vaccine, but had not received it during adolescence, they were proactive in bringing up the conversation to their doctor to vaccinate for self-protection or to protect their partners. For example, Helen, a 25-year-old participant said she initiated the conversation with her doctor. She said:

> My doctor never prompted it, but I was aware that you could get it up to age 26 and now they extend it to aged 45 so, I just asked him. And then, I got it. I just feel like it is extra protection, but I'm not concerned that I would get the HPV.

While most participants received the vaccine preventatively, there were a few participants who mentioned receiving it after receiving a positive HPV test. For example, Liem, a 39-year-old participant described his experience getting the vaccine after being diagnosed with HPV infection. He said, "I'm a gay male and so I want to reduce a lot of whatever health risks were possible. I had genital warts so I really wanted to protect myself from possibilities of getting anything, maybe precancerous or cancerous moving forward. So, I got the vaccine." Vaccinated participants were highly accepting of the vaccine and willing to discuss it with their peers, but unvaccinated participants were still hesitant to vaccinate because they received conflicting messages from trusted family members and doctors.

Network Influence Narratives among Unvaccinated

Several unvaccinated young adults were still heavily influenced by parents, less comfortable discussing sexual health with peers, and more hesitant to vaccinate due to negative or neutral messages from parents or doctors they had received during adolescence. For example, Kevin, a 21-year-old participant said: "I am not vaccinated because of parental reasons. They just wouldn't prefer me to get the vaccine, as of now so that's, the main reason why. I haven't fully looked into the vaccine either because I just trust my parents, so I haven't really looked into it…" Similarly, Kim, a 25-year-old unvaccinated

participant who mentioned being abstinent described her reason for not vaccinating. She said:

> It was really discouraged by my aunt and my parents [during adolescence] so I just never got it… I think they thought it might be a gateway. Just because you think you're vaccinated; you might be more likely to engage in more [sexual] activity that you may not otherwise engage in if you were not vaccinated. And then, a couple of months ago, I brought it up with a primary care doctor and then she discouraged because I think CDC guidelines say that by the time you're 26, there's really no point in getting it anymore. I was actually 24 when I went to see that doctor, but she said I was so close to being 26 anyways… there was no point in me getting it anyway.

Furthermore, one participant explained that his parents did not trust the medical system, which influenced his vaccine mentality. Nam, a 20-year-old unvaccinated participant mentioned that he did not receive the HPV vaccine because his parents taught him to not accept any "unnecessary" medical treatments. He said:

> I didn't really know about the HPV vaccine until, I want to say like a little over a year ago. I went to get my flu shot to volunteer at the hospital and the physician told me, "Hey, since you're getting your flu shot, do you want to get your HPV vaccine?" I was really unsure. Basically, a part of it was that I wasn't sure my health insurance covered the vaccine itself... I also didn't really think I was going to be sexually active at all so I didn't see the point of getting the vaccine. I just wanted to be in and out of the clinic… Also, another thing is that my parents always tell me that they always try to offer you something and to just say no because they're just trying to make money

off of you. That has influenced my decisions too. That's why I have that very in-and-out and get what I need mentality.

Joseph, a 35-year-old participant mentioned wanting to receive a test and vaccination, but a lack of recommendation from his provider led him to be complacent about it. He said: "I didn't see any point in pushing for the vaccine. They didn't push for the vaccine either. But I did want both, to get tested and the vaccine." These conflicting, unsupportive, or neutral messages from parents and/or providers seem to influence decision making processes even into adulthood. This is where vaccinated peers are in a unique position to pass along supportive messages to their unvaccinated counterparts using their experiences to support vaccination behavior; however, it is important to understand how and in what context HPV vaccine communication conversations may arise.

HPV Vaccine Communication Narratives

Less than half of participants (46%) said they had discussed HPV or the vaccine with peers or partners. HPV and/or the HPV vaccine usually came up in conversation when there was an event that sparked the HPV vaccine conversation among peers were triggered by vaccination, a positive HPV test, and discussions with providers. For the most part, HPV vaccine communication emerged through daily conversation or when participants themselves received the vaccine and then told peers about their experience. When discussing HPV vaccine communication narratives, participants described a) peer communication after vaccination, b) peer communication after HPV infection, c) partner communication, d) provider recommendations, e) non-discussion, and f) willingness to promote the HPV vaccination among peers.

Peer Communication after Vaccination

Participants mentioned discussing the HPV vaccine either because they or a peer received the vaccine, or they or a peer received a positive HPV test. Vaccinating for HPV frequently triggered conversations with peers that would not have otherwise happened. Several men described their experiences discussing the HPV vaccine and encouraging their friends to vaccinate because they did not know they were also eligible for the vaccine. For example, Minh, a vaccinated 22-year-old man discussed that his parents had not vaccinated him as a child so he made an appointment on his own to get the vaccine. He then told his best friend about his experience and suggested that he check his medical records. He said: "I mentioned to him, like 'Hey, by the way, dude, check if your family like opted you out of the vaccine, because my family did"… I basically was telling him like, 'Hey, you should do this because I did it.' Similarly, Jason, another vaccinated 27-year-old participant recommended the vaccine to his friend after vaccinating. He conveyed he had learned that men were eligible to receive the vaccine during his medical school studies. He explained:

> I have actually [discussed the vaccine] with a college friend of mine who also wanted to go to medical school. We did not realize that this is something that men should get as well, not just women. So, it came up because I had gotten vaccinated first, and we were talking about it. And then he ended up getting vaccinated too, but I think it came up because we both were not aware of the importance of getting vaccinated [until learning about it in medical school].

While some participants learned about the vaccine by simply checking their medical records or through school settings, some learned about it in other settings like their

workplace. Ashley, a 25-year-old participant who learned about the vaccine through her workplace (a cancer non-profit organization) said that she openly shared with family and friends about the vaccine after vaccinating. She said: "I'm pretty open about my health screenings and all that, so I just told everyone [about it]. I told my coworkers, my partner, my family members. I told them I got the vaccine and they should too."

Peer Communication after HPV Infection

Although supportive communication narratives came up directly after vaccinating, participants also encouraged the vaccine to their peers through conversations after disclosing their HPV status or hearing about their peers' stories. This disclosure often led participants to discuss the vaccine with their peers and advocate for vaccination behavior. For example, Liem, a 39-year-old man who identified as gay said:

> When I got HPV, I was definitely very open about it. I talked to one of my close friends about how I had it and it was really intense… I felt dirty. And I really wanted to like also talk about it because it's something that men oftentimes will talk about as well and relationship to you know our physical health and mental health. I mean there's a lot of conversations around HIV, AIDS, but not about any other STI, and so I talked to one friend about it to process everything. I think crossing the threshold is a little awkward. [To my friend,] I had to be like, "Hey, I have genital warts. I found sores on my butt." I think it's kind of funny but it's not. And she's like, "Really?" I was like yeah and then we got into the conversation about [HPV and the vaccine]…She didn't make fun of me about it. She was supportive and I really appreciated it. I also talked about this to my sisters too (laughs)… I wanted to share with them that the

> vaccine is out if they were interested… I mean HPV is so common. For me, it's like let's just not stigmatize anymore and let's be honest about it, especially now that we have a vaccine for like the most dangerous strains of it. Let's talk about it.

Similarly, Lan, a 31-year-old woman described her experience hearing about her friend who disclosed she had HPV and was not vaccinated. Although Lan was not eligible for the vaccine, her friend's story and regret for not vaccinating sooner encouraged her to do more research for herself. She told her story:

> We had dinner – we cooked together. We just talked about, 'Who are you seeing?' She just said she broke up with someone and [she got HPV from them]. She said, 'I wish my mom gave me the vaccination when I was younger.' Her mom didn't agree to let her get vaccinated. She told her, 'You're human. You can be immune by yourself.'

Partner Communication

Participants in relationships described conversations between them and their partners that sparked vaccination behavior or at least further questioning about the vaccine. Others who had very little knowledge, but received support from partners or peers were open to vaccinating. For example, Peter, a vaccinated 27-year-old described his experience:

> My wife was very transparent with all of this in the beginning which I really appreciated… To be frank, I'd never heard of it, or at least wasn't aware of [the HPV vaccine] during my youth. But when I started dating my, now wife, she was in med school and she mentioned, "Have you heard of the HPV series and Gardasil? It's

> overall something that you should consider." So, I did more research and it looked like something that should have been completed. That was what prompted me to go through that series.

Another participant, William, a 23-year-old participant also mentioned that his partner realized they didn't have their HPV vaccine after discussing it with him. He said:

> Recently, [my partner and I] were talking about vaccinations. I was helping my cousin who came from Vietnam to update his immunization records to match with the guidelines. I also was able to look and see what I potentially was missing and I discussed it with my partner. I asked, "Are you missing anything this? Like do you have this vaccine?" And then they mentioned that like, "Oh! I might actually be missing HPV. "

In relationships, one partner would receive the vaccine and encourage the other, however, there were some instances where discussions between partners also led to inaction for various reasons like lack of susceptibility or age recommendations. For example, Phuong, a 25-year-old vaccinated participant explained: "I did recommend it to my boyfriend…The conversation didn't really go anywhere. It just fizzled out so he didn't get it after we talked about it." These examples show that partner communication can provide another means of support for vaccinating, but messages need to be clear about risk, benefits, susceptibility/risk, and protection in order for partners to be convinced to vaccinate.

Provider Recommendation

Another way in which HPV vaccine conversations came up among peers was through daily conversation, especially if the conversation involves describing a medical visit. For example, Kim, an unvaccinated 25-year-old participant was initially discouraged from getting the vaccine by her parents and medical doctor (due to almost being on the verge of age eligibility). After discussing with her friend more about it and hearing what his doctor recommended, she was interested in learning about the vaccine. She said: "A friend of mine just mentioned that he was getting some blood tests done and apparently, his doctor told him that he never developed immunity against HPV, even though he already had the three shots and then he said he would have to get two doses again. So, then I was asking him what the process was like, and how far apart those doses are…because if it was convenient, I'd get it."

Similarly, Nam, a 20-year-old unvaccinated participant explained his thought process and discussion with friends after being recommended the vaccine by his doctor:

> I wasn't sure about insurance coverage, so I just wanted to play it safe. And then, additionally, since I know I'm not sexually active, it's not really a priority right now. For example, if it were like a COVID vaccine, I would obviously get it even if I wasn't sure if it was covered by my insurance because I know my likelihood of getting COVID compared to the HPV virus… I discussed [the vaccine] with my peers was after I had that discussion with my doctor just because it was fresh on my mind. I just told them what happened.

Tricia, a vaccinated 26-year-old woman described her interaction with her doctor, which led her to tell her peers about the vaccine later on. She said:

> The doctor at my university said, “It's really good that you're taking all the steps that you can to take preventive measures.” She told me to tell my friends and even guys to go get this vaccine, because a lot of them are not aware of it. Especially guys…they don’t know HPV can cause penile cancer.

While direct provider communication to tell patients to promote the vaccine to friends could influence vaccine decisions, there were also some instances where unvaccinated participants expressed that lack of provider recommendation or strong push to vaccinate led them to be complacent about it. For example, Joseph, a 35-year-old unvaccinated participant mentioned, “[When I was 25], I asked to get HPV tested and they did not want to test me so I didn’t see any point in pushing for the vaccine. [The doctor] didn’t push for the vaccine either. But I did want both, to get tested and the vaccine.”

These examples show medical providers not only have the unique position to encourage or discourage vaccination, but also the chance to further educate their patients on the benefits of vaccinating early even if they are not currently sexually active. Providers also have the opportunity to recommend that patients spread information to their peer network, which can be disseminated through word-of-mouth/ daily talk. Both recommending the vaccine to patients and encouraging them to discuss the vaccine with their peers could potentially result in better vaccination outcomes for young adults.

Non-Discussion

Over half of participants noted they had never discussed the HPV vaccine with their peers for several reasons including a) lack of knowledge about the vaccine, b) lack of

perceived importance due to cultural stigma, and c) lack of confidence to bring it up in conversation with peers.

Lack of Knowledge. Among those who had never discussed HPV or the vaccine with their peers, many were unvaccinated participants who lacked knowledge about the vaccine or were beyond the current age range recommendations. The majority of unvaccinated participants also were men. For example, several older participants (age >27) had never heard of the vaccine even though they had been eligible to receive the vaccine at some point in the last decade. Paul, a 34-year-old unvaccinated participant reflected on his experiences and said: "I didn't know about it. I didn't know that it was a big enough issue that I should be vaccinated against and also, it's never really come up anywhere in school or in conversation about getting vaccinated against [HPV]."

Lack of Perceived Importance Due to Cultural Stigma. Among those who were unvaccinated and had heard of the HPV vaccine, they had never discussed HPV because it did not seem relevant to them. Furthermore, cultural and parental influences also led to the perception that vaccinating was not important or stigmatizing. For example, Kevin, a 21-year-old unvaccinated participant mentioned not thinking it was important for him. He mentioned parental influence, the taboo of sexual health, and religion as reasons for not discussing and getting vaccinated. He said,

> My parents weren't even open to [talking] about relationships because they would like to prefer me to focus on school. So that's why the [HPV vaccine] wasn't promoted because they just want me to focus more on myself and, anything related

> to sexual health] seems more of a taboo than anything. Religion also kind of makes it harder to talk about.

Lack of Confidence. Among some vaccinated individuals, the topic simply never came up in a naturally occurring conversation or they did not know how to bring it up. When asked if they would be open to discussing the HPV vaccine with their peers, many were unsure of how to bring it up or how to frame the conversation. Van, a 19-year-old vaccinated participant said: "I personally don't like to recommend things [like the HPV vaccine] to other people because I'm not entirely sure what their stances on vaccines are."

Willingness to Promote Vaccination among Peers

While they were usually not sure how to bring up the conversation due to not knowing how peers will react, the majority of participants said they would be willing and open to advocating for the vaccine among their peers if they knew how. For example, Minh, a 22-year-old vaccinated man said:

> As a Vietnamese man, I need to be the one to advocate for more people to get the vaccine. Like it bothers the hell out of me that people don't know that, like everyone should be getting it. I just strongly believe in like this problem is just like it's so easy to fix… I have like a pretty big group of like guy friends that I talk to. I'm definitely going to be like, "Hey, I just had this chat about the HPV vaccine. I got the shot and turns out it is super easy. You should do it, too, you can avoid a lot of cancers from getting the shot and avoid giving people cancer." It's not like super-targeted or personalized may be online and like maybe not directly face to face it'd be a lot easier for me to just share that as like a resource and encourage people to look at it.

This sentiment and willingness to be peer advocates for the vaccine was shared across participants, even if they were unvaccinated or not completely comfortable having sexual health conversations. Participants felt comfortable enough framing the vaccine as a cancer prevention vaccine to promote vaccine behavior among their peers if the opportunity arose.

Discussion

The current study sought to describe culture-centric sexual health narratives and HPV vaccine communication among Vietnamese American young adults and their peers. This study is unique in the approach to understanding the cultural experiences and processes in which young adults go through to become comfortable discussing sexual health topics and HPV with their peers. Results suggest that family silence and shame lead young adults to seek sexual health information elsewhere. Consistent with our past work, young adults expressed experiencing a maturity process and gaining independence from their parents to make decisions on their own, such as vaccinating for HPV (Hopfer et al., 2017). Therefore, they learned about sexual health topics outside of the home through school, peers, work, or their doctor (Hopfer et al., 2017; Lee et al., 2013; Rawson & Liamputtong, 2010). Over time, young adults become more comfortable discussing sexual health topics with their peers as they mature and experience common life events like dating and relationships. Naturally, conversations evolve into discussing about health topics like encouraging each other to vaccinate for HPV either after they themselves vaccinate or peers vaccinating. Reinforcing positive and supportive communication about HPV vaccination through peer networks has potential to influence vaccine behavior.

Culture & Sexual Health Comfort Processes

The majority of participants mentioned that sexual health was a taboo topic in the Vietnamese culture and their family culture as well. In the family silence and shame narratives, silence around sexual health in Vietnamese American families like many Asian American families was common and expected (Nguyen, 2021; Trinh et al., 2014; H. A. Rawson & Liamputtong, 2010; J. L. Kim & Ward, 2007). Given that many young adults have grown up in a different culture than their parents, many do not believe their parents to be the best sexual health educators. Consistent with our past work, young adults expressed experiencing a maturity process and gaining independence from their parents to make decisions on their own, such as vaccinating for HPV (Hopfer et al., 2017). Therefore, they learned about sexual health topics outside of the home through school, peers, work, or their doctor (Hopfer et al., 2017; C. Lee et al., 2013; H. A. Rawson & Liamputtong, 2010). As the HPV vaccine may not be supported by all Vietnamese American parents early on in adolescence, these external sources of sexual health information are unique opportunities to introduce and reinforce the importance of vaccinating for HPV.

Many participants explained that after going through the maturity process, they felt comfortable discussing sexual health topics. with their peers' experiences and characteristics mirrored their own. Sexual health conversations usually came up in the context of conversations surrounding dating or relationships, which are relatable events that young adults experience. Several participants also mentioned that their peers were similar in ethnicity, which made cultural experiences easier to relate to (Trinh & Kim, 2021). The "homophily" of individuals within a social network has been shown to influence

health decisions (Berkman et al., 2000) as well as vaccination attitudes and norms (Konstantinou et al., 2021; Smith & Christakis, 2008). There is, however, a spectrum of comfort depending on the level of closeness and relationship with peers. This level of comfort influences which peers they are willing to disclose sensitive information to, which shows a more complex decision-making process than homophilic characteristics like gender, age, or ethnicity. This process aligns with the Disclosure Decision-Making Model, which suggests people make calculated decisions on whom they share sensitive information with depending on several factors (Greene et al., 2012).

Although the majority of participants were comfortable discussing sexual health with peers, there were differences by gender and relationship status—most notably among men. Women were much more comfortable discussing sexual health with peers early on compared to men, who were more so comfortable in adulthood, especially when in a relationship. Men who were not currently in relationships mentioned that sexual health conversations are typically uncomfortable, discussed as a joke, or in passing among peers. Men in relationships, however, described serious conversations that they had with their partners around pregnancy prevention, STIs, and sexual health. This observation is alludes to Gender Role Theory, which suggests that males and females tend to occupy socially ascribed roles and tend to be judged for how they ought to behave (Shimanoff, 2009). Prior research has identified gender socialization to be the main reason why women tend to seek health information while men avoid information until there is a diagnosis (Tabaac, 2016; Manierre, 2015). One explanation is that women are socialized to tend to their bodies more often than men, which indicates a gendered reactivity to illness and are more likely to

perceive their risk for getting sick (Gustafsod, 1998; Manierre, 2015). On the other hand, men are also likely to exhibit or conform to masculine norms, which leads to less perception of risk and less help-seeking behavior when it comes to health and cancer prevention (Courtenay, 2000; Gustafsod, 1998). Gender roles can lead to disparities in communication, health information seeking behavior, which cumulatively leads to disproportionate preventive behavior and vaccine uptake among men and women.

HPV Vaccination Knowledge Gap among Men and Unvaccinated Individuals

Our results showed gender plays a large role in vaccine disparities and differences in sexual health communication. Several men described not knowing about the vaccine until they were older or that they did not feel it was important for them. This is concerning because HPV is the most common STI in the U.S, (CDC, 2020) and can lead to several types of cancer, however, is seemingly the least important STI. This may be due to low education around the topic because the HPV vaccine and marketing around the vaccine increased at the time the majority of participants were already in high school and beyond (Kops et al., 2019). The vaccine is also heavily gendered as the majority of women had already received the vaccine, while many men were unvaccinated and had low knowledge of the vaccine (Hung et al., 2019; Meites, 2019). This is because the vaccine was initially approved for women and marketed for young adolescent girls. Little importance was placed on men vaccinating until recently. It was clear in our study that many male participants did not know about the HPV vaccine until later into adulthood, which shows the historical "feminization" of the HPV vaccine, leading to a gender vaccine disparity (Daley et al., 2017). Thus, there needs to be more education and emphasis on vaccinating both men and women.

In a similar vein, there is still a knowledge gap between those who are vaccinated and unvaccinated. This can be attributed to the knowledge gap hypothesis, which posits there are increasing differences in knowledge due to social and structural inequities (Viswanath & Finnegan, 1996; Zhang & Centola, 2019). Part of the knowledge gap is a result of the composition, attitudes, and ideas of a person's social networks (Zhang & Centola, 2019). A social network can influence the quantity and quality of the information received (Southwell, 2013; Zhang & Centola, 2019). Moreover, drawing from social contagion theory, attitudes and behaviors of an individual can be contagious to others in their social networks, which helps us to understand how vaccine behaviors can be adopted in a social network. In the context of vaccines, those who learned about the vaccine early on had received the vaccine, whereas those who did not learn about it prior continue to lack knowledge. There were some unvaccinated participants who were faced with negative attitudes from family and even doctors toward the vaccine during adolescence, which perpetuates vaccine hesitancy into adulthood (S. Quinn et al., 2016). While there was uncertainty, some participants conveyed they were open to it after discussing it more with peers or partners. Prior research emphasizes the importance of a provider recommendation (Gilkey et al., 2016), but this study shows that peer recommendations may reinforce vaccination messages and lead to behavioral change. This is consistent with the vaccine hesitancy literature that has observed that people have more positive vaccination attitudes and a greater likelihood of vaccinating when exposed to positive attitudes and discussions about vaccinations with family and friends (Konstantinou et al., 2021).

Combating Vaccine Hesitancy: Emphasis on Social Networks

In order to combat vaccine hesitancy, a multilevel approach is necessary. Strategizing how to spread information across multiple levels of influence is key to vaccination behavior (Ma et al., 2021; A. Oh et al., 2021). Health information also does not diffuse without opinions and attitudes attached (Konstantinou et al., 2021; Zhang & Centola, 2019); thus, reinforcing supportive vaccine messages at multiple points of communication can normalize behavior and nudge young adults to vaccinate (Pan et al., 2020). Peers may have HPV vaccine conversations when it comes up in daily conversations after vaccinating or talking to their doctor about the vaccine. This shows a doctor's recommendation is not only still extremely important for vaccine decision making (Gilkey et al., 2016), but also has the potential to spark conversations among peers in daily conversation. While a provider's positive recommendation can influence vaccine behavior, a neutral or lack of a recommendation may also drive young adults away from vaccinating or promoting the vaccine.

On the interpersonal level, peers can be trained to be peer health advocates and disseminate HPV vaccine information to their social network. With the development of social media and group chat technology, sharing health information to peer social networks may be more normalized and easier to do especially after the COVID-19 pandemic (Duong & Hopfer, 2020, 2021). Peers who have been vaccinated and normally discuss sexual health topics with peers (e.g., relationships and health) may be the ideal peer health advocate for a future peer-led intervention. Sexual health conversations can be a foot-in-the-door strategy to introduce HPV vaccination information among peers (Freedman & Fraser, 1966;

Guéguen, 2002). This approach suggests introducing a smaller request (naturally occurring sexual health conversations) in order to advance to a second request (e.g., vaccinating for HPV). Talking about the HPV vaccine in the context of sexual health conversations that peers are already comfortable with can make it more acceptable among peers. This technique can help ease peers into learning more about the vaccine, feel supported about vaccinating, and decide to vaccinate. Culture-centric peer sexual health narratives may be used to promote HPV vaccination and sexual health prevention behavior among Vietnamese American young adults.

On an organizational and policy level, a number of vaccinated participants mentioned learning about the vaccine or vaccinating through their university student health center, health courses, and/or workplace (McLendon et al., 2021). Vaccinating through these organizations also helped to spur conversations and vaccine recommendations among peers. This indicates the need for more organizational and policy changes to educate and support vaccinating. The caveat to this, however, is the increasing politicization of vaccines during the pandemic, which may be an additional barrier to achieving this goal (Saulsberry et al., 2019). As this type of policy change may not be feasible given the current times, we can at least educate about the benefits and begin to disrupt vaccine hesitancy using a social network approach.

Limitations

In light of the pandemic, there were several limitations and/or challenges that arose during the study. Recruitment occurred virtually through an initial survey that participants filled out, but many participants were no longer interested by the time they were contacted

to schedule a meeting. The $50 incentive did increase interest participation in the interview phase; however, participants for the interview were recruited from initial surveys, which was optional based on interest. Women were more interested in participating in the interviews compared to men, however, purposive sampling of men helped to recruit additional men to the study. Moreover, vaccinated participants were more interested in the interview component than unvaccinated participants, which led to a low sample size of unvaccinated participants. These limitations may introduce self-selection and social desirability bias into the study (Noble & Smith, 2015), but we only purposively sampled by gender to compare gender differences, leaving vaccination status open to chance.

The interviews were conducted virtually, which was convenient and accessible for participants but had many challenges as well. The advantages of this format were that it facilitated high retention, was a cost-effective method of data collection, convenient for participants, allowed us to expanded the geographic reach and range of participants, and included participants who otherwise may not have been able to attend in-person (Boland et al., 2021). The disadvantage of this format was that some participants chose not to show their faces on screen, so it was difficult to read non-verbal cues around comfort in discussing these sensitive topics. Furthermore, there were instances of technology glitches, issues with network connection, participants (and researcher) not being about to find a private, quiet space at home or school (Boland et al., 2021; Hensen et al., 2021). One of the biggest disadvantages was not being able to being about to control who was present in the background for participants, which may have impacted their comfort level or ability to disclose all their thoughts (Hensen et al., 2021). To mitigate this problem, participants were

emailed the interview guide ahead of time to determine their space needs and reflect on the questions ahead of time. While this was a strategy used to help the interview flow, many participants were busy and did not view the document ahead of time as expected.

Conclusion

From this study, we learned that peers discuss sexual health, which could be a foot-in-the-door approach (Guéguen, 2002) to discussing and recommending HPV vaccination. We also learned that culture can negatively impact comfort with sexual health conversations, but also be a driver and motivator for being proactive about health issues. Also, the quantity and quality of family, patient-provider, and peer communication can impact young adults' perception of how important the HPV vaccine is for themselves and their peers. How these conversations arise may either increase vaccine hesitancy or make vaccinating normal and acceptable. A multilevel intervention is the best approach for emphasizing positive vaccine messages, however, it is essential to strategize how to introduce and reinforce vaccine messages in a positive light in order to lead to vaccine acceptability and behavior. Lastly, it is also important to note that this generation of young adults is the new generation of parents in the upcoming years. Thus, educating them about the vaccine for themselves may encourage future vaccination for the next generation of children/adolescents.

Tables and Figures

Table 5.1 Sample Characteristics

	Females, n=13(%)	Males, n=13(%)	Total, n=26(%)
Age			
18-21	2 (15)	3 (23)	5 (19)
22-25	7 (54)	2 (15)	9 (35)
26-29	3 (23)	5 (38)	8 (31)
30-33	1 (8)	0 (0)	1 (4)
34-37	0 (0)	2 (15)	2 (8)
38-40	0 (0)	1 (4)	1 (4)
Vaccination Status			
Vaccinated (at least 1 dose)	10 (77)	8 (62)	18 (69)
Unvaccinated	3 (23)	5 (38)	8 (31)
Regular Primary Care Provider			
Yes	12 (92)	12 (92)	2 (8)
No	1 (8)	1 (8)	24 (92)
Ever Discussed HPV/ HPV vaccine with peer			
Yes	5 (38)	7 (54)	12 (46)
No	8 (62)	6 (46)	14 (54)
Location			
California	8 (61)	7 (54)	16 (62)
Alabama	0 (0)	1 (8)	1 (4)
Florida	2 (15)	0 (0)	2 (8)
Massachusetts	0 (0)	1 (8)	1 (4)
Minnesota	0 (0)	1 (8)	1 (4)
New York	1 (8)	1 (8)	2 (8)
Oregon	1 (8)	0 (0)	1 (4)
Texas	1 (8)	0 (0)	1 (4)
Washington	0 (0)	1 (8)	1 (4)

Table 5.2. Summary of Narratives

Culture-Centric Sexual Health Communication Narratives	
Silence and Shame	Young adults described not being comfortable discussing sexual health with family members due to cultural silence and it being a taboo/shameful subject. Despite this, it pushed them to be comfortable discussing it outside the family context.
Maturity	Young adults described a maturity process of growth that led them to eventually be comfortable discussing sexual health with peers. Some also felt they had to justify to their peers being comfortable talking about sexual health given the racial stereotype that Asians are "shy and less outgoing" equating to not being able to openly discuss sexual health.
Peer Comfort	Young adults described being comfortable discussing sexual health with peers who are close in relationship, age, similar gender, personality, and ethnicity/culture. More importantly, peers who were going through similar experiences like relationships and taking birth control for pregnancy prevention were easy to talk to.
HPV Vaccine Decision Narratives	
Protection among Vaccinated	Vaccinated young adults showed their maturity and decided independently as an adult to vaccinate for HPV to protect themselves or their partners.
Network Influence among Unvaccinated	Unvaccinated young adults decided to not vaccinate for HPV even during adulthood because of negative messages they previously received from their family members and doctors.
HPV Vaccine Communication Narratives	
Peer Communication after Vaccination	Young adults told their peers to vaccinate after they themselves vaccinated.
Peer Communication after HPV Infection	Young adults told their peers to vaccinate after receiving a positive HPV test to warn their peers about possible infection.
Partner Communication	Partners discussed HPV vaccination with each other in the context of their relationship.
Provider Recommendation	Providers recommended the vaccine to young adults and told them to tell their peers about it too.

Non-Discussion	Many young adults described not discussing HPV vaccination because it never came up naturally in conversation for various reasons.
Lack of Knowledge	HPV vaccination does not come up in conversation if young adults lack knowledge about the vaccine recommendations.
Lack of Importance Due to Cultural Stigma	HPV vaccination does not come up in conversation if young adults perceive the vaccine as stigmatizing or not important for them, especially if they are not sexually active.
Lack of Confidence	HPV vaccination does not come up in conversation if young adults do not feel confident about how to bring up the conversation to peers.
Willingness to Promote HPV Vaccination among Peers	Whether participants had discussed HPV or not with peers, they were willing to discuss and promote HPV vaccination with peers in the future if the opportunity arose.

CHAPTER 6: CONCLUSION

This dissertation sought to investigate whether peers are a source of supportive communication for HPV vaccine behavior. We also wanted to examine whether communication and vaccination differs by gender as well. Furthermore, we observed how culture contributes to both peer sexual health and HPV vaccine conversations. These research studies were built on a blending of several theoretical frameworks including Berkman et al. (2000)'s Social Networks and Health framework, social support theory, gender role theory, and narrative theory to better understand the interplay between socio-structural conditions (gender and culture), psychosocial mechanisms (peer sexual and HPV vaccine communication), and health behavioral pathways (vaccination uptake). The current dissertation contributes to the literature a) a validated measure of perceived and received supportive communication about HPV vaccine among Vietnamese American young adults, b) an understanding of gender differences in communication and vaccination status, and c) a cultural perspective on how HPV vaccination conversations arise in the context of sexual health conversations among Vietnamese American young adults.

This work fills several gaps that have either not been previously addressed or were scarce in the literature. To narrow the ethnic health disparities gap, this research contributes disaggregated vaccine data among Vietnamese American young adults who had not been previously vaccinated as an adolescent, which has been sparse in the literature thus far. Furthermore, this work includes young adult men in the discussion of the HPV vaccines, which only recently has received more attention. This dissertation research also proposed a new measurement scale for peer supportive communication about the HPV

vaccine. Lastly, findings bring forth the intersection between Vietnamese American culture, sexual health communication, and HPV vaccine communication narratives in the context of young adult peer relationships as a potential way to reach other unvaccinated young adults in the community.

Summary of Findings

Chapter 3 contributes a peer received supportive communication about HPV vaccination (RSC-HPV) scale and a peer perceived supportive communication about HPV vaccination (PSC-HPV) scale. Based on social support theory, we found that the model containing three dimensions of informational, emotional, and instrumental supportive communication fit the data adequately for both scales. The RSC-HPV scale showed that each dimension was associated with HPV vaccination uptake, but collectively, the three dimensions were not significantly associated with HPV vaccination uptake. Furthermore, results showed that the PSC-HPV scale each dimension was related to vaccination, but only perceived instrumental supportive communication remained related after controlling for relevant variables. This is a scale that other researchers could adapt for use in other minority populations; some strategies are suggested to improve the measure for future use.

Chapter 4 furthers our understanding of gender differences in received/perceived supportive communication, sexual communication frequency, and HPV vaccination uptake in our sample of Vietnamese American young adults. In our sample, there were no gender differences in vaccination status, which could perhaps indicate a closing gap. Women received less supportive communication compared to men, and particularly less instrumental supportive communication. Results also suggest that perceived instrumental

supportive communication is significantly related to HPV vaccination uptake, which could refer to a cultural explanation that asking for support is not a Vietnamese cultural norm, but perceiving support can contribute to vaccination uptake. Results also suggest two groups of young adults: those who are more sexually experienced/ independent from parental influence and those who are more conservative and heavily influenced by their network for vaccine decision making. Future directions for research include further study of sexual activity status, sexual conservatism/ values, and culture influences on vaccination perceptions and uptake.

Chapter 5 describes culture-centric sexual health and HPV vaccine narratives among Vietnamese American young adults. From the literature and our study, we know that providers have a strong role in vaccination uptake among young adults, however, peers can contribute to vaccine decision-making especially when there has been previous pushback from providers and parents. Culture can negatively impact comfort with sexual health conversations, but also be a driver and motivator for being proactive about health issues. Also, the quantity and quality of family, patient-provider, and peer communication can impact young adults' perception of how important the HPV vaccine is for themselves and their peers. How these conversations arise may either increase vaccine hesitancy or make vaccinating normal and acceptable. Conversations with peers may arise after vaccinating, receiving an HPV diagnosis, discussing with doctors, and with partners. Non-discussion narratives occurred due to a lack of knowledge, cultural stigma, and lack of confidence in bringing up conversations. Peers discuss sexual health information with each other which can influence vaccine behavior. Findings inform the future development of a culture-centric

peer-led intervention to increase HPV vaccination. Acknowledging similar cultural experiences may lead to vaccination using peers a source of information.

Future Research

This dissertation research serves as a starting point for further understanding the contribution of peer support and communication to vaccine behavior. These studies showed that Vietnamese American young adults do discuss sexual health and HPV with their peers, which could be a foot-in-the-door approach to discussing and recommending HPV vaccination (Guéguen, 2002). It is important to note that findings in this study represent a group of young adults who were not previously vaccinated as adolescents. It is also clear that peers are not the main driver for vaccination uptake unless negative messages were received from parents and providers earlier on. While received and perceived supportive communication can encourage vaccine behavior to an extent, messages also need to be supportive from other sources.

Future research should empirically test whether peer supportive communication contributes to vaccine uptake in the absence of provider or parent communication. Furthermore, inclusion of variables like sexual activity status, sexual conservatism/ values, and culture influences could lead to a better understanding of how to target unvaccinated young adults who hold more conservative beliefs around sexual health. Moreover, future research should investigate the relationship between peer supportive communication and HPV vaccination uptake if individuals *ask* for support. Future research in this area should also further explore the specific source(s) of vaccine recommendation, time of recommendation, and vaccine hesitancy status. Given the current times during this

pandemic recovery period, vaccines are especially a sensitive topic of conversation. Therefore, understanding who is most trusted in an individual's personal network given possible vaccine hesitancy would provide insight into the best ways to intervene for increasing HPV vaccine and other important vaccines. In practice, there are some potential, proposed intervention strategies for promoting HPV vaccination among those unvaccinated young adults.

Implications for Practice

On the community level, a multilevel intervention targeting the interpersonal, organizational, and policy levels would be the best approach for emphasizing positive vaccine messages (Hopfer et al., 2017; Ma et al., 2021; A. Oh et al., 2021). This includes the involvement of different people in the network like providers, parents, and peers embedded within community clinics, universities, and workplace wellness programs (Ma et al., 2021). In addition to supportive messages, incorporating culture-centric narratives to ground messages in cultural experiences could increase the effectiveness of messages (Hecht & Krieger, 2006; Hopfer, 2012b). On a network level, using technology-based interventions such as social media chat apps among peer friend groups with Peer Health Advocates could facilitate greater comfort in discussing sensitive topics and promote behavior (Duong & Hopfer, 2020, 2021). In addition to communication interventions, there needs to be more structural support for men's vaccination (e.g., consistent provider recommendation, normalizing behavior, insurance coverage, clear vaccine guidelines) (Daley et al., 2017; Kops et al., 2019; Pan et al., 2020). These recommendations may help to facilitate culturally acceptable norms around HPV vaccination, ultimately reaching vaccine equity among Vietnamese American young adults in the U.S.

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APPENDICES

Appendix A: Survey Questions

"Peers" include friend peers and family peers (e.g. cousins, siblings, relatives you consider to be your peers)

Warm-up questions

This section will ask you questions about your frequency of communication about health with your peers.

1. How often do you discuss general health topics (e.g. diet, exercise, wellness) with your peers?
    a. Always
    b. Very Often
    c. Sometimes
    d. Rarely
    e. Never

2. What types of health topics do you discuss with your peers?
    a. Diet
    b. Exercise
    c. Mental health
    d. Cancer prevention
    e. Infectious diseases
    f. Sexual Health
    g. Other: _____
    h. None of these topics

3. Which of the following topics with your peer family members?
    a. Breast cancer
    b. Cervical cancer
    c. Oropharyngeal cancer
    d. Stomach cancer
    e. Liver cancer
    f. Lung cancer
    g. Skin cancer
    h. Colorectal cancer
    i. Vaginal cancer
    j. Penile cancer
    k. Anal cancer

Social Network Characteristics

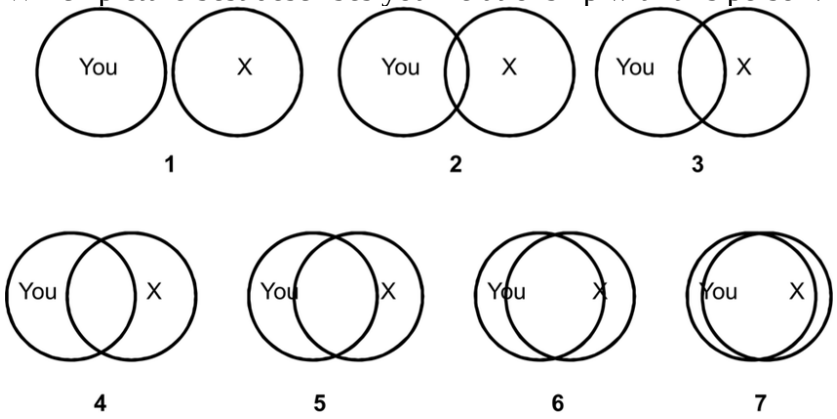
This section will ask you to identify who you feel comfortable discussing sexual health with in your peer network.

1. Please think of 3 people in your life whom you feel **most** comfortable discussing sexual health with in your peer network. Rank them in order from most comfortable to less comfortable.
    a. Friend
    b. Cousin
    c. Sister
    d. Brother
    e. Aunt
    f. Uncle
    g. Spouse/Partner
    h. Close Friends
    i. Other: _____
    j. I don't talk to anyone about sexual health.

2. How old is that person? ____

3. What is the gender of that person?
    a. Female
    b. Male
    c. Other: _____

4. Which picture best describes your relationship with this person?



Peer Sexual Communication Frequency Scale

In this section, we ask you to think about the sexual communication you have had with your peers (friends, siblings, cousins, close-age relatives) at this point in your life. Please select how often you have talked to your peers about each of the following subjects.

Options (1= Never discussed, 2= Discussed once, 3= Discussed a few times, 4= Discussed frequently)

1. STDs (other than HIV/AIDS)
2. HIV/AIDS
3. Condom Use
4. Unplanned pregnancies
5. Abortion
6. Abstinence
7. Oral sex
8. Resisting sexual pressure
9. Monogamy (having only one partner)
10. Fidelity (being faithful to a partner)
11. The enjoyment/fun/pleasure of sexual relationships
12. Parents' attitudes about me having sex
13. Masturbation
14. Rape/molestation/sexual harassment
15. Resources available to help with family planning
16. Resources available to help deal with sexual trauma/rape
17. Statistics about sexually active young adults
18. Gender specific information (menstruation, ejaculation)
19. Non-sexual ways to show love
20. Sexual orientation

HPV Vaccination Questions

The HPV vaccine protects against HPV-related cancers including cervical cancer, oropharyngeal cancer, anal cancer, penile cancer, vulva, and vaginal cancer. The Advisory Committee on Immunization Practices (ACIP) recommends a catch-up vaccination as primary prevention for young adult men and women up to age 26 and between 27-45 (if needed).

Options: (0= No, 1= Yes)

1. Has a doctor ever recommended the HPV vaccine to you?
    a. Yes
    b. No
2. If yes, at what age were you recommended this vaccine?
    a. Before age 18
    b. After age 18
    c. Never
3. Have you ever discussed sexual health with a parent or guardian?
    a. Yes
    b. No
4. Have you ever discussed the HPV vaccine with a parent or guardian?

    a. Yes
    b. No
5. Have you been vaccinated for HPV?
    a. Yes
    b. No
    c. I don't know.
6. How many doses did you receive?
    a. 1
    b. 2
    c. 3
    d. I don't remember.

HPV Vaccine Knowledge (T/F)

1. HPV vaccines require three doses.
2. The HPV vaccines offer protection against all STIs.
3. Someone who has had HPV vaccine cannot develop cervical cancer.
4. The HPV vaccines offer protection against most cervical cancers.
5. One of the HPV vaccines offers protection against genital warts.
6. Women who have had the HPV vaccine do not need a [Pap test].
7. Men can also receive the HPV vaccine.
8. Young adults between 18-26 should also receive the HPV vaccination.

Other HPV Vaccine Barriers (if unvaccinated)

Options: (1= Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree)

1. It would be hard to find a provider or clinic that would be easy to get to for getting vaccinated against HPV.
2. It would be hard to find a provider or clinic where I could afford the HPV vaccine.
3. It would be hard to find a provider or clinic that has the HPV vaccine available.
4. I am concerned the HPV vaccine costs more than I can pay.
5. It would be hard to find a provider or clinic where I don't have to wait a long time to get an appointment to be vaccinated.

HPV Vaccine Perceived Behavioral Control (for unvaccinated participants and if participants answer "I don't know" to HPV vaccination status)

Options: (1= Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree)

1. I feel confident in my ability to get vaccine for HPV even if getting the shot hurts a little.
2. I feel confident in my ability to get vaccinated for HPV, even if it is expensive.
3. I feel confident in my ability to get vaccinated for HPV, even if it means finding time to go to the doctor three times.

HPV Vaccine Intention (if unvaccinated)

Options: (1= Not likely at all, 2= Not very likely, 3= Neutral, 4= Likely, 5= Very likely)

1. How likely will you get the vaccine today if it was available for you?
2. How likely will you get the vaccine within the next 6 months?
3. How likely would you get the HPV vaccine if it were completely free?

Supportive Peer Communication about HPV

This section will ask you questions about your communication about HPV and HPV vaccine with your peers.

1. Have you ever discussed HPV or HPV vaccination with your peer family member(s)?
    a. Yes
    b. No

Please rate your level of agreement with the following statements. (1= Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree)

2. My peer family member was supportive of me getting the HPV vaccine.
3. My peer family member encouraged me to get the HPV vaccine.
4. My family member gave me information about the HPV vaccine.
5. My peer family member offered to attend the doctor's visit with me.
6. My peer family member discussed with me importance of getting the HPV vaccine.
7. My peer family member drove me to the doctor to get the HPV vaccine.
8. My family member offered to help pay for the vaccine for me.
9. My peer family member did something to help me stick to my vaccine schedule.
10. My peer family member praised me for my efforts to go get vaccinated.
11. My peer family member showed that they understood the importance of me getting vaccinated.
12. My peer family member helped motivate me to get vaccinated even when I did not want to go.
13. In general, how helpful or unhelpful were these efforts by the people in your life to support your efforts to get the HPV vaccine?
    a. Very unhelpful
    b. Unhelpful
    c. Neither helpful not unhelpful
    d. Helpful
    e. Very helpful

Perceived Supportive Communication about HPV (if answer "no" to SC #1)

This section will ask you questions about your communication about HPV and HPV vaccine with your peers.

1. Why have you not discussed HPV vaccination with your peer family member?
    a. It has never come up when talking with peer family members.
    b. I am not comfortable talking about it with peer family members.
    c. Other: _____

Please rate your level of agreement with the following statements. (1= Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly agree)

2. My peer family member would be supportive of me getting the HPV vaccine.
3. My peer family member would encourage me to get the HPV vaccine.
4. My family member would give me information about the HPV vaccine.
5. My peer family member would offer to attend the doctor's visit with me.
6. My peer family member would discuss with me importance of getting the HPV vaccine.
7. My peer family member would drive me to the doctor if I asked to get the HPV vaccine.
8. My family member would offer to help pay for the vaccine for me if I needed it.
9. My peer family member would do something to help me stick to my vaccine schedule.
10. My peer family member would praise me for my efforts to go get vaccinated.
11. My peer family member would show that they understood the importance of me getting vaccinated.
12. My peer family member would help motivate me to get vaccinated even when I do not want to go.

Demographic Characteristics

1. What is your age in years?

2. What is your gender?
    a. Male
    b. Female
    c. Other _____
3. Do you have health insurance?
    a. Yes
    b. No

4. How many years have you lived in the U.S?
    a. (year selection tool)

5. What is your level of religiosity in general?
    Options: 0 1 2 3 4 5 6 7 8 9 10

6. How well do you understand English when spoken to you?
    a. Very well
    b. Well
    c. Somewhat well
    d. Not well
    e. Not at all

7. How well do you speak in English?
    a. Very well
    b. Well
    c. Somewhat well
    d. Not well
    e. Not at all

8. How well do you read in English?
    a. Very well
    b. Well
    c. Somewhat well
    d. Not well
    e. Not at all

9. How well do you write in English?
    a. Very well
    b. Well
    c. Somewhat well
    d. Not well
    e. Not at all

10. Would you be interested in participating in a follow-up study/ online Zoom interview to talk about how sexual health conversations come up with your peer family members? (if yes, you will be directed to another page at the end of the survey)

Appendix B: Interview Guide

Introduction: To introduce myself, my name is Theresa and I am a PhD student at UCI. I am hoping to learn more about how peer family members communicate about sexual health and the HPV vaccination. I want to start off by acknowledging that I am very grateful for your participation today and that you are helping to advance knowledge about an important topic among Vietnamese American young adults.

So to begin, let me share my screen to go over the interview procedures.

Study Procedures: To reiterate, your participation in this study is both voluntary and confidential. Your responses will not be associated with your name in any way. Only I have access to your contact information, and will not share it with anyone else. Any published data will be de-identified.

This interview will be audio recorded so I can transcribe our conversation – you can choose to share your screen or not. Today we'll be talking about your experiences discussing sexual health and the HPV vaccination with your peer family members.

Consent: To start, do you consent to participate in this interview?

Thank you, let's begin. I will begin the recording now.

Introduction questions

1. What is your age?
2. Do you have a regular primary care provider?
3. Do you have health insurance?
4. Where do you live?

Sexual Health Narratives

Introduction: The World Health Organization defines sexual health as a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships.

Topics may include: abstinence, sexual behaviors, sexually transmitted diseases, reproductive health, sexual violence, pregnancy, HIV/AIDS prevention, LGBT Health, etc.

5. Warm-up: Can you tell me of a time in which you discussed a sexual health topic with a peer?
    a. What was the experience like?
    b. How did your peer react?
    c. How did the conversation come up?

d. Was the conversation online or in-person?
e. How did you feel when this conversation occurred?

Peer Characteristics

1. Who in your peer network do you find most comfortable in discussing sexual health with?
    a. Why do you feel most comfortable with this person?
    b. Can you describe your relationship with this person(s)?

Cultural Experiences

2. How do you think culture plays a role in your sexual health discussions with your peers?
    a. ***Probes:*** How does your peer play a role in whether or not you can have open discussions about sexual health?
    b. ***Probe:*** How would you describe your Vietnamese-American cultural identity? How does your Vietnamese American cultural identity play a role if at all in sexual health conversations?
    c. How do personal religious beliefs play a role in whether or not sexual health discussions occur?

HPV Vaccine Communication Narratives

3. Have you received the HPV vaccination?
    a. At what age did you receive the vaccination?
    b. How many doses did you receive?
    c. ***If vaccinated:*** What or who prompted you to receive the HPV vaccination as an adult?
    d. ***If not vaccinated:*** Why are you not vaccinated? What influences your decision to get vaccinated?
4. Have you ever been tested for HPV? (typically, an HPV test following a positive Pap test)
5. Have you ever discussed the HPV or the HPV vaccine with a peer?
    a. How did you hear about HPV/ the HPV vaccine?
    b. How did it come up?
    c. Would you feel comfortable discussing HPV with your peers?