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Promoting HPV Vaccination for Male Young Adults: Effects of Social Influence

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**PROMOTING HPV VACCINATION FOR MALE YOUNG ADULTS:
EFFECTS OF SOCIAL INFLUENCE**

by

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DEDICATION

To my *hero*, my *dream maker*, and my *shining star*

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I have an almost endless list of people to thank, and I would not have been able to complete this dissertation without any one of them – but here I would definitely like to start with my gratitude toward Dr. Ran Wei, my major professor, and Dr. Augie Grant, Dr. Brooke McKeever, and Dr. Suzanne Swan, my dissertation committee members. All of them have been very helpful during my doctoral studies, advising me on various aspects including research, studies, teaching, future career, etc. I would also like to thank all faculty members in the School of Journalism and Mass Communications, since I have learned a lot from each of them during the past three and a half years. And I am grateful to all staff in the School for their support in every step during my doctoral studies. I also need to thank my cohort in the United States, and my friends and professors in Hong Kong, for their academic and emotional support during my studies.

Of course, my gratitude to my dear family is beyond words.

ABSTRACT

HPV vaccination is an important public health issue, but past research has mostly been done on the HPV vaccination for females. This study explores promotions of the HPV vaccination for men, focusing on how social influence plays a role in influencing young male adults' attitudes toward the HPV vaccine. An online survey was conducted on Amazon Mechanical Turk, and responses from 656 males aged 18-26 in the United States were analyzed. Results indicated that exposure to messages were associated with perceived effects of the messages on others, which related to the perceived descriptive norm of vaccine uptake among other males. However, the perceived injunctive norm was more powerful in predicting support for the HPV vaccination for males than the perceived descriptive norm. Perceived descriptive norm were found to be associated with how men attributed the responsibilities of HPV infections and vaccinations to the self or to women, which in turn related to support for the vaccine. Findings point to suggestions for future promotions of the HPV vaccination for males.

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CHAPTER 1

INTRODUCTION

Context of study: HPV vaccination for men

Human papillomavirus (hereafter HPV) refers to a group of more than 150 viruses that can be transmitted through sexual contact including vaginal, anal, or oral sex with someone who has the virus. Some types of HPV can cause health problems including cervical cancer, oropharyngeal cancer, genital cancers at the vulva, vagina, penis, or anus, genital warts, and warts in the throat. HPV is the most common sexually-transmitted infection in the United States, according to a report from the CDC (CDC, 2014a).

According to the statistics compiled by CDC, there are around 12,900 new cases of cervical cancer each year, but only around 1,820 new cases of penile cancers and 2,640 new cases of anal cancers in men. Almost all cases of cervical cancer are related to HPV, but only 63% of penile cancer and 91% of anal cancer are related to HPV (American Cancer Society, 2015a; American Cancer Society, 2015b; American Cancer Society, 2015c; CDC, 2014b; CDC, 2015).

While both men and women can be infected by HPV and transmit the virus to others, and the most common health problems caused by HPV happen to women, the good news is that it is preventable. The CDC recommends both males and females aged through 9-26 to be vaccinated. On June 8, 2006, the FDA approved the use of the first HPV vaccine on female; but it was not until October 16, 2009 that the HPV vaccine was approved to be used on male (FDA, 2014). Now there are three types of HPV vaccines,

and two of them (Gardasil and Gardasil 9) protect against cancer and genital warts in both females and males. Three shots of the vaccine should be given over six months, and each shot costs around USD130 to USD140, not including the doctor's charge. Some insurance plan covers the cost, but it depends. Common side-effects are minor, including injection-site reactions, fever, and headache (CDC, 2014b; American Cancer Society, 2014). In 2015, the estimated coverage of HPV vaccine (with no less than 3 doses) in adolescent females aged 13-17 in the U.S. was 39.7%, while the coverage in male aged 13-17 was only 21.6% (CDC, 2015).

It is not surprising that the coverage of HPV vaccines is much higher in females than in males. Gilbert et al.'s (2011) online survey indicated that only 37% of the heterosexual men were willing to receive HPV vaccine. There are several important barriers to persuade males to get the HPV vaccine. The cost for three doses, is prohibitively high. Awareness of the benefits of the vaccine for men, including preventing penile cancers, oropharyngeal cancers, anal cancer, genital warts, and recurrent respiratory papillomatosis (RRP) (a particular type of warts that grow in the throat), are generally lower than awareness of the benefits for women. Although recommended by the CDC, the HPV vaccine is still not a part of standardized healthcare in the medical routine. More importantly, public perceptions of the vaccine represented yet another problem. The vaccine carries a stigma of being an STD vaccine or promiscuity drug. And people doubt the vaccine for unfounded safety concerns. The HPV vaccine is also still perceived to be a female vaccine, due to its strong linkage with prevention of cervical cancer (Venable et al., 2011). Chesson et al. (2011) estimated the cost-effectiveness of vaccination of 12-

year-old males, indicating that male vaccination would be cost-effective when the female HPV vaccination coverage was low – which is the current situation.

Hence, the HPV vaccination for males faces major problem from a communication perspective in low-level of public awareness, lacking of proven effectiveness, and stigmatized perceptions of people taking the vaccine. While Chesson et al. (2011) suggested that male vaccination would only be cost-effective when the female HPV vaccination coverage was low, Zimet & Rosenthal (2010) suggested the cost-effectiveness approach has its own limitation, and public health policy should not solely rely on this approach to address the problem. On the other hand, the HPV vaccination represents an opportunity for education and research for the sake of improving public health (Zimet & Rosenthal, 2010). Given the current situation that only 4 out of 10 females have been completely vaccinated, the HPV vaccination for males is in need for effective public health campaigns promotions.

In sum, the HPV vaccination for men is a challenging opportunity for communication and public health scholars as well as a significant topic to investigate. When the HPV vaccine is associated with sexually-transmitted diseases that are stigmatized in the society, how to promote HPV vaccine uptake in men merits research for a solution.

Goals of Study

The present study investigates how informative messages about HPV vaccination for men can be effective to seek a fuller understanding of the communication problems. To be specifically, I conducted the study with a perceptual effect approach coupled with a ego-network analysis. The rationale for such an incorporated design is

based on the following considerations: First, how social psychological factors and social influence was related to support for vaccination for males were investigated. Next, investigation involves individuals' discussion networks - by examining egocentric variables, the relationship between social influence from discussion networks and attitudes toward the vaccine is explored. This analytical approach is original and holds the promise to break some new research ground.

This study aims to examine how messages on HPV vaccine for males can be effective in influencing men's intention to be vaccinated and their support for male's HPV vaccination with an emphasis on the role of social influence. To do so, the influence of presumed influence model (Gunther & Storey, 2003) was applied as the major theoretical framework. Concepts from other media effects theories such as theory of reasoned action (Ajzen and Fishbein, 1973; Fishbein & Ajzen, 1975), the health belief model (Becker, 1974), and the theory of normative social behavior (Rimal & Real, 2003) were also incorporated into the theoretical foundation of this study. Supported by ample evidence (such as Gunther & Storey, 2003; Chia, 2006; Sun, Shen & Pan, 2008; Wei, Lo, & Lu, 2008, 2010), these theories of media effects not only underscore biased perceptions of media messages, but the biased perception can influence people's behavioral intentions. That is, when people perceive others to be affected by the message, their perceived social norm will alter because of such perceptions. As a result, they would likely change their own behavior. This study aims to expand the literature by testing the perceptual effect of public health messages about HPV vaccination for men. In particular, the possible different roles of descriptive and injunctive norms regarding behaviors were assessed.

The second aim of the study is to examine the relationship between different perceived benefits and risks presented in the messages about HPV vaccination for men and their attitudes toward the vaccine. The HPV vaccine can prevent genital warts and cervical cancer in women, and it can also prevent genital warts and certain cancers in men. However, due to the low risks of HPV-related cancers in men, vaccination for males is also viewed as an “altruistic act”, which is the motivation to help others for their welfare (Fiske, 2014). Because HPV vaccination for males involves benefits to others in the society, males’ motivations to get the HPV vaccine not only reflect self-interest in receiving personal protection, but also have a great deal to do with social influence. Social influence refers to influences that come from significant others such as family members, peers, and sexual partners. HPV vaccination can be motivated by altruism to these close-related sexual partners and the society as a whole. How their perceived benefits to different people are associated with their intentions to take the vaccine were tested.

In order to get men motivated to be vaccinated, it is not only important for them to understand the benefits of the vaccine to their health, but also to have a sense of responsibility for taking the HPV vaccine and preventing possible transmission of HPV to others. To move people to take an altruistic act, it is crucial to boost their sense of responsibility as a mechanism (Fiske, 2014). Related to this idea, Brickman et al. (1982) developed “Four Models of Helping and Coping”, which shows that consequences of attribution of responsibilities vary with attributions of responsibility for the problem and attributions of responsibilities for the solution. People act differently when they attribute

the responsibilities to the self or to the others. Informed by Brickman's model, this study focuses on how attribution of responsibilities predicts the intention of HPV vaccination.

In addition, this study investigated the effects of social influence on behaviors from a social network perspective – that is, how egocentric network variables in a discussion network about sexual matters are related to people's behavioral intentions. The basic assumption of social network analysis is that when investigating social influence, and social interaction, people should not only be considered as isolated individuals. Therefore, network level variables should be considered in studies examining social influence on behavior or behavioral change. To be specific, I will examine how an egocentric discussion network is related to perceptions of norm regarding the HPV vaccination for males, and people's behavioral intentions in turn. Adding this network level of analysis to the study not only enriches it but also distinguishes the present study from past perceptual effect research.

Significance of the Study

Theoretically, this study is significant in a several aspects. First, mass communications scholars have taken enormous efforts into the understanding of how messages, communicated via media, change target audience's attitudes and behaviors. The indirect effects model taken in this study expands the scope of media effects research by suggesting that people's attitudes and behaviors may not be directly affected by communication messages, but indirectly through perceived effects of the messages on others through peer norms. Past studies have provided an increasing amount of evidence that people will take action related to the perceived effects of socially undesirable messages, for example, supporting Internet censorship as a consequence of perceived

effects of Internet pornography on others (Lo & Wei, 2002). However, evidence of the indirect effects of socially desirable messages by social influence is not as robust as that of socially undesirable messages (Golan & Day, 2008). This study examined the indirect effects model by HPV vaccination messages as a type of socially desirable messages, and more importantly, advancing the theory by examining how to change people's attitudes and behaviors in a unique way: how to persuade people to do good for others by assessing the indirect effects of messages. Because of the nature of HPV vaccination for men, this topic is particularly appropriate for such examination and makes its unique contribution in research on indirect media effects.

Although social distance has been constantly examined in third-person effects research, not much has been done on perceived peer norm in an indirect effects model. In particular, most studies regarding the indirect effects model in mass communications does not distinguish between descriptive norm and injunctive norm, which can be contrast to each other (Cialdini, Reno & Kallgren, 1990). By separating the two types of norm, this study provides a better illustration of message effects through the norm. Also, this study shows empirically whether perceived in-group and out-group differences lead to different indirect effects of the messages. As HPV vaccination is an issue related to gender, gender as an in-group/out-group difference is also examined.

This study also contributes to better understanding of social influence by examining variables related to the Four Model of Helping and Coping and conducting analysis on egocentric network variables. By examining the attribution of responsibilities for the problems and the solutions about HPV transmission and vaccination, findings will point to an effective way of promoting prevention of a stigmatized sexually-transmitted

disease in future public health messages. Network analysis, on the other hand, will provide explanation of human behaviors in term of social relationships regarding a stigmatized issue like HPV. By examination of an individual's discussion network for sexual matters, significant implications on the way that public health messages, especially those regarding sexual health, can influence people are discussed.

In terms of health communication, this study applies the indirect effects model on public health messages. This helps build up systematic theoretical knowledge in dissemination of public health messages. Instead of individual factors, examining social influence in this study brings in a broader perspective of evaluating health messages in the area of health communication research.

Practically, public health messages about the HPV vaccination of men are unique for systematic research. It differs from other types of public health communication messages such as anti-smoking messages, because the health risks that men are susceptible from HPV are not as obvious as smoking. Benefits of HPV vaccination are also unique - Instead of acting only for the health of oneself, HPV vaccination for males can be perceived as something good for others' health as well. Most of the past studies in HPV vaccines have focused only on men's intention of taking the vaccine, but have not examined taking the vaccine as an altruistic act, and how perceived social norms can influence behaviors. This study seeks to fill the research gap that exists with men's HPV vaccination. As a study tightly focused on examining sex and gender, investigating promotions for the HPV vaccination for males can shed light on the differential influence of gender. Findings will also suggest new directions for designing future campaigns and

messages related to HPV vaccination, and public health messages involving broader issues.

Outline of the dissertation

The following chapter (Chapter 2) introduces the theoretical framework of the study. Relevant literature are reviewed to provide theoretical groundings for hypotheses and research questions. Chapter 3 talks about the method of conducting this piece of research. As a quantitative study, the sampling method, design of the questionnaire, and measurements of the variables will be discussed in detail. After that, findings are presented in Chapter 4. Descriptive statistics, results of hypotheses testing, and answers to the research questions are included. The next chapter, Chapter 5, interprets the findings. Theoretical implications from the findings are explored. From the findings, suggestions for future promotions of the HPV vaccination for males are provided. Further related research directions and limitations of the study are presented. The dissertation is concluded there.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The Influence of presumed influence

To examine the effects of communication messages about HPV vaccination to men's attitudes toward uptake of the vaccine, the major theoretical framework used for this study is the influence of presumed influence (IPI) model, which was proposed by Gunther and Storey (2003). It is an indirect effects model, stating that media exerts influence on people's attitudes and behaviors not directly, but indirectly through their perceptions of media influence on others. That is said, this indirect effects model focuses more on attitudinal and behavioral change due to social influence instead of direct media effects.

The influence of presumed influence model originates from another perceptual effect theory known as the third-person effect hypothesis. The third-person effect (TPE) was first proposed by Davison (1983), which predicted people tended to overestimate the influence that mass communications had on the attitudes and behavior of others. Individual audience who were exposed to a form of communication would expect it to have a greater effect on others than on themselves; therefore, the effect was not perceived to be exerted on the first or second persons ("me" or "you"), but on the third person ("them"). When the TPE was first proposed, Davison focused on the perception of persuasive communication such as advertising. An experiment was done to show that people reasoned others would be more easily persuaded than themselves. The topics

examined included the governor's call against his challenger, persuasion by commercial products on television, and influence on voting in the presidential election, all verifying the TPE. In a critical review of past studies on the TPE, Perloff (1999) concluded that the TPE was a reliable and persistent phenomenon that emerged across variations in question order, format and wording but was situational specific.

After the TPE was proposed, there had been a proposal of the "reverse TPE", or the "first-person effect (FPE)". The Innes & Zeitz (1988) study was the first one to recognize the phenomenon that people perceived greater effects of socially persuasive messages on self than on others. The term "reverse TPE" was later termed by Cohen and Davis (1991), when they found that people tended to overestimate the effect of attack ads on oneself than on the others. The "first-person effect" term was introduced to the literature later (Golan & Day, 2008), which is now widely understood to refer to the phenomenon that a media advocacy message encouraging a socially desirable outcome will be perceived to exert a greater positive effect on oneself than on the others (David, Liu & Myser, 2004).

There have been extensive first-person effect studies of public service announcements (PSAs) on various topics, such as AIDS prevention (eg. Duck, Terry & Hogg, 1995, Chapin, 2000), traffic safety (eg. Hoorens & Ruiters, 1996), drunk driving (eg. Duck & Mullin, 1995) and antismoking campaigns (eg. Henriksen & Flora, 1999). In Duck & Mullin (1995)'s study, an experiment was carried out to demonstrate the third-person perception in three types of media content, including negative content (eg. violence), positive content (eg. behaving prosocially) and public service campaigns (eg. drunk-driving). Respondents saw themselves relatively vulnerable to influence from PSAs, but relative invulnerable to the

ego-threatening negative content, confirming the FPE. It also showed that the FPE was not a universal response to social influence, but occurred in specific social comparative contexts, for example, being more pronounced among non-commercial television viewers.

While past studies provided strong evidence on the TPE, evidence on the FPE has been mixed. David, Liu & Myser (2004) tried to test the robustness of the TPE and the FPE in a study about alcohol messages by experiments with methodological variations. According to the findings, the TPE was robust, while the FPE was insignificant when social comparative contexts were minimized in the between-subject methodological control in the experiment, in which respondents assigned a positive media effect to friends rather than to the self or to other typical students. The FPE was also significant only for the episode-based anti-drinking messages with vivid and emotional accounts but not the statistics-based messages with statistical evidence support. These findings led to a doubt that the FPE might not be as robust as the TPE.

To better explain the effects of socially desirable messages, Gunther and Storey (2003) put the TPE into a model which explained the influence of perceived effects by media messages on people's behaviors. Their indirect effects model, called "the influence of presumed influence", suggested that people's perception of the influence of a communication on others would change their own attitudes or behaviors; therefore, the TPE was only a special case under this broader model. The influence of presumed influence model was illustrated by a case in which clients were exposed to a radio drama aiming at improving health worker's interpersonal communication skills. As they perceived positive effects of the drama to health workers, they had more positive expectations of professional qualities of health workers and more positive attitudes

toward the health workers, causing improvements in their perceived behavioral interactions with the health workers in real life as well. Applying this model to examine the effects of sex-related media use, Chia (2006) found supporting evidence to the influence of presumed influence. Sex-related media produces a significant indirect effect that encourage more sexual activities of adolescents, in addition to their direct effect on adolescents' sexual attitudes. Adolescents' perception of peer norms about sex-related issues is based on their estimation of sex media effects on peers.

Other research has also provided supporting evidence that perceived effects of communication messages can lead to behavioral outcomes. The third-person perceptual gap between perceived effects on the self and on others had been found to be associated with behaviors including support for Internet censorship (e.g., Gunther & Hwa, 1996; Rojas, Shah & Faber, 1996; Lo & Wei, 2002), the likelihood of developing an eating disorder (David & Johnson, 1998), the intention to relocate if people believed that others were more affected by media coverage of their town than they were (Tsfati & Cohen, 2003), the increased desire to be slim (Park, 2005), and the intention to seek health information and immunization vaccines (Wei, Lo, & Lu, 2008), engage in information seeking and discussions of the polls (Wei, Lo, & Lu, 2011), intention to prepare for the millennium bug (Tewsbury, Moy & Weis, 2004), intention to stay or leave the town (Tsfati & Cohen, 2003), engaging in information seeking in a presidential election and discussions of the polls (Wei, Lo, & Lu, 2011). Noguti & Russell's (2014) study on product placement of alcohol brands in television series found that positive presumed influence among peer was associated to youth audiences' greater desire to consume the alcohol brands placed in the TV series.

Applying influence of presumed influence model in HPV vaccination for men

There are two important reasons to apply the influence of presumed influence model as the major theoretical framework for this study. Firstly, the nature of communication messages about HPV vaccination is different from other public health messages. Most public health messages such as anti-drinking messages and anti-drug messages emphasize personal health benefits. However, the case of HPV vaccination for men is unique in a sense that men are not as much benefited from vaccination as women. However, vaccine uptake by men can help reduce the spread of HPV among women. In this case, persuasion for men to take the vaccine cannot be solely done by emphasizing the benefits on themselves. As their uptake of the vaccine can be beneficial on others, social influence may play an important role in their attitude formation and behavioral intentions. How men perceive others will act, and how they perceive they are expected by others to act, can be important factors related to their decisions. Influence of presumed influence, as a model talking about social influence, is thus applicable.

The influence of presumed influence model is also appropriate for another nature of communication messages related to HPV vaccination to men – As HPV is sexually-transmitted and its infection can lead to sexually-transmitted diseases, the topic of HPV vaccination is stigmatized. Chia (2006) argued that perceived exposure to the messages and perceived peer norm was particularly important for attitudes on sex-related issues, because people often did not talk about these stigmatized issues explicitly. As a result, people could only infer their thoughts on others and estimate others' attitudes without knowing what's exactly happening. Vaccines for the sexually transmitted HPV can be a similar case – people do not talk about it very often, so their perceptions of what others

think about it become more influencing than what others really think. The model of influence of presumed influence is a good framework for investigation of the HPV vaccination for men, because the model indicates indirect media effects by social perceptions.

Most media-effect theories that explain attitudinal and behavioral change tend to focus on individual factors instead of taking a perspective of social influence. For example, information-seeking model of health messages discuss how factors such as personal experience, perceived risks, and so on, are related to health information seeking behaviors, but seldom talk about social influence in making health-related decisions. Also, the model of influence of presumed influence is a broader model that can include different types of behavioral consequences other than information seeking, which is more appropriate in the context of HPV vaccination for men.

Furthermore, Schweisberger, Billinson and Chock (2014)'s investigation on the third-person effect on Facebook suggest that perceived personal relevance to the messages was related to third-person perceptions, that is, personally relevant stories were perceived to have a greater impact on themselves than do non-personally relevant stories; on the contrast, stories with lower relevance would have a greater impact on others than on themselves. As the HPV vaccination is usually regarded as a topic more relevant to women instead of men, whether the IPI model still holds for messages for the HPV vaccination for males can be theoretically important.

Awareness and acceptances for HPV vaccination for males

With an approval from the FDA three years behind the approval for the vaccination for females, and much fewer cases of HPV-related cancer among men, media have not

been enthusiastic in reporting messages regarding the topic. Content analyses of media contents related to HPV vaccination have been conducted in the past, and findings reveal that media mostly linked HPV vaccine with diseases related to females, in particular, cervical cancer. Calloway, Jorgensen, Saraiya, and Tsui (2006) analyzed newspaper coverage about HPV vaccine in the U.S. from 2003 to 2005, before the vaccine was approved by the FDA. Results showed that media provided information of the HPV vaccine's experimental status, and explanations of the link between HPV and cervical cancer. After the experimental stage of the HPV vaccine, Abdelmutti and Hoffman-Goetz (2009) compared reports of fear-inducing messages about the HPV vaccine between Canadian and U.S. national newspapers from 2006 to 2007. Results indicated significant differences between the two countries in the number of fear messages about cervical cancer, but not HPV. Kelly, Leader, Mittermaier, Hornik and Cappella (2009) conducted a content analysis of 321 news stories from major newspapers, the AP wire and television news networks, showing that many stories did not report important knowledge about HPV. Twenty-three percent of stories did not mention HPV being sexually transmitted. Leung (2015) examined newspaper articles and television news transcripts in the U.S. from 2006 to 2014, revealing that the media presented the HPV vaccine as more beneficial to women's health than to men.

Past studies also revealed that awareness of HPV vaccination for males had not been high. A study by Reiter, McRee, Kadis and Brewer (2011) investigated the HPV vaccine with adolescent males aged 11-17 and their parents, finding show that most parents and their sons were unaware the vaccine can be given to males. In Beshers et al.'s (2015) survey with 817 undergraduates at 2 northeastern US universities in 2010, females had

significantly greater awareness of HPV, and the HPV vaccine, and more discussions with their clinicians about the HPV vaccine. Hunter and Weinstein's (2015) survey with 116 male undergraduate showed that more than 80% of the respondents did not plan to receive the HPV vaccine. 35% even had never heard of HPV before taking the survey and 51% had never heard of the HPV vaccine before taking the survey. 80% indicated that they did not know that the HPV vaccine was available for men.

The HPV vaccine for males was also not widely accepted. An online survey with 296 heterosexual men and 312 gay and bisexual men from a national panel of U.S. households in 2009 suggested that 73% gay and bisexual men were willing to receive HPV vaccine, compared with only 37% of the heterosexual men. Gay and bisexual men also reported significantly greater awareness of HPV vaccine, perceived worry about HPV-related diseases, perceived effectiveness of HPV vaccine, and anticipated regret for declination of the vaccination (Gilbert et al., 2011).

Ferris et al. (2009) found that HPV vaccine acceptance was positively related with higher education, hispanic ethnicity, wearing a seat belt most of the time, regular tobacco use, not being sexually active, history of more than 10 female sexual partners, not having oral sex, extreme worry about vaccine side effects, extreme concern about vaccine safety, the importance of getting vaccines, familiarity with HPV, and extreme importance of receiving the HPV vaccine.

Among 428 gay and bisexual men aged 18 to 26 years in 2013 surveyed by Reiter et al. (2015) surveyed, only 13% of participants had received any doses of the HPV vaccine. More than 80% among those vaccinated had received a health care provider

recommendation for the HPV vaccination were vaccinated; in contrast, only 5% took the vaccine without a recommendation.

Zimet and Rosenthal, S. L. (2010) reviewed research about male HPV vaccination. For males over 18 years of age, who therefore would not qualify for the Vaccine For Children program in the United States. And some insurance companies do not cover male HPV vaccination or HPV vaccination for young adults. The relatively high costs of the 3-dose HPV vaccine can be a significant barrier to vaccine uptake among young men, even they are positive toward HPV vaccination for men (Zimet and Rosenthal, 2010).

Another literature review by Liddon et al. (2010) reviewed 23 published articles on acceptability of the HPV vaccine for males among young males. Acceptability of a human papillomavirus virus (HPV) vaccine that protects against cervical cancer and genital warts was high in studies conducted among male college students (74%–78%) but lower in a community sample of males (33%). They found that studies sampled among male college students had a higher acceptability of the vaccine (74%–78%) than in a community sample of males (33%). Most studies reported that messages about the HPV vaccine for prevention of cervical cancer for female partners did not produce resonance among adult males.

Newman et al. (2013) also conducted a meta-analysis about research on HPV vaccine acceptability among men. The weighted mean HPV vaccine acceptability was 50.4 over 100 in 22 studies. Perceived HPV vaccine benefits, anticipatory regret, partner thinks one should get vaccine and healthcare provider recommendation were factors with medium effect sizes.

Analysis of electronic health record data from 15,970 males aged 11-26 years from 2012 to 2013 in physicians' clinics in Baltimore, MD, found that among the permissive age group (22-26 years), age, clinic visit, attendance to a preventive care visit, military insurance and Internal Medicine practice were related to initiation of the vaccine. Preventive care visits were associated with vaccine initiation among all ages. Initiation was highest among black males. Researchers suggested that more education on the value of catch-up vaccination among adult-focused specialties may increase HPV vaccination initiation among males aged 13 - 26 years (Clarke et al., 2015).

Perceived exposure

Gunther's (1998) study suggested that people infer media exposure of others from their own media exposure. According to him, the perceptual process of perceived media effect on others starts when people attend to a particular medium and generalize the content of other media from the content of the particular medium; after that, they would then believe that others are all exposed to that similar content.

Eveland, Nathanson, Detenber and McLeod (1999) showed in their study that perceived exposure of each comparison group is a significant predictor of perceived effects on the group. When people estimate the media effect of others, they use the theory of media effects resembling the hypodermic model, assuming negative effects of media on people's attitudes. Meirick (2005)'s study confirmed that perceived exposure of comparison groups to the media content showed a consistent positive relationship with perceived effects on the others for cigarette advertising. Chia's (2006) found evidence supporting that adolescents infer exposure of peers to sex-related media from their own

media consumption – People generally have a self-serving bias, so they will project their exposure to the messages to others when they estimate others' exposure.

As past research indicated, men have not been much exposed to messages about HPV vaccination for men, and they may project others the same. In Chia's (2006) model, adolescents estimate possible consequent effects on peers, according to their perceived exposure of others to the sex-related media, which was related to their own consumption. The general low exposure and awareness of the HPV vaccination for men may be associated with perceived effects that promotions of the vaccine was not successful.

H1: Exposure to the messages of the HPV vaccination for men will positively predict perceived effects of promotions for the vaccine.

Pluralistic ignorance and perceived social norm

The term pluralistic ignorance (Allport, 1924) means that people have unwarranted and mistaken impressions of other people's feelings and thoughts on certain topics (Shamir & Shamir, 1997). Davison (1983) suggested that pluralistic ignorance might be one of the underlying causes of perceptual differences in message effects on the self and on others. It led to a misconception of others' attitudes, so people assumed that other audiences had been brainwashed by the biased media.

Pluralistic ignorance has been found among young people when they try to estimate peer norm. For example, college students believed that the average other person of their own gender expected sexual intercourse in a relationship to begin much earlier than the real case (Cohen & Shotland, 1996). College students also estimated the level of peers' comfort in performing campus-based sexual behaviors higher than the actual comfort ratings (Hines, Saris, & Throckmorton-Belzer, 2002). Lambert, Kahn, & Apple's (2003)

studies found that both men and women overestimated the other gender's comfort with hooking up behaviors—in which two people agree to engage in sexual behavior without future commitment.

Pluralistic ignorance can lead to a misperception in social norms. Norms are constructed by evaluating behaviors that become implicit rules (Miller & Prentice, 1996). Norms can have an impact on people's behaviors. To younger people like college students, the peer norm can be very important to their attitudes and behaviors, because younger people have lower levels of resistance to peer influence (Sumter, Bokhorst, Steinberg & Westenberg, 2009). Evidence in the past supported that peer norms, particularly perceived peer norms, is influential on adolescents' attitudes and behaviors (Cvetkovich & Grote, 1980). Reiss (1967) found that an adolescent's perception of the sexual attitudes held by his or her close friends was a better predictor of his or her own sexual attitude relative than perceived attitudes held by parents. Adolescents' sexual behavior was even demonstrated to be “a function of the reputation of the peer reference group” (Mirande, 1968, p. 573).

Paek and Gunther (2007) analyzed effects of antismoking media messages in a survey of 1,687 middle school students, finding indirect effects of the messages among both ever-smokers and never-smokers through peer norm. Such effects were moderated by peer proximity, that is, only perception of influence on proximal peers, but not distal peers, decreased their favorable thoughts toward smoking.

Descriptive norm and injunctive norm

Cialdini, Reno and Kallgren (1990) distinguish two types of social norms, injunctive norms and descriptive norms. Injunctive norms was defined as “rules or beliefs as to what

constitutes morally approved and disapproved conduct”, and descriptive norms was defined as describing “what most people do” and “what is typical or normal” (p.1015). In other words, the descriptive norm refers to what the behavior is, that is, people’s actual behaviors.

The injunctive norm, on the other hand, refers to what behaviors are approved or disapproved by other people (what the behavior “ought” to be) (Cialdini et al., 1990; Borsari & Carey, 2003). Cialdini et al.’s (1990) littering experiments revealed that people were more likely to litter when they saw more litter on the ground or others littering, and people were less likely to litter when they thought that people disapproved of such behavior.

Cialdini et al. (1990) argues the two types of norms should be separately in research because they can act antagonistic to each other in some situations. And it is extremely important for those who designed persuasive messages in PSAs to design the statement appropriately in terms of creating norms:

“...the campaigns' creators have missed something critically important: Within the statement “Many people are doing this *undesirable* thing” lurks the powerful and undercutting normative message “Many people *are* doing this.” Only by aligning descriptive norms (what people typically do) with injunctive norms (what people typically approve or disapprove) can one optimize the power of normative appeals. Communicators who fail to recognize the distinction between these two types of norms imperil their persuasive efforts.” (Cialdini, 2003, p.105)

Rimal & Real (2003) later proposed the theory of normative social behavior (TNSB) that differentiates descriptive from injunctive norms. They also attempted to explain the

underlying cognitive mechanisms that associate norms and behavioral intentions, suggesting that descriptive norms affect people's behaviors through injunctive norms, outcome expectations, and group identity. Borsari and Carey's (2003) meta-analysis on college drinking literature also suggests self-other discrepancies in injunctive norms, that is, discrepancies in self-perception of approval of drinking and others' approval of drinking, are larger than those in descriptive norms.

Studies have been conducted regarding the influence of descriptive and injunctive norms, mainly on attitudes toward drinking and smoking. Rimal and Real's (2005) survey of 1,352 college students revealed that both descriptive norms and injunctive norms influenced drinking intentions, but they did not interact with each other.

Hong, Rice and Johnson's (2012) panel study of smoking behaviors among 1,607 high school students in the 9th grade and later in the 12th grade indicated that salient descriptive norms resulted in increased smoking in both the 9th grade and the 12th grade. On the contrary, the strength of injunctive norms did not affect the amount of smoking in the 9th grade, but only later in the 12th grade. Paek (2009) surveyed 761 Undergraduates, finding that while injunctive norms predicted college students' smoking intentions, descriptive norms were not related to their own smoking intentions. Such findings were different from previous studies on college student's drinking, and Paek suggested that descriptive or injunctive norms may not work in the same way across different health contexts.

Because students usually grew up in an environment that smoking were widely considered as a more risky behavior than drinking, peer approval of smoking was more crucial for their smoking intentions. Bresnahan, Zhuang & Sun's (2013) experiment on

effects of gain/loss antismoking messages on young Chinese adults found that a lower descriptive norm was associated with less resistance efficacy, and enjoyment of smoking and behavioral intention to smoke peaked with a moderate level of prevalence of smoking (descriptive norm); a higher injunctive norm approving smoking was associated with higher levels of enjoyment, lower levels of susceptibility to harms of smoke, lower perceived severity of smoke harms, and less resistance efficacy.

In most past research of the influence of presumed influence model, norm is not divided into two types. This study seeks to contribute to the research gap by examining the two types of norm, descriptive and injunctive. Zaleski and Aloise-Young (2013) surveyed 271 6th graders, asking their perceived prevalence of friend smoking (descriptive norm) and perceptions of friends' disapproval of smoking (injunctive norm). Participants were also asked to list their five best friends so that the actual injunctive norm could be calculated. Results showed that future smoking intentions were associated with the perceived injunctive norm but not with the actual injunctive norm.

Second, the perceived injunctive norm was more predictive of smoking intentions by adding 3.4% of variance above and beyond the perceived descriptive norm. In view of previous research, the descriptive and injunctive norms examined in this study also focused on the perceived norms by the respondents, instead of the actual norm.

Descriptive norm refers to whether men in the society are really taking the HPV vaccine, while injunctive norm refers to whether people in the society approve and support the HPV vaccination for males. As consistent findings have not yet been found regarding the mechanism associating descriptive norm and injunctive norm and behavioral intentions,

more testing and confirmation are needed (Rimal & Real, 2005). This study serves as another piece of evidence on associations between perceived norms and behaviors.

Past studies have shown that both injunctive and descriptive norms could be important for behaviors of adolescents and young adults – the same as the targets in this study. Perceived norm can be particularly important in the case of the HPV vaccination for men, because people not only take the vaccine for themselves, but for stopping transmitting the virus to others as well. According to Piliavin and Charng (1990), there are two types of altruism. The first type is primitive and impulsive, acting on emergency situations. The second type involves responses to social expectations and is not spontaneous.

Greater sensitivity to social norms may increase the tendency to perform altruistic behaviors (Brickman, 1982) - There is a three-step process for the development of altruism: presocialization, awareness that others value altruistic behaviors, and finally the internalization of altruistic norms (Cialdini, Baumann & Kenrick, 1981). In the case of HPV vaccine, messages about the vaccine may lead to certain perceived social norms of HPV vaccination for males. HPV transmission and vaccination is an issue involving closely-related others – family, peers, and sexual partners. Their attitudes toward vaccination can be shaped by perceived norms among these closely-related others and the society.

Based on the above review of the literature, the following hypotheses are proposed:

H2: Perceived effects of HPV vaccination messages to other men will positively predict perceived (a) descriptive norm and (b) injunctive norm regarding HPV vaccine uptake by men.

H3: Perceived (a) descriptive norm and (b) injunctive norm regarding HPV vaccine uptake by men will positively predict respondents' support for HPV vaccine uptake.

Attributions of responsibilities

Vaccination for HPV not only helps oneself prevent the diseases caused by the virus, but also reduces the opportunity of HPV being spread in the society by sexual contact. Therefore, vaccination can be viewed as a form of prosocial behavior – that is, the behavior is intended to benefit others. For men, vaccination for HPV benefits others more than themselves, because diseases caused by HPV in men, such as penile cancer and anal cancer, are much rarer than diseases caused by HPV in women, such as cervical cancer.

In order to persuade men to take actions for others by communication strategies, the theoretical concept “attributions of responsibility” is applied. The attributions of responsibility is associated with altruism, that is, whether people are motivated to do something for others' good instead of the self's good. For example, in Darley and Latane's (1968) experiment, participants' response when they heard another's seizure were recorded. Results showed that in an environment that more people are possible to help, people's felt responsibility decreases and they become less likely to help.

Boiarsky, Rouner and Long (2013) examined the effect of message attributes in response to health messages on college students. They examined 3 variables –

responsibility attribution (individual vs. social), source (personal blog vs. online magazine), and illness (stigmatized vs. non-stigmatized). Results indicated that while participants who received the individual-responsibility messages believed more in individual responsibilities than those who received the social-responsibility messages, participants who received the social-responsibility messages did not differ in attribution of social responsibilities than others. It implied that individual-responsibility messages may have more effects on young adults.

Culture can be a factor influencing attributions of responsibilities. In individualist cultures, people put their own needs prior to the group's needs, contrary to collectivist cultures in which people emphasize their groups such as family, the community, the organization, and the country (Fiske, 2014). American culture tends to be strongly individualistic (Gudykunst, 2003). As a result, people are more likely to believe in individual responsibilities – it is more likely they believe that individuals should be responsible for their own healthcare. They also believe in a “just world”, in which rewards are proportionate to efforts, and undesirable outcomes happen because of personal explanations (Braman & Lambert, 2001; Furnham, 2003; Hafer & Bogue, 2005).

Schwartz (1970) suggested that altruism is affected by personal norms of obligation to perform certain behaviors, that is, whether the person attributes responsibility to the self or the person attributes responsibility to someone else. Schwartz and Fleishman (1982) found that women who indicated a personal norm opposed to welfare increase volunteered less to delivery food for the elderly. They argued that if people have negative personal norms (feelings of obligation to avoid a particular action) that made them feel they should not help, for example, avoiding signing a petition to

support welfare increase, they help even less than people who have no norms (absence of felt obligation).

Four Models of Helping and Coping

Brickman et al. (1982) discussed the four models of helping and coping, namely, the moral model, the enlightenment model, the compensatory model, and the medical model. The model is divided according to two factors: attribution of responsibility to the self for the problem, and attribution of responsibility to the self for the solutions. Or the two types of attributions of responsibility can be called causal and treatment. Causal responsibility focuses on the problem source, the responsibility for the origin of a past event, clearly involving the question of deserving and blame” (Brickman et al., 1982, p.369); treatment responsibility focuses on responsibility to tackle the problem, that is, the responsibility for the solution to future events, involving an assessment of who might be able to control events (Brickman et al., 1982).

Both the moral model and the enlightenment model propose high attribution to self of responsibility of the problem, but the former attributes high responsibility of the self for the solutions as well, and the latter attributes low responsibility of the self for the solutions. In contrast, both the compensatory model and medical model attributes low responsibility of the problem to the self. The compensatory model attributes high responsibility to self for the solutions, while the medical model attributes low responsibility to self for the solutions.

The four models, moral, enlightenment, compensatory, and medical, are divided according to the attributions of responsibilities, for the problem and the solution respectively, as shown in Table 2.1 (Brickman et al., 1982; Fiske, 2014):

In the moral model, people are supposed to be responsible for both the problem and the solution. They are viewed as being lazy if they do not perform well. And people should act as peers without hierarchy when helping each other. In the enlightenment model, people are responsible for causing the problem, but they are viewed as not being able to solve the problems on their own. In this case, authority with higher power should give a hand to help them. In the compensatory model, people are not responsible for causing problems, but they have to be responsible for the solutions. They are viewed as deprived and should be helped by others as subordinates. In the medical model, people do not hold responsibilities for neither the problems nor the solutions. People are viewed as being weak and ill, and they need medical help.

Table 2.1 The Four Models of Helping and Coping (Brickman et al., 1982)

Attributions of responsibilities for the problem	Attributions of responsibilities for the solution	
	High	Low
High	Moral	Enlightenment
Low	Compensatory	Medical

Applying Models of Helping and Coping to HPV

The Four Models of Helping and Coping is relevant to HPV vaccination for men because HPV causes sexually transmitted diseases. With HPV’s sexually transmitted nature, some may associate HPV with sexual permissiveness – which attribute the responsibilities for the problem of HPV infections more on the self. Some, on the contrary, may suggest people who get HPV from having sexual contact with others are only victims. Although more intercourse and multiple sex partners may increase the opportunities of contracting HPV, HPV can be transmitted by any sexual activities, even only occurs one time. The virus can stay in the body and causes disease in future (CDC,

2014c). In addition, men seldom suffer from the consequences of HPV, so many may not realize their responsibilities for spreading the virus around. In term of the solution, while the HPV vaccine can be a solution to the problem of HPV transmission and infection, to get vaccinated means the vaccinated feel the responsibilities to pay for the costs and visit the physicians for a few times.

Ladany, Stern and Inman (1998) examined how different diseases and attributions of responsibility influence medical students' attitudes and willingness to treat HIV patients. They found that the medical students operated under the moral model, assuming people are responsible for both the problems and the solutions, when the patients had multiple sex partners and blamed chance for the illness. On the contrary, if the patients had multiple sex partners and blamed themselves, the medical students assumed patients are responsible for their problems but not the solutions – the enlightenment model.

Gender is found to be a factor of attributions of responsibilities into social responsibilities or individual responsibilities. Females are more likely to believe in social responsibility than males. Also, when the message topic is a non-stigmatized disease not related to health like skin cancer, men believed more in social responsibility when they came across social-responsible messages. However, when the message topic is a stigmatized disease related to female's sexual health like cervical cancer, their beliefs did not change no matter the messages emphasized social or individual responsibilities. Such findings may imply cultural attitudes that put emphasis on females' own responsibilities in health, in particular, sexual health, which is difficult to be altered by messages (Boiarsky et al., 2013).

Stigmas tend to discredit, devalue and exclude individuals in social settings (Major & O'Brien, 2005). Stigma is associated with certain health conditions, including sexually transmitted disease (Friedman & Sheppard, 2007). People with stigmatized diseases are perceived to be less intelligent, less credible than non-stigmatized patients, and even less deserving of sympathy. Boiarsky et al. (2013) compared how participants had different responses to messages about HPV as a stigmatized health condition to messages about skin cancer as a non-stigmatized condition.

As HPV is sexually-transmitted and stigmatized, and produces more consequences among women than among men, many people may perceive HPV as a virus only contracted by women who perform unsafe sexual behaviors, have sexual activities early, or are promiscuous. Women being infected by HPV can be attributed to personal responsibilities, instead of being victims of infections. Women can also be attributed to the solution of HPV infections, including taking the HPV vaccine and conducting Pap test (or called Pap smear), a screening test for pre-cervical cancer, every year as suggested by the CDC (CDC, 2014c). Attributions of individual responsibilities to women in HPV infections, instead of men, may lower men's motivation to get vaccinated.

This study aims to find out how men and women are viewed as responsible for the problem, and who should take up the responsibilities for the solution. According to the Four Models of Helping and Coping, in order to motivate people to act, they must have felt responsibility. In the case of HPV vaccination, that means men must feel they are responsible for transmitting the virus (the problem), and they are responsible for

preventing transmission of the virus by vaccination (the solution). The following hypotheses are proposed:

H4.1: Greater attribution of responsibility to women of the problem will negatively predict respondents' support for HPV vaccine uptake.

H4.2: Greater attribution of responsibility to women of the solution will negatively predict respondents' support for HPV vaccine uptake.

H5.1: Greater attribution of responsibility to men of the problem will positively predict respondents' support for HPV vaccine uptake.

H5.2: Greater attribution of responsibility to men of the solution will positively predict respondents' support for HPV vaccine uptake.

Examining the Four Models can provide implications for designing an effective communication strategy to promote HPV vaccination for men. By associating the Four Models to the attitudes about getting the HPV vaccine, communication strategies for HPV vaccination for men can be applied accordingly. For example, if the moral model were found to be the most significant in association with positive attitudes toward HPV vaccination for men, in a print ad promoting the HPV vaccine for men, cues that emphasize their responsibilities for both spreading HPV and not being vaccinated will be added.

RQ1: Which model in the Four models of helping and coping are applied on women regarding the HPV issue?

RQ2: Which model in the Four models of helping and coping are applied on men regarding the HPV issue?

Attitudes and behavioral intentions

The theory of reasoned action was proposed by Ajzen and Fishbein (1973; Fishbein & Ajzen, 1975). It emphasizes that attitudes and subjective norms can predict behavioral intentions, which can predict behaviors in turn. Attitudes refer to the beliefs that the behaviors will lead to certain positive or negative outcomes, and these outcomes are evaluated. Subjective norm refers to the beliefs of others' thoughts, including what others think of the behaviors, what experts think of the behaviors, and motivations to comply with others. According to the theory of reasoned action, subjective norms are important predictors of behaviors. Attitudes and norms can be shaped when people discuss health-related issues with friends and healthcare providers, or when they are exposed to media campaigns (Sheeran & Abraham, 1996).

Chia (2006) examined predictors of adolescents' intentions to engage in sexual behaviors, and the results were partially consistent with the theory of reasoned actions. The study confirmed that sexual attitudes predicted intentions to engage in sexual behaviors. However, the perceived peer norm did not predict behavioral intentions directly, instead, it predicted behavioral intentions indirectly through adolescents' sexual attitudes.

Attitudes toward the HPV vaccine were found to be a more important predictor of vaccination as compared to mere knowledge. Dempsey, Zimet, Davis, and Koutsky's (2006) intervention study on 1,600 parents of 8- to 12-year-old children suggest that while providing parents with an HPV information sheet improved knowledge level about HPV, it did not have a great deal of effects on the acceptability of HPV vaccines by parents. Simply educating parents on knowledge about HPV and HPV vaccines was not

sufficient to influence their attitudes toward HPV vaccination. Other non-information-based preferences that influenced their beliefs and attitudes may be more influential than knowledge in the decision-making process. Brewer and Fazekas's (2007) systematic review also suggested that parents with a lower education level were more likely to support vaccination – knowledge was not a crucial factor for decisions of vaccination.

The health belief model

The health belief model (Becker, 1974) is a theoretical framework for explaining and predicting health behaviors by focusing on individuals' attitudes and beliefs (Painter, Borba, Hynes, Mays, & Glanz, 2008). The model is composed of six factors that affect an individual's engagement in healthy behaviors. The factors are perceived susceptibility (perceived likelihood of getting a condition); perceived severity (perceived seriousness of the condition and its consequence); perceived benefits (perceived potential of tangible and psychological benefits, including avoiding undesirable outcomes); perceived barriers (tangible or psychological costs needed to take action); Self-efficacy (capability to perform the healthy behavior for a desirable outcome); and cues to action (signals and reminders experienced by an individual, from media, family, friends, healthcare providers, etc.) (Paek, Bae, Hove & Yu, 2011).

The health belief model has been applied to study vaccination (Blue and Valley, 2002; Chapman and Coups, 1999), in particular, HPV vaccine research (Brewer & Fazekas, 2007). Reiter et al. (2009) found that the health belief model constructs were associated with vaccine initiation decided by adolescent girls' parents: perceived risk (the belief that HPV infection and cervical cancer are likely to occur), perceived severity (the negative effects of HPV infection and cervical cancer), perceived benefit (belief that HPV

vaccine will diminish the risk or severity of HPV infection and cervical cancer), and perceived barriers (any perceived obstacles preventing HPV vaccination, such as insurance coverage).

Gerend and Shepherd (2012) compared the health belief model and the theory of planned behavior (which originates from the theory of reasoned action) by conducting a survey with women aged 18-26. Significant predictors of HPV vaccine uptake from the health belief model included perceived susceptibility and perceived barriers (vaccine safety concerns and vaccine cost). Brewer and Fazekas (2007) did a systematic review of 28 studies, showing that vaccination acceptability was higher when people believed the vaccine was effective, a physician would recommend it, and HPV infection was likely. Cost and concerns that vaccination would promote adolescent sexual behavior were barriers to vaccination.

In terms of HPV vaccination for men, Wheldon et al. (2011) surveyed 179 self-identified gay and bisexual men (mean age 22 years), who were at greater risk of anal cancer as a result of HPV infection. Findings indicated that 93% of the men had heard of HPV, but less than half associated HPV with anal, penile, and oral cancers. Only 26% were aware of HPV vaccination for males, and 36% indicated likelihood to be vaccinated. Stronger perceived physical and psychological benefits from vaccination, more positive attitudes toward the vaccine, and less concerns with the financial cost predicted greater likelihood for vaccination. Mehta, Sharma and Lee (2012) examined predictors of HPV vaccine acceptability among single, heterosexual, Caucasian college male students by focus groups. Using the health belief model as a guide in developing questions, results

identified a lack of perceived susceptibility, perceived severity of HPV, and barriers toward taking the HPV vaccine as major themes.

From past research in the health belief model, perceived benefits and risks are important factors influencing vaccine uptake. Perceived benefits refers to perceived potential of tangible and psychological benefits, including avoiding undesirable outcomes (Paek et al., 2011; Painter et al., 2008.). Perceived benefits of men's HPV vaccination on others can also be associated with intentions to vaccination.

From a sociobiological perspective, people tend to be more willing to help others perceived as similar or with close ties to themselves (Brickman et al., 1982). Being altruistic may bring social rewards to the vaccinated. Bonafide and Venable's (2015) study about college young men found that both altruistic motives for female health protection and personal health benefits were associated with HPV vaccine acceptance. Because this study focuses on HPV vaccination for men as something not only beneficial to men, but also good for women, the messages examined will be divided into three parts: a) perceived benefits on the self (men) by men's HPV vaccine uptake; b) messages regarding benefits on sexual partners by men's HPV vaccine uptake; c) messages regarding benefits in the society by men's HPV vaccine uptake. The following hypothesis is proposed:

H6: Perceived benefits of HPV vaccination by men will positively predict intentions to take the HPV vaccine.

Piliavin and Charng (1990) suggest that propensities to take risks are associated with willingness to take part in altruistic acts which potentially produces costs. The risks

taken by males to get the HPV vaccine can be the side effects and safety concerns. Also, the vaccine is expensive, which costs more than \$300.

H7: Perceived costs of HPV vaccination by men will negatively predict intentions to take the HPV vaccine.

Influence of one's social networks

Most mass communication theories have looked at social problems and phenomena at an individual level. For example, although the influence of presumed influence model include social norm as a component, it views perceived social norm from an individual perspective. Network analysis, instead, gives the possibilities that integrate both individual-level and societal-level factors. By bridging two levels of analysis, more comprehensive understanding of human behaviors and patterns of communication can be achieved.

In this study, analysis of ego-centric network variables is applied to investigate HPV vaccination for men. Both the influence of presumed influence model and theory of reasoned action have shown that perceptions of norms are associated with attitudes and behavioral intentions. These normative beliefs can be strongly influenced by interaction with peers. Instead of only being influenced by the public health messages, norms can be learned from observing peers' behaviors and interpersonal communication with friends. Sometimes people may even have inaccuracies in perceptions of norms in other reference groups because of having close friends as their reference group (Valente, 2010).

Rimel and Real (2005) found inconsistent results regarding the normative mechanisms in two studies, and they suggested that whether injunctive norm interacted with descriptive norms to influence behavioral intentions might be related to participants'

social network. When participants were incoming students who had not yet lived with members in the community, injunctive and descriptive norms did not interact with each other. Rimel and Real proposed that the two types of norms only affected drinking consumption when the social networks were more established and sanctions became more meaningful, for instance, when the participants had been on campus for at least a year. In view of such premise, it is important to investigate respondents' social networks when examining normative influence on behaviors.

Besides perceiving norms, social networks can also influence transmission of related information. As indicated by the health belief model, perceived benefits and risks are associated with behavioral intentions. Although Dempsey et al.'s (2006) study showed that mere knowledge did not predict acceptability of HPV vaccination, exposure to information about benefits and risks of men's HPV vaccination can influence people's perceptions.

Past studies have shown the importance of networks in transmitting public health information. For example, interpersonal communication has been found to be important in transmission of family planning information (Valante et al., 1994). Kelner and Wellman (1991) suggested that information flow within a community concerning medical treatment of back pain is dependent on individual and group network properties. Favorable information from a credible source can be even more powerful in influencing decisions. In Reiter et al. (2015)'s survey, more than 80% among those vaccinated had received a health care provider recommendation for the HPV vaccination were vaccinated, while only 5% took the vaccine without a recommendation. In particular,

with the sexually-transmitted nature of HPV, discussion with closely-related and trusted others can be influential in making decisions for vaccination.

Properties of discussion network

Previous studies have been done on examining the core discussion network, which is defined as “the set of alters with whom ego discusses important matters, is believed to represent people’s close, important, trustworthy, and socially supportive partners (Small, 2013, p. 470).” Since the 1985 General Social Survey, the first survey network data representative of the American population, researchers had been able to use network data investigated the properties of the core discussion network, by looking at the size, the kinship, the density, and the heterogeneity of the network for discussion of important matters (Marsden, 1987).

The core discussion network has been found to be related to people’s attitudes and behaviors. Burt (1987) found that expression of happiness increased with a person’s core discussion network, and decreased with the prevalence of strangers in the network, even with respondents’ demographics controlled. Hurlbert, Haines and Beggs’ (2000) analysis showed that individuals who had a core discussion network in higher density, with more gender diversity, with a higher proportion of males, kin, and younger alters, activated more network ties for informal support during a hurricane.

Following previous research on the core discussion network, this study focuses on the discussion network of sexual matters which include topics closely related to the HPV vaccination. The size and the density of the discussion network were measured. The strength of the ties with whom the respondents discussed sexual matters were also examined. As Small’s (2013) survey on the core discussion network showed, 45% of the

discussion network was composed with people whom the respondents did not consider to be important to them. They did show because those alters were known to be knowledgeable and available when important issues happened. Granovetter (1983) states that weak ties form when individuals communicate on daily, but are not close to each other; The weak ties can be bridges that connect different groups and spread information throughout a community and population. Adelman, Parks and Albrecht (1987) proposed functions of weak ties as accessing a diversity of information, and disclosure of risky or stigmatized topics. On the contrary, strong ties are important in transmitting behavioral influence, because “people are more likely to be influenced by those they are close to and have multiple relations with than those to whom they are weakly connected (Valente, 2010, p.66).”

Besides strength of the ties, heterogeneity of alters with whom the respondents discussed sexual matters was also tested, because perceived similarity can mediate the association between the norm and intentions to follow the norms. Larimer et al. (2004) investigated students in sororities and fraternities and found that both descriptive norm and injunctive norm were related to their drinking intentions. Authors suggested that injunctive norms was particularly important in the Greek system, because it represented highly-valued approval from similar others. Marsden’s (1987) used the 1985 General Social Survey data to analyze heterogeneity of the core discussion network among Americans, indicating that the discussion network was relatively homogeneous compared with the characteristics of the respondents, in terms of age, education, race/ethnicity, and sex.

Perceived norm in the discussion network can influence behavioral intentions as well, because those people are more proximal. A survey of 254 undergraduate students (Yun & Silk, 2011) examined four types of social norms - Proximal peer descriptive and proximal peer injunctive norms were associated to intention to exercise and intention to maintain a healthy diet; Distal peer injunctive norms were associated only to intention to have a healthy diet, but not intention to exercise. In light of this, perceptions of support for the HPV vaccination for males in the discussion network were examined.

To explore the relationship between a discussion network and behavioral intentions, the following research question is proposed:

RQ3.1: How is a) the size, b) the tie strength and the heterogeneity of the discussion network of sexual matters, and c) perceived attitudes among alters in the discussion network associated with perceived descriptive norm of the HPV vaccination for males?

RQ3.2: How is a) the size, b) the tie strength and the heterogeneity of the discussion network of sexual matters, and c) perceived attitudes among alters in the discussion network associated with perceived injunctive norm of the HPV vaccination for males?

To recapture the wide range of literatures and empirical studies, from which the hypotheses were raised, they are summarized as follows:

Hypotheses from the influence of presumed influence model

H1: Exposure to the messages of the HPV vaccination for men will positively predict perceived effects of promotions for the vaccine.

H2: Perceived effects of HPV vaccination messages to other men will positively predict perceived a) descriptive norm b) injunctive norm regarding HPV vaccine uptake by men.

H3: Perceived a) descriptive norm b) injunctive norm regarding HPV vaccine uptake by men will positively predict respondents' support for HPV vaccine uptake.

Hypotheses from attribution of responsibilities

H4.1: Greater attribution of responsibility to women of the problem will negatively predict respondents' support for HPV vaccine uptake.

H4.2: Greater attribution of responsibility to women of the solution will negatively predict respondents' support for HPV vaccine uptake.

H5.1: Greater attribution of responsibility to men of the problem will positively predict respondents' support for HPV vaccine uptake.

H5.2: Greater attribution of responsibility to men of the solution will positively predict respondents' support for HPV vaccine uptake.

Hypotheses from theory of reasoned action and health belief model

H6: Perceived benefits of HPV vaccination by men will positively predict intentions to take the HPV vaccine.

H7: Perceived costs of HPV vaccination by men will negatively predict intentions to take the HPV vaccine.

Research questions from Four models of helping and coping

RQ1: Which model in the Four models of helping and coping are applied on women regarding the HPV issue?

RQ2: Which model in the Four models of helping and coping are applied on men regarding the HPV issue?

Research question from discussion network

RQ3.1: How is a) the size, b) the tie strength and the heterogeneity of the discussion network of sexual matters, and c) perceived attitudes among alters in the discussion network associated with perceived descriptive norm of the HPV vaccination for males?

RQ3.2: How is a) the size, b) the tie strength and the heterogeneity of the discussion network of sexual matters, and c) perceived attitudes among alters in the discussion network associated with perceived injunctive norm of the HPV vaccination for males?

How the study was conducted to test the hypotheses and answer the research questions will be discussed in the next chapter. The sampling method, design of questionnaires, and measurements of variables will be presented.

CHAPTER 3

METHOD

Data collection

A survey was administered to males aged 18-26 currently living in the United States. Males aged above 18 were chosen as respondents because they are in a critical age of decisions to take the vaccine – if they have not yet been vaccinated, they have to think about taking the vaccine or not, or otherwise it may be too late. As early adults, they can start to make decisions on their own when influence from the family starts to fade. Peer influence becomes more important for their decisions, which fits the aim of this study as investigating social influence on support for the vaccine. The CDC recommends the HPV vaccine to all males through age 21 and gay and bisexual men through age 26 (CDC, 2014b). Also, the FDA approved use of the HPV vaccine on males based on research findings that showed the vaccine can prevent genital warts among boys and men aged 9 through 26. Therefore, the maximum age of respondents were set at 26.

Before administration of the survey, in-depth interviews were carried out to understand target respondents' thoughts on the HPV vaccine, which helped design the questionnaire. As the survey, interviewees were males aged 18-26 in the United States. Students in the class Mass Communications Research in spring 2015 at the University of South Carolina were given the interview guide (Appendix A), and was asked to conduct the interviews in a semi-structured way. The interviewers audio-recorded the process during the interviews, and transcribed the conversation later. Students were given extra

credits in class after submission of the interview transcripts. Sixteen students completed the interviews, and the transcripts were analyzed to shed light on design of the questionnaire.

After completing the first draft of the questionnaire, the survey was set up using Google Forms. Then the questionnaire was pretested with males aged 18-26 in the United States in May 2015. Once again, students in the class Mass Communications Research in spring 2015 at the University of South Carolina were given extra credits for distribution the questionnaire through different electronic platforms including email, Twitter, and Facebook. The questionnaire was also pretested on Amazon Mechanical Turk by providing 50 cents incentive for each completed questionnaire to make sure MTurk acted as a good platform for recruitment of respondents. A total of 102 questionnaires were collected for pretest. Using the dataset, reliabilities of items and correlations between variables were checked.

The questionnaire was then revised according to the results of the pretest. After that, the survey was launched on Amazon Mechanical Turk (MTurk) in August 2015. Each respondent were given 70 cents for completing the survey. To obtain reliable responses, only workers on Amazon MTurk with a past approval rate no less than 85% were eligible to take the survey. Screening questions were set up to filter unqualified respondents and respondents not paying full attention during the survey. 897 respondents completed the questionnaire, and after screening, 656 questionnaires (73.1%) were valid for further data analysis (N = 656). Table 3.1 indicates the number of respondents filtered due to different reasons.

Table 3.1 Number of rejected respondents due to different reasons.

Reasons for rejections	Number of rejected respondents
Not males aged 18-26 living in the United States	119(13.2%)
Failure in answering the attention-check question	81(9.03%)
Year of vaccination before 2009	36(4.01%)
Reported time using media a day exceeded 24 hours	5(.56%)
Total	241(73.1%)

This research project was partially funded by the School of Journalism and Mass Communications Graduate Council, University of South Carolina. Before data collection started, the research proposal was submitted to the Institutional Review Board at the University of South Carolina and had been approved. At the beginning of the questionnaire, there is a paragraph stating the purpose of this study, the identity of the researcher, and the nature of this study including voluntary participation, anonymity, and confidentiality. With a topic related to sexual matters, respondents were assured that there were no right or wrong answers to the questions in order to prevent issues related to social desirability.

Sample profile

Respondents were asked to report their demographics, including age, ethnicity, state of residence, religion, and level of education. Age was computed from the date of birth given by the respondents ($M = 24.13$, $SD = 1.99$, ranging from 17.75 to 26.83).

More than 60% of the respondents were White. Distribution of ethnicity of the respondents was: Hispanic or Latino ($n = 47$, 7.2%); American Indian or Alaska Native ($n = 43$, 6.6%); Asian ($n = 78$, 11.9%); Black or African American ($n = 53$, 8.1%); Native

Hawaiian or Other Pacific Islander (n = 1, .1%); White (n = 427, 65.6%); Others (n = 7, 1.1%).

Around 40% of the respondents reported that they were unaffiliated. Among those who reported having a religion, Catholic was the most popular, followed by Protestant and Other Christian. Each of the other religions composed no more than 5% of all the respondents. The distribution was: Protestant (n = 101, 15.4%); Catholic (n = 135, 20.6%); Other Christian (including Mormon, Pagan, Jehovah's Witnesses, etc.) (n = 82, 12.5%); Jewish (n = 11, 1.7%); Buddhist (n = 11, 1.7%); Muslim (n = 18, 2.7%); Hindu (n = 33, 5.0%); Unaffiliated (including atheist, agnostic) (n = 260, 39.6%); Others (n = 5, 0.8%).

Level of education of the respondents was relatively high. Nearly 70% of the respondents were with college-level education (n = 452, 68.9%). More than 15% reported an education level at graduate school (n = 114, 17.4%). Education level at Grade 8 (Middle school) or below (n = 1, .2%) and Grade 9 -12 (High school) (n = 89, 13.6%) were in minorities.

Residents in the South composed the largest portion of the respondents (n = 237, 36.1%), followed by residents in the West (n = 164, 25.0%). Residents in the Northeast (n = 130, 19.8%) and the Midwest (n = 125, 19.1%) shared almost the same portion.

Regarding sexual orientation, heterosexuality remained the largest portion of the respondents (n = 592, 90.2%). Homosexuality (n = 28, 4.3%) and bisexuality (n = 33, 5.0%) together composed nearly 10% of the respondents. Other reported sexualities included pansexuality and asexuality (n = 3, .5%).

In term of sexual experience, more than 40% the respondents had only started sexual activities for less than six months (n = 274, 41.8%). Distribution of other categories was almost even: 6-12 months (n = 59, 9.0%); More than 1 year - 2 years (n = 63, 9.6%); More than 2 years – 5 years (n = 77, 11.7%); More than 5 years – 10 years (n = 98, 14.9%); More than 10 years (n = 32, 4.9%). Less than 10% of the respondents had never been sexually active (n = 53, 8.1%).

Among respondents who were sexually active, 30.9% (n = 203) reported that they always used protection during sexual activities in the past year. 17.4% (n = 114) reported that they used protection more than 50% of the time (but not always), 12.8% (n = 84) used protection less than 50% of the time, and 21% (n = 138) never used protection.

Of the sample, 12% of all the respondents (n = 79) indicated that they had been vaccinated. Among those who had been vaccinated, 3.80% (n = 3) indicated they were vaccinated in 2009, 11.4% (n = 9) in 2010, 8.86% (n = 7) in 2011 and another 8.86% (n = 7) in 2012, 13.9% (n = 11) in 2013, 34.2% (n = 27) in 2014, and 16.5% (n = 13) in 2015.

Exposure to messages of HPV vaccination for males

Design of Questionnaire

Appendix B shows the full questionnaire.

Insights from Interviews. Appendix A shows the interview guide for the pre-survey interviews, which contains six questions. Firstly, the interviewee was asked to talk about his knowledge of HPV. Among 16 respondents, 12 have heard of HPV. Most of them knew about HPV from their doctors and health education classes during middle school and high school; Only a few learned about HPV from mass media such as TV commercials and the Internet. Even they had heard about HPV, many only knew it was

sexually-transmitted, and some thought it was only related to girls. Other details about HPV were mostly unknown. For those who knew nothing about HPV, the interviewer would provide them a brief introduction of the virus.

Then the interviewee was asked whether he knew the CDC recommended HPV vaccination for males. Eleven out of 16 respondents did not know about this. Some expressed surprised feelings when they heard of this. Among those who knew CDC's recommendation for the vaccine, all of them learned the information from their doctors, instead of mass media.

The next two questions involved opinion regarding HPV vaccination for males and the benefits of vaccination. Most of the respondents indicated that they were for the vaccine (13 out of 16); however, they also thought that only certain people should take the HPV vaccine and they did not need the vaccine themselves. Many suggested that only people who had multiple sex partners, had sex a lot, did not use protection during sexual activities, or were homosexual, needed the HPV vaccine. A few also expressed that parents were more responsible for decisions on the subject matter. Only one interviewee suggested males should get the HPV vaccine for stopping spreading diseases. As for those who did not support the vaccine, they said they believed in exercising their immune system or safe sex more than vaccination.

These interviews provided meaningful insights to the design of the questionnaire. Firstly, since most interviewees suggested they obtained information about HPV from schools and doctors, a question was set up to ask for their sources of information about HPV.

Next, as most interviewees did not have a concrete idea of transmission and consequences of HPV, the questionnaire included a paragraph explaining what HPV and the HPV vaccine are before respondents started to answer questions regarding HPV vaccination. In particular, the paragraph included statements about the CDC's recommendation of the vaccine, which was mostly unknown. Respondents were asked to read carefully this paragraph so as to make sure they had enough background knowledge to understand what the questions were talking about. As suggested by respondents in the pretest, the cost of vaccination, around USD400, was also supplied as a piece of information for the respondents.

Because some of the interviewees told that they thought of vaccination for females when they heard of HPV, the topic of this study as the HPV vaccination for males, instead of the vaccination for females, was emphasized. In some questions wordings like "MALES" were bolded as a reminder.

Edits after pretest. The questionnaire was edited after the pretest. In the section that asked questions about the discussion network for sexual matters, respondents were asked to provide demographic information of their alters. However, since respondents in the pretest suggested the questionnaire being too long and demographic questions about others were difficult to answer, questions about religion, ethnicity, and status of employment were deleted, and questions about age, gender, and education were kept.

Another change is concerned with questions about attribution of responsibilities. In the pretest, attribution of responsibilities for the problem and attribution of responsibilities for the solution were not distinct enough. First, the "problem" was represented by clear wordings "getting HPV-related diseases including cervical cancer",

instead of only general wordings “infections of HPV.” Second, in order to emphasize that responsibilities for the problem in the society as a whole instead of the self’s contraction of HPV, wordings saying “others (including females) getting HPV-related diseases” were used added.

Screening questions. Respondents were asked to confirm they were males aged 18 through 26 living in the United States at the beginning of the questionnaire. To make sure they were qualified for this study, they had to provide their gender, date of birth, and state of residence. Also, in the middle of the questionnaire, an attention-check question was set up, which asked respondents to click “totally agree.” Those who claimed they had taken the HPV vaccine had to provide the date of vaccination. Although Hirth et al. (2013) examined 514 record claims from one insurance company to identify male who initiated the HPV vaccine from 2006 to 2009, that is, after the vaccine was approved for female but before it was approved for males by the FDA, only 21% of completed all 3 vaccine doses of the vaccine within 12 months among all the claims. Since the FDA approved the HPV vaccine in 2009, respondents who provided the date of vaccination earlier than 2009 were rejected, lest they did not have a clear idea of the type of vaccination concerned in this survey.

Question order. Shen and Huggins (2013) examined the impact of question order in the model of influence of presumed influence by a web-based quasi-experiment, that provides evidence showing that the IPI model lie in a robust causal chain in the form of self-exposure → other-exposure → presumed effects on others → behavior. In the self-other question order, the causal chain in the model was supported. However, when they altered the question order, the causal chain emerged as other-variable → self-variable →

perceived effects on self → behavior. The major concern lied on the self-variable and the other-variable. In this study, the self-variable and the other-variable were examined in different ways. Exposure of the self to the messages and perceived effects on others were asked. In this way, it became less likely that respondents would project exposure of the self to variables related to others.

Measurements of variables

As stated in the hypotheses and research questions, the following variables were examined in this study:

Media Use. Respondents were asked to provide their average daily use of newspaper ($M = 45.58$, $SD = 47.98$), TV ($M = 151.83$, $SD = 115.98$), and the Internet and social media ($M = 286.95$, $SD = 187.83$). Because findings from the pretest showed that the respondents had a low use of newspapers – probably because the respondents were relatively young - use of online version of newspapers was specified to be included in use of newspaper in the later version of the questionnaire. A ratio scale allowing respondents to provide the amount of time in hours, minutes, and seconds was set up. Later the scale was recoded into a number of minutes.

Exposure to messages about HPV vaccination for males. Three questions were written to ask for the number of times seeing information about HPV vaccination for males on newspapers ($M = 1.58$, $SD = .80$), TV ($M = 1.64$, $SD = .915$), and websites and social media ($M = 2.00$, $SD = 1.10$) respectively, in the past year. Because it may be difficult for respondents to recall the exact number of times seeing the message in the past year, a 5-point ordinal scale was set up for easier answer: 1 = Never; 2 = Once or twice; 3 = 3-5 times; 4 = 6-10 times; 5= More than 10 times.

Another question asked for respondents' way of obtaining information about HPV vaccination for males. They could choose whether they had ever heard of the information from the following sources: Family members and relatives; Friends; Member of the same group / organization / school / housing community; Teacher / Other educational professionals; Doctor / Other medical professionals.

Perceived effects of HPV vaccine messages. Three items were set up to measure the respondents' perceived effects of the messages about HPV vaccination for males. Respondents were asked to indicate on a 5-point Likert scale (1 = totally disagree; 2 = somewhat disagree; 3 = neutral; 4 = somewhat agree; or 5 = totally agree) their attitude toward the following items: 1) Promotion of HPV vaccination for males has been effective in raising intentions to receive the vaccine among males; 2) Promotion of HPV vaccination for males has been effective in creating greater awareness of the vaccine among males; 3) Promotion of HPV vaccination for males has been effective in removing any misunderstandings regarding the vaccine among males. The three items indicated a high reliability with a Cronbach's alpha = .922. The three items were added up and divided by three to become the final score of the variable.

Perceived descriptive norm and perceived injunctive norm. Many previous studies had measured descriptive norm and injunctive norm with a single item. Paek (2009) measured descriptive norm by asking "What percentage of your peers would you say smoke cigarettes at least once a week?" Injunctive norm was measured with "How do you think your peers think and feel about smoking?" with a 7-point semantic differential scale from (1) "Not at all ok" to "Perfectly fine" and (2) "Completely disapprove" to "Completely approve". Hong, Rice and Johnson's (2012) measured descriptive norm by

“How many of your friends smoke cigarettes?” with a scale ranging from none (0) to all (4). Injunctive norm was also assessed by one survey item, “How do you think your close friends feel (or would feel) about you smoking one or more packs of cigarettes per day?”, with a scale ranging from strongly disapprove (0) to would not disapprove (3).

To make sure measurements of the variables were reliable, perceived descriptive norm and injunctive norm regarding uptake of the HPV vaccine were measured in multiple items. Rimel and Real (2005) suggested that questions used in their study asked about perceptions of approval from authority figures (university administrators, parents, etc.), so it was likely that the influence of injunctive norms were greater when approval cues emanate from members of students’ social circles. In light of this, questions used in this study avoided asking perceptions regarding authority figures or people higher in the hierarchy. The items were modified from Larimer et al. (2004).

For perceived descriptive norm, respondents indicated on a 5-point Likert scale from 1 = totally disagree to 5 = totally agree on the following three items: 1) Uptake of the HPV vaccine is prevalent among males in this nation; 2) Uptake of the HPV vaccine is prevalent among males in the community where I live; 3) Uptake of the HPV vaccine is prevalent among males in the organization where I work / the institution where I study. The items gave a high reliability (Alpha = .906). The three items were summated and divided by three.

Measurements for perceived injunctive norm used the same 5-point scale, and the items were: 1) Males in the nation think they should avoid transmission of HPV to others by receiving the vaccine; 2) Males in the community where I live think they should avoid transmission of HPV to others by receiving the vaccine; 3) Males in the organization

where I work / the institution where I study think they should avoid transmission of HPV to others by receiving the vaccine. The items were also reliable with an Alpha = .940. The three items were summated and divided by three.

Attitude toward HPV vaccine. Respondents indicated their support for HPV vaccination for males on a 5-point Likert scale from 1 = totally disagree to 5 = totally agree to the following three items: 1) I support the CDC's recommendation of the HPV vaccine to males; 2) I support an increase in males receiving the HPV vaccine; 3) I support more promotions of HPV vaccination for males. The three items gave a Cronbach's alpha = .937, showing their high reliability. The three items were then added up and divided by three.

Attribution of responsibilities. Variables concerning with attribution of responsibilities were measured with items modified from Karuza et al. (1990). In this study, there are four variables related to attribution of responsibilities, and all of them were measured on the same 5-point Likert scale ranging from 1 = totally disagree to 5 = totally agree. Each variable was measured by three items, and divided to make the final score of the variable.

Findings from the pretest showed that attribution of responsibilities to the self and attribution of responsibilities to others (females) were highly correlated. To avoid such correlations being a result of confusion in wordings, and to focus on HPV vaccination males as an altruist act for others, the items were rephrased and rewritten. Firstly, the word "FEMALES" when talking about attribution of responsibilities to females were bolded for easier reading. Second, when talking about HPV vaccination as a way to stop transmission of diseases to other people, the statements specified that "other people"

included the opposite gender, females, so that the respondents understand the problem and the solution for HPV transmission involved females as well. Third, when talking about HPV diseases as the problem, the most common HPV-related disease, cervical cancer, was quoted as an example so that the respondents had a broader sense of the most serious consequence of contracting HPV.

Attribution of responsibilities for the problem to the self. In this study, the “problem” was indicated by getting HPV-related diseases such as cervical cancer. As the “problem” caused by HPV not only included HPV-related disease on males but also on females, the three items were written as followed: 1) I am personally responsible for other people (including females) getting HPV-related diseases such as cervical cancer; 2) I could have prevented other people (including females) getting HPV-related diseases such as cervical cancer; 3) I could have controlled other people (including females) getting HPV-related diseases such as cervical cancer. The three items indicated a high Alpha value at .916.

Attribution of responsibilities for the solution to the self. The “solution” examined in this study was HPV vaccination. Because the main purpose of this study was to examine HPV vaccination for males as a way not only beneficial to themselves, but also beneficial to others, the “solution” was emphasized as a way to stop transmission of HPV to others including females. Respondents were asked to indicate their attitude toward three items: 1) I am personally responsible for receiving the HPV vaccine to stop transmission of the virus to other people (including females); 2) If I receive the HPV vaccine myself, I could stop the transmission of the virus to other people (including females); 3) If I receive the HPV vaccine myself, I could control the transmission of the

virus to other people (including females). Reliability of the three items with an Alpha = .801 was acceptable.

Attribution of responsibilities for the problem to females. To measure how respondents attributed the responsibilities of getting HPV-related diseases including cervical cancer to females, they indicated their attitude toward the following items: 1) Females are personally responsible for their getting HPV-related diseases such as cervical cancer; 2) Females could have avoided their getting HPV-related diseases such as cervical cancer; 3) Females could have controlled their getting HPV-related diseases such as cervical cancer. A Cronbach's alpha of .855 shows an acceptable reliability among the three items.

Attribution of responsibilities for the solution to females. How male respondents attributed responsibilities of HPV vaccination as a solution of HPV-related diseases to females were measured by their indication of agreeing the following items: 1) Females are personally responsible for receiving the HPV vaccine to prevent infection of the virus; 2) If females receive the HPV vaccine themselves, they could prevent infection of the virus; 3) If females receive the HPV vaccine themselves, they could control infection of the virus. Reliability with an Alpha = .859 was acceptable.

Perceived benefits of HPV vaccine. Respondents were asked to indicate on a 5-point Likert scale whether they thought HPV vaccination was beneficial to 1) themselves; 2) their sexual partner(s); 3) the society in general. Reliability among the three items were high with Alpha = .884, so they formed a summated scale and were divided into three for the final score.

Perceived costs of HPV vaccine. How the possible cost of getting the HPV vaccine was perceived was measured in respondents' support on a 5-point scale from 1 = totally disagree to 5 = totally agree for the following items: 1) I am willing to pay around \$400 for the HPV vaccine; 2) I have doubts on the long-term safety of the HPV vaccine; 3) I have doubts on the short-term side-effects of the HPV vaccine. The first item was recoded so that the direction of the scale became the same as other items, i.e. a larger number represents a greater perceived cost ($M = 3.59$, $SD = 1.36$). The second two items were summated and divided to become the variable "health costs" ($M = 2.90$, $SD = 1.18$), with a high reliability (Cronbach's Alpha = 0.892). The three items represented two different types of perceived costs of the vaccine: monetary costs and health costs.

Egocentric discussion network for sexual matters. Questions examining the egocentric discussion network for sexual matter were set up with modifications from the general social survey (GSS, 2014) and related articles (Burt, 1985; Marsden, 1987). To establish the size of the discussion network, the respondents were asked to recall people with whom they had discussed sexual matters in the last six months. There were no limits of the number of names. Mean number of names suggested = 1.78, $SD = 1.98$.

After that, for each of the first three names in the list, the following variables were examined:

Type of relationship. Respondents were asked to indicate how the person was connected to them by choosing one or more from the following categories: Parent; Sibling; Spouse/Romantic partner/Sexual partner; Other family members; Classmate/Schoolmate; Member of the same group (eg. Fraternity); Roommate; Neighbor; Co-worker; Friend; Teacher. The type of relationship was then recoded into 1

= Kinship (Parent/Sibling/Other family members), 2 = Partnership (Spouse/Romantic partner/Sexual partner), and 3 (All others). If the answer fell on more than one category, priority was given to kinship, and then partnership, and finally others.

Closeness. Respondents indicated how close they were with the person on a 5-point scale, ranging from 1 = Absolutely not close, 2 = Not so close, 3 = Somewhat close but not too close, 4 = Quite close, to 5 = Very close. (M = 4.54, SD = .822, N = 518 for the first person; M = 4.12, SD = .907, N = 327 for the second person; M = 3.98, SD = .954, N = 224 for the third person).

Frequency of contact. On a 5-point scale, respondents indicated their frequency of contact with the person from 1 = No more than once a year, 2 = Around once every few months, 3 = Around once every few weeks, 4 = Around once every few days, to 5 = Every day.

(M = 4.45, SD = .900 for the first person; M = 3.91, SD = 1.04 for the second person; M = 3.83, SD = .975 for the third person)

Duration of acquaintance. Respondents were asked how long they had known the person by choosing from the following: Less than 6 months, 6-12 months, More than 1 year - 2 years, More than 2 years – 5 years, More than 5 years – 10 years, More than 10 years. (M = 4.35, SD = 1.22 for the first person; M = 4.39, SD = 1.35 for the second person; M = 4.24, SD = 1.46 for the third person)

Perceived support for HPV vaccination. To examine the influence of the discussion network for sexual matters on the respondents' attitude toward HPV vaccination for males, the respondents were asked to estimate how likely the person would support HPV vaccination for males on a 5-point scale, ranging from 1=

Completely unlikely, 2 = Somewhat unlikely, 3 = Maybe, but not so sure, 4 = Somewhat likely, to 5 = Very likely. (M = 3.97, SD = 1.07 for the first person; M = 3.87, SD = 1.14 for the second person; M = 3.92, SD = 1.03 for the third person)

Demographics. Respondents were asked to report their demographics, including age, ethnicity, state of residence, religion, and level of education. Age was reported in a whole number (M = 23.78, SD = 1.94), and reconfirmed with the date of birth. Categories for ethnicity were slightly modified from US census data (Census.gov, 2014): Hispanic or Latino; American Indian or Alaska Native; Asian; Black or African American; Native Hawaiian or Other Pacific Islander; White; Others.

Categories for religion were slightly modified from the Pew Research Center data (Pew Research Center, 2015): Protestant; Catholic; Other Christian (including Mormon, Pagan, Jehovah's Witnesses, etc.); Jewish; Buddhist; Muslim; Hindu; Unaffiliated (including atheist, agnostic); Others.

Categories for education level were Grade 8 (Middle school) or below; Grade 9 -12 (High school); College; Graduate School.

In 2013, reports have alarmed the great differences in HPV vaccination among regions in the US. According to the CDC (2013) statistics of HPV vaccine coverage among adolescents aged 13-17 years, in 2012, the Northeast had the highest percentage of female completing 3 doses of the HPV vaccine (40.4%) and the West had the highest percentage of male completing the 3 doses (9.4%). On the contrary, the South has the lowest percentage of both female (29.9%) and male (6.2%) completing all 3 doses of the HPV vaccine. In view of the possible difference in coverage of the HPV vaccine in different regions in the U.S., the state of residence were then recoded into four different

areas: Northeast, Midwest, South, and West. Divisions of the states were the same as shown in the data provided by the CDC (2013): Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont); Midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin); South (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia); West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

Sexual experience. HPV vaccination is a topic highly related to sexual activities and safe sex. Also, findings from interviews showed that people's perceived need for vaccination was highly related to their sexual orientation and experience. In view of this, sexual orientation, sexual experience, protection during sexual activities, were included as controlled variables. Categories for sexual orientation were heterosexual; homosexual; bisexual; others (eg. pansexual, asexual). The variable sexual orientation was dummied with heterosexual = 0, and others = 1.

Sexual experience was measured in the length of time since the respondents started to be sexually active; and the options were I have never been sexually active; Less than 6 months; 6-12 months; More than 1 year - 2 years; More than 2 years – 5 years; More than 5 years – 10 years; More than 10 years.

Among respondents who were sexually active, they were asked the frequency of using protection during sexual activities in the past year: Never; Less than 50% of the time; Around 50% of the time; More than 50% of the time, but not always; Always.

HPV vaccinated. Finally, whether the respondents had been vaccinated was controlled. If the respondent indicated that he had been vaccinated, they had to give the date of vaccination, and the variable was recoded into year of vaccination.

Respondents who had not yet vaccinated were asked to indicate their likelihood to take the vaccine in the future, ranging from 1 (completely unlikely), 2 (somewhat likely), 3 (maybe, but not so sure), 4 (somewhat likely), to 5 (very likely) ($M = 3.09$, $SD = 1.24$).

In next chapter, results of the responses in collected questionnaires will be reported. Statistical tests will be conducted to test hypotheses and to address research questions.

CHAPTER 4

FINDINGS

Descriptive findings

More than a half (57.3%, n = 376) of the respondents reported that they had never seen any information regarding the HPV vaccination for males on newspapers in the past year. 30.5% (n = 200) had seen such information on newspapers once or twice, and 9.3% (n = 61) had seen it 3 to 5 times. Figure 4.1 shows a pie chart of exposure to the messages of the HPV vaccination for males on newspapers.

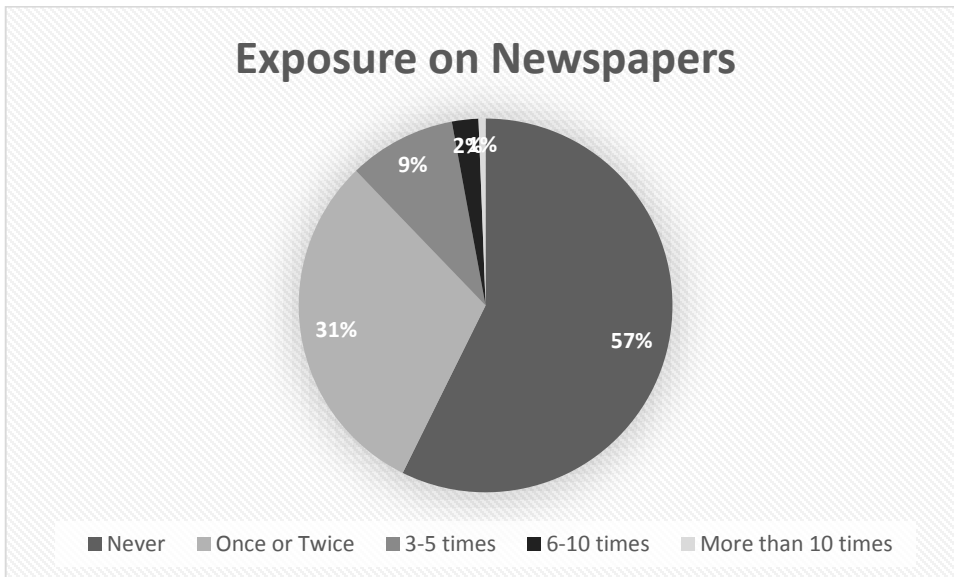


Figure 4.1. Exposure of messages about HPV vaccination for men on newspapers

Respondents who reported that they had never seen any messages about the HPV vaccination for males on TV in the past year were also more than a half (58.4%, n = 383). 25.3% (n = 166) had seen the information on TV once or twice, and 11.1% (n = 73) had

seen it 3 to 5 times. Figure 4.2 shows a pie chart of exposure to the messages of the HPV vaccination for males on TV.

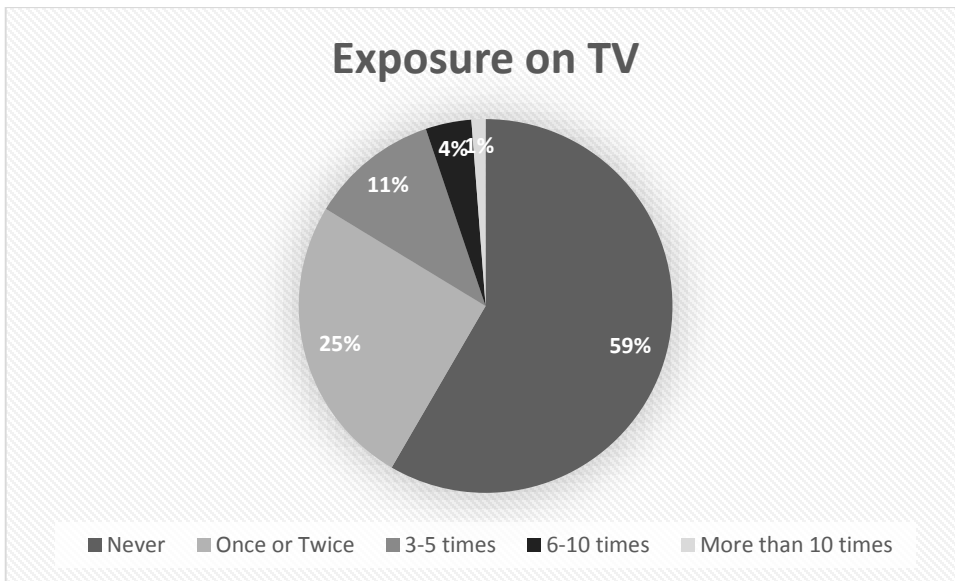


Figure 4.2. Exposure of messages about HPV vaccination for men on TV

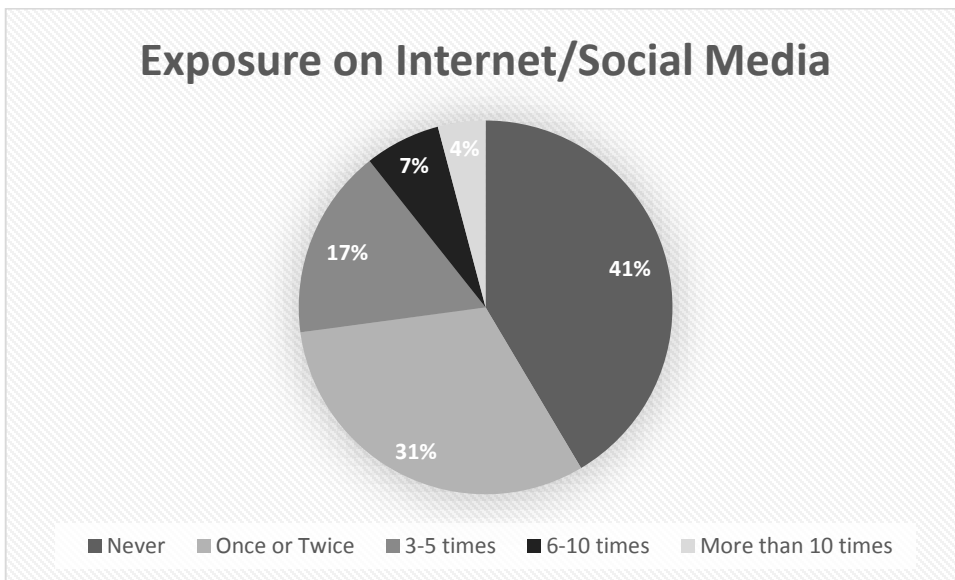


Figure 4.3. Exposure of messages about HPV vaccination for men on Internet/Social media

More than 40% (41.5%, n = 272) of the respondents had never seen any messages about the HPV vaccination for males on the Internet or social media in the past year.

31.4% (n = 206) had seen the information on the Internet once or twice, and 16.5% (n = 108) had seen it 3 to 5 times. Figure 4.3 shows a pie chart of exposure to the messages of the HPV vaccination for males on social media.

As for interpersonal sources of information about the HPV vaccination for males, 41.3% (n = 271) of the respondents indicated that they had never obtain any such information form interpersonal sources. 20.6% (n = 135) suggested they had heard the HPV vaccination for males from family members and relatives; 27.9% (n = 183) had heard it from friends; 10.7% (n = 70) heard it from members of the same group or organization or school or housing community; 13.3% (n = 87) heard from teachers or other educational professionals; and 33.4% (n = 219) had heard from doctors or other medical professionals.

In sum, 23.8% of the respondents (n = 156) indicated that they had never received any information regarding the HPV vaccination for males in any of the listed sources in this survey, neither from media including newspapers, TV, and the Internet, nor from any interpersonal sources.

Results of Hypothesis testing

The rest of this chapter will be devoted to the key results of hypothesis testing. Because all hypotheses involve examining predictors of the dependent variables, a series of hierarchical regressions were run. As this study is relatively exploratory, regressions are appropriate to explore the association between various variables. A model can be built up from significant predictors of the dependent variables after running all the regressions.

To test H1 which proposed that exposure to messages of the HPV vaccination for males would positively predict perceived effects of promotions of the vaccine, a

hierarchical regression was performed. Demographic variables, including the respondents' age, ethnicity, state of residence, level of education, and religion, were entered into the regression equation as the first block of independent variables. Ethnicity was dummied as 0 = White, and 1 = Others. Religion was dummied as 0 = Unaffiliated, 1 = Affiliated with a religion. State of residence was dummied as 0 = the South, and 1 = Others. Then exposure to messages from media and exposure to messages from interpersonal sources were entered as the second block of independent variables.

The regression equation was significant ($F = 30.35, p \leq .001$). VIF of all variables did not exceed 1.36. Both exposure to messages from media ($Beta = .396, p \leq .001$) and exposure to messages from interpersonal sources ($Beta = .127, p \leq .001$) were significant predictors of perceived effects of promotions of the HPV vaccine for males. The model explained 23.9% of the variance in total, with exposure to the messages explained 20.1% of the total variance. H1 was supported. Detailed regression results can be found in Table 4.1.

To test H2 which states that perceived effects of the messages about the HPV vaccination for males would positively predict the descriptive norm and the injunctive norm, another hierarchical regression was performed. The first two blocks of independent variables were the same as in the previous regression equation. Then a third block of independent variables, perceived effects, was added. The overall regression equation was significant ($F = 71.45, p \leq .001$), with an adjusted R square .464. VIF of all variables did not exceed 1.57. Perceived effects was shown to be a significant predictor of descriptive norm ($Beta = .577, p \leq .001$), and accounted for 25.2% of total variance. H2a was supported.

Table 4.1. Hierarchical regression analyses of demographics, exposure to messages, perceived effects, and perceived norms

Regressions	Perceived Effects	Descriptive Norm	Injunctive Norm	Support for HPV Vaccination for Males
Predictors				
Block 1 : Demographics				
Age	-.044	-.020	.008	.039
Ethnicity	.045	.088**	-.037	-.011
Education	.057	-.005	.005	.002
State of residence	.010	.009	-.037	.032
Religion	.021	.048	.031	.049
<i>Adjusted R²</i>	.038	.045	-.004	.000
Block 2: Exposure to messages				
Exposure from media	.396***	.104**	-.139**	-.040
Exposure from interpersonal sources	.127***	.083**	.064	.039
<i>Incremental adjusted R²</i>	.201	.167	.005	.007
Block 3: Perceived effects				
Perceived effects		.577***	.127**	.023
<i>Incremental adjusted R²</i>		.252	.011	.015
Block 4: Perceived norm				
Descriptive norm				.055
Injunctive norm				.737***
<i>Incremental adjusted R²</i>				.528
Total adjusted <i>R²</i>	.239	.464	.012	.550

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; $N = 656$

Note: Standardized beta weights from final regression equation with all blocks of variables in the model.

Another hierarchical regression was performed to test H2b. The predictors entered into the model were the same as the previous regression, with the injunctive norm as the dependent variable instead. The overall regression equation was significant ($F = 1.98$, $p \leq .05$). VIF of all variables did not exceed 1.55. Perceived effects of the messages was a significant predictor of the injunctive norm (Beta = .127, $p \leq .01$), but it only accounted

for 1.2% of the total variance. Adjusted R square for this model was only .011. H2b was still supported. The above regression results can be found in Table 4.1.

H3a and H3b suggested the perceived descriptive norm and the perceived injunctive norm positively predicted attitude toward the HPV vaccination for men. A hierarchical regression with the same first three blocks of independent variables as before, and descriptive norm and injunctive norm were set as the fourth block of independent variables. Attitudes toward the HPV vaccination for males were the dependent variable. The overall regression equation was significant ($F = 78.99, p \leq .001$), with an adjusted R square of .550. VIF of all variables did not exceed 1.96. Injunctive norm was shown to be a significant predictor of the respondent's attitude ($Beta = .737, p \leq .001$); however, the descriptive norm was insignificant in predicting attitudes. The norms accounted for 52.8% of the total variance. Only H3b was supported. Regression results are shown in the fourth column of Table 4.1.

H4 hypothesized that attribution of responsibilities to women predicted attitudes toward the HPV vaccination for males. To control for demographics, age, ethnicity, state of residence, religion, and level of education were entered into the regression equation as the first block. Then attribution of responsibilities of the problem to women, and attribution of responsibilities of the solution to women, were entered as the second block of independent variables. The regression equation was significant ($F = 33.58, p \leq .001$). VIF of all variables did not exceed 1.23. All independent variables in the second block significantly predicted attitudes toward the HPV vaccine. Attribution of the problem to the women ($Beta = -.105, p \leq .01$) negatively predicted the attitudes, while attribution of the problem to women ($beta = .544, p \leq .001$) positively predicted the attitudes. The total

variance explained by the model was 25.6%, and attribution of responsibilities accounted for all the total variance. H4.1 was supported, but H4.2 was not.

To test H5 which stated that attribution of responsibilities to the self would predict attitudes toward the HPV vaccination for males, another hierarchical regression was run. The first block of variables were demographics, and attribution for the problem to the self and attribution for the solution to the self were entered as the second block of independent variables. The regression equation was significant ($F = 48.16, p \leq .001$), with an adjusted R square of .335. VIF of all variables did not exceed 1.12. While attribution for the solution to the self was a significant positive predictor of attitudes (Beta = .600, $p \leq .001$), attribution for the problem to the self was a significant negative predictor of attitudes (Beta = -.118, $p \leq .001$). Attribution of responsibilities to the self accounted for 33.5% of the total variance of the independent variable. H5.2 was supported, but not H5.1. Regression results for H4 and H5 are shown in Table 4.2.

To examine whether the predictive power of attribution of responsibilities was associated with other variables in the influence of presumed influence model, hierarchical regressions were run with attribution of responsibilities as the dependent variable. Demographics were entered as the first block, and exposure to messages about the HPV vaccination for males from media and interpersonal sources were entered as the second block. Then perceived effects were entered as the third block, and the perceived descriptive norm and the injunctive norm were entered as the fourth block of independent variables.

Table 4.2. Hierarchical regression analyses of demographics and attribution of responsibilities

DVs	Support for HPV Vaccination for Males	
Predictors		
Block 1 : Demographics		
Age	.035	.033
Ethnicity	.022	-.012
Education	.054	.005
State of residence	.028	.006
Religion	.017	.050
<i>Adjusted R²</i>	.000	.000
Block 2: Attribution of responsibilities		
Women-Problem	-.105**	
Women-Solution	.544***	
Self-Problem		-.118***
Self-Solution		.600***
<i>Incremental adjusted R²</i>	.256	.335
Total adjusted <i>R²</i>	.256	.335

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; $N = 656$

Note: Standardized beta weights from final regression equation with all blocks of variables in the model.

For attribution of the problem to the self, the regression equation was significant ($F = 7.77, p \leq .001$), with an adjusted R square of .095. VIF of all variables did not exceed 1.96. Descriptive norm was found to be a significant predictor (Beta = .178, $p \leq .001$).

For attribution of responsibility of the solution to the self, the regression equation was significant ($F = 27.67, p \leq .001$) with an adjusted R square of .295. Descriptive norm (Beta = .125, $p \leq .01$) and injunctive norm (Beta = .537, $p \leq .001$) were shown to be significant predictors.

For attribution of responsibilities of the solution to women, the regression equation was significant ($F = 20.09, p \leq .001$) with an adjusted R square of .231, and VIF of all variables did not exceed 1.96. Injunctive norm was found to be a significant predictor of

the dependent variable (Beta = .462, $p \leq .001$). However, for attribution of responsibilities of the problem to women, the regression equation was not significant.

Table 4.3 indicates all Hierarchical regression analyses of demographics and attribution of responsibilities.

Table 4.3. Hierarchical regression analyses of demographics, exposure to messages, perceived effects, and perceived norms

DVs	Attribution for the Problem to the Self	Attribution for the Solution to the Self	Attribution for the Solution to the Women
Predictors			
Block 1 : Demographics			
Age	.045	.021	-.002
Ethnicity	.077*	-.009	-.079*
Education	.077	.013	-.064
State of residence	.040	.020	-.037
Religion	.041	.020	.076
<i>Adjusted R²</i>	.041	-.006	.018
Block 2: Exposure to messages			
Exposure from media	.058	-.008	-.054
Exposure from interpersonal sources	-.006	.067	-.023
<i>Incremental adjusted R²</i>	.002	.009	.004
Block 3: Perceived effects			
Perceived effects	.061	-.067	-.047
<i>Incremental adjusted R²</i>	.019	-.004	.000
Block 4: Perceived norm			
Descriptive norm	.178***	.125**	.042
Injunctive norm	.025	.537***	.462***
<i>Incremental adjusted R²</i>	.015	.029	.208
Total adjusted <i>R²</i>	.095	.295	.231

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; $N = 656$

Note: Standardized beta weights from final regression equation with all blocks of variables in the model.

H6 proposed that perceived costs of taking the HPV vaccine would negatively predict attitudes toward the HPV vaccination for males. To test the hypotheses, a

hierarchical regression was performed. Demographics were entered as the first block of independent variables for control. The perceived monetary cost and the perceived health cost were entered as the second block of independent variables. The regression equation was significant ($F = 18.70, p \leq .001$), with an adjusted R square of .157. VIF of all variables did not exceed 1.11. The perceived monetary cost ($Beta = -.220, p \leq .001$) significantly negatively predicted attitudes. The perceived monetary cost ($Beta = -.329, p \leq .001$) significantly negatively predicted support for the HPV vaccination for males. Perceived costs accounted for 15.7% of the total variance in the dependent variables. H6 was supported.

H7 suggested that perceived benefits of the vaccine would positively predict attitudes toward the HPV vaccination for males. A hierarchical regression with demographics entered as the first block and perceived benefits entered as the second block was run, giving a significant regression equation ($F = 82.82, p \leq .001$) with an adjusted R square of .427. VIF of all variables did not exceed 1.05. Perceived benefits was shown to significantly predict the dependent variable ($Beta = .655, p \leq .001$), accounting for 42.7% of the total variance. H7 was supported. Table 4.4 include results for both H6 and H7.

Table 4.5 summarizes the results of hypotheses testing.

To address RQ1, the mean score of attribution of responsibilities to women of the problem and of the solution were compared by a paired-sample T-test. The mean scores of the two variables were 3.28 ($SD = 1.03$) and 3.87 ($SD = .944$), and a significant difference was found ($t = -13.895, p \leq .001, df = 655$).

Table 4.4. Hierarchical regression analyses of demographics and perceived benefits and costs

DVs	Support for HPV Vaccination for Males	
Predictors		
Block 1 : Demographics		
Age	.018	-.004
Ethnicity	-.026	-.050
Education	-.014	.021
State of residence	-.008	.013
Religion	-.031	-.002
<i>Adjusted R²</i>	.000	.000
Block 2: Perceived Benefits/Costs		
Monetary Cost	-.220***	
Health Cost	-.329***	
Benefits		.655***
<i>Incremental adjusted R²</i>	.157	.427
Total adjusted <i>R²</i>	.157	.427

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; $N = 656$

Note: Standardized beta weights from final regression equation with all blocks of variables in the model.

Table 4.5. A summary of results of hypotheses testing

No.	Hypotheses	Results
<u>The Influence of Presumed Influence Model</u>		
H1	Exposure to the messages of the HPV vaccination for men will positively predict perceived effects of promotions for the vaccine.	V
H2a	Perceived effects of HPV vaccination messages to other men will positively predict perceived descriptive norm	V
H2b	Perceived effects of HPV vaccination messages to other men will positively predict perceived injunctive norm regarding HPV vaccine uptake by men.	V
H3a	Perceived descriptive norm regarding HPV vaccine uptake by men will positively predict respondents' support for HPV vaccine uptake.	X
H3b	Perceived injunctive norm regarding HPV vaccine uptake by men will positively predict respondents' support for HPV vaccine uptake.	V
<u>Attribution of Responsibilities</u>		
H4.1	Greater attribution of responsibility to women of the problem will negatively predict respondents' support for HPV vaccine uptake.	V
H4.2	Greater attribution of responsibility to women of the solution will negatively predict respondents' support for HPV vaccine uptake.	X

H5.1	Greater attribution of responsibility to men of the problem will positively predict respondents' support for HPV vaccine uptake.	X
H5.2	Greater attribution of responsibility to men of the solution will positively predict respondents' support for HPV vaccine uptake.	V
<u>Theory of Reasoned Action & Health Belief Model</u>		
H6	Perceived benefits of HPV vaccination by men will positively predict intentions to take the HPV vaccine.	V
H7	Perceived costs of HPV vaccination by men will negatively predict intentions to take the HPV vaccine.	V

Note: V=Supported; X=Not supported

Another paired-sample t-test was conducted to answer RQ2. The mean score of attribution of responsibilities to the self for the problem and for the solution were 2.37 (SD = 1.28) and 3.69 (SD = 1.05). A significant difference was found ($t = -23.67, p \leq .001, df = 655$).

A paired-sample t-test suggested a significant difference between attribution of responsibilities for the problem to the self and to women ($t = -16.17, p \leq .001, df = 655$). A significant difference was also found between attribution of responsibilities for the solution to the self and to women ($t = -4.396, p \leq .001, df = 655$). Table 4.6 indicates findings of comparing mean scores of attributions of responsibilities.

Table 4.6. Comparison of mean scores of attributions of responsibilities

Attributions	Problem	Solution	T-value
Self	2.37	3.69	-23.67***
Women	3.28	3.87	-13.895***
T-value	-16.17***	-4.396***	

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; $N = 656$

To answer RQ3, hierarchical regressions with variables related to the discussion network for sexual matters as the independent variables were run. Demographics were set as the control variables in the first block. The testing variables were then entered as the second block. Three hierarchical regressions were performed with perceived descriptive

norm as the dependent variable, which address various properties of the discussion network as stated in RQ3.1. The first regression addresses the size of the discussion network for sexual matters (RQ3.1a). The second regression addresses further properties of the discussion network, including the tie strength and heterogeneity (RQ3.1b). The third regression addresses perceived attitudes of alters in the discussion network as the independent variable (RQ3.1c).

In the first regression, the number of names suggested in the discussion network, which represented the size of the network, was entered ($F = 6.39, p \leq .001$), but it was not significant in predicting the dependent variable. In the second regression, properties of the discussants including differences between the discussants and the respondent's age and education level, number of female discussants, and the average tie strength, were entered. The regression equation was significant ($F = 4.75, p \leq .001$), but all the variables in the second block were insignificant in predicting the dependent variable. In the third regression ($F = 7.10, p \leq .001$), the total adjusted R square was .050. VIF of all variables did not exceed 1.06. Average perceived support for the HPV vaccination for males of the discussants were entered as the second block, and was significant in predicting descriptive norm ($Beta = .089, p \leq .001$), though only 0.6% of the total variance was accounted for. Detailed results of all three regressions were shown in Table 4.7.

The next set of hierarchical regressions was run with the same independent variables as the previous set, but perceived injunctive norm was entered as the dependent variable instead to address RQ3.2a to RQ3.2c. The first regression equation was insignificant ($F = .525, p > .05$). In the second regression ($F = 2.73, p \leq .01$, adjusted $R^2 = .020$), average tie strength ($Beta = .136, p \leq .01$), differences between the discussants and the

Table 4.7. Hierarchical regression analyses of demographics and discussion network for sexual matters

DV	Descriptive Norm		
Predictors			
Block 1 : Demographics			
Age	-.057	-.054	-.062
Ethnicity	.170***	.169***	.177***
Education	.126***	.144***	.117**
State of residence	.012	.011	.011
Religion	-.009	-.023	.008
<i>Adjusted R²</i>	.044	.044	.044
Block 2: Discussion Network for Sexual Matters			
Number of names suggested	-.070		
Average tie strength		-.009	
Number of females		-.013	
Age difference		.001	
Education difference		.043	
Perceived support for HPV vaccine			.089*
<i>Incremental adjusted R²</i>	.003	.004	.006
<i>Total adjusted R²</i>	.047	.040	.050

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; $N = 656$

Note: Standardized beta weights from final regression equation with all blocks of variables in the model.

respondent's age (Beta = .084, $p \leq .05$) and education level (Beta = -.117, $p \leq .01$) were significant predictors of the injunctive norm, accounting for 2.4% of the total variance.

In the third regression ($F = 7.65$, $p \leq .001$, adjusted $R^2 = .059$), average perceived support for the HPV vaccination for males significantly predicted the injunctive norm (Beta = .02, $p \leq .001$), accounting for 6.3% of the total variance. Detailed results of the two significant regressions were shown in Table 4.8.

Table 4.8. Hierarchical regression analyses of demographics and discussion network for sexual matters

DV	Injunctive Norm	
Predictors		
Block 1 : Demographics		
Age	.006	.019
Ethnicity	-.027	.070
Education	-.046	.068
State of residence	-.043	.078
Religion	.011	.027
<i>Adjusted R²</i>	-.004	-.004
Block 2: Discussion Network for Sexual Matters		
Average tie strength	.136**	
Number of females	.002	
Age difference	.084*	
Education difference	-.117**	
Perceived support for HPV vaccine		.020***
<i>Incremental adjusted R²</i>	.024	.063
<i>Total adjusted R²</i>	.020	.059

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; $N = 656$

Note: Standardized beta weights from final regression equation with all blocks of variables in the model.

Figure 4.4 shows a summary of all significant relationships found between variables in one diagram.

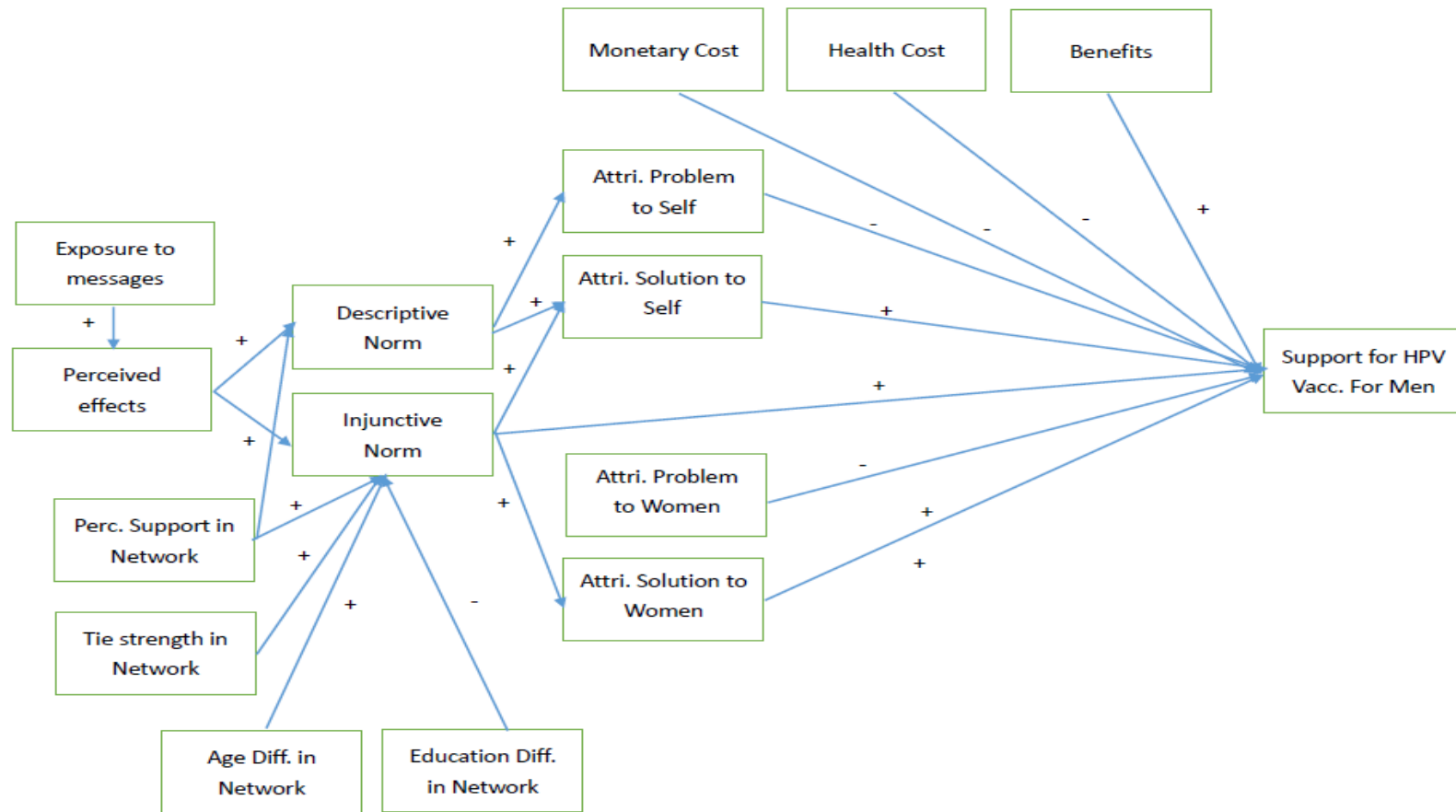


Figure 4.4 A summary of all significant relationships found between variables

CHAPTER 5

DISCUSSIONS

Descriptive norm and injunctive norm in the IPI model

Findings from this study basically confirm the influence of presumed influence model. Exposure to messages about HPV vaccination of males significantly predicted respondents' perceived effects of the messages to other people. Furthermore, such perceived effects significantly related to their perceived social norms regarding the issue. And the perceived norms are significantly related to support for the HPV vaccination for males.

One of the main contributions from this study is the examination of the perceived descriptive norm and the injunctive norm, and interesting results were found. First, the exposure->perceived effects->norm route was found to be a stronger predictor in explaining the perceived descriptive norm. Perceived effects significantly predicted the descriptive norm after controlling for exposure, and it explained 25.2% of the variance in the descriptive norm. This implies that informational messages did influence people's perception of whether the HPV vaccination were prevalent among other males in their organization/institution, their community, and the nation. Media and interpersonal information sources were important in creating a norm that people around are more likely to perform the behaviors.

However, the association between perceived effects and the injunctive norm was much weaker. While perceived effects was a significant predictor, only 1.1% of the

variance in the injunctive norm was explained by the perceived effects. In other words, while people perceived the behavior being more popular if they had been in contact with the messages more, it did not affect their judgment of others' approval for the behavior. Even though they heard of the HPV vaccination for males more often, they might think more people got vaccinated because of the promotions, it does not necessarily mean that others' approved such behaviors and agreed that everyone should take the vaccine. Promotions of the vaccine only influenced the perceived prevalence of the vaccine on the surface, but not deeper internal values in people's mind. One reason may be that the HPV vaccine is promoted to people at a relatively young age (9-26 years). Getting vaccinated may be a decision made by parents or physicians, instead of the one who get vaccinated. While the messages could give an image that the vaccine was prevalent, respondents may think such prevalence was only a result of decisions by parents and physicians, instead of a norm that was approved by other males.

Second, the descriptive norm did not significantly predict support for the HPV vaccination for males. This appears to be contradictory to the influence of presumed influence model. The IPI model proposes an indirect effect of media messages through creating a social norm. However, findings in this study indicate that even promotional messages successfully created a norm that the vaccine was prevalent among males, it did not lead to support for the vaccine.

The injunctive norm, on the other hand, significantly predicted support for the HPV vaccine. The association was strong, with a beta of .737 and 52.8% of the variance in support for the vaccine was explained by the injunctive norm. Compared to the descriptive norm, the injunctive norm is a stronger factor influencing people's attitude

toward the HPV vaccination for males. Only perceiving others performing the behaviors is not enough to influence their own decisions. People have to perceive the society has a norm that others think they should do it in order to take action.

The difference in predictive power of the descriptive norm and the injunctive norm showed that the two concepts are distinctive, which is in line with literature (eg. Rimal and Real, 2005). Hong, Rice and Johnson's (2012) panel study found that the injunctive norm was associated with smoking intentions among 12th-graders but not 9th-graders. This study with young adult respondents confirmed that the injunctive norm might be more important among older people. As people grow older, what others think they ought to be done becomes more important than what others people actually do.

While the injunctive norm significantly predicted attitudes toward the HPV vaccine, it was not strongly associated with perceived effects of the messages. The influence of presumed influence model barely holds for indirect effect of the promotional messages through the injunctive norm. One reason can be attributed to the content of most promotional messages about the HPV vaccination for males. For example, on the CDC's (2015) webpage titled "HPV Vaccine is Recommended for Boys", information focuses on how the HPV vaccine can prevent cancer for boys, and safety of the vaccine. Only one sentence mentioned the vaccination for boys is beneficial to girls by reducing the spread of the virus. Promotional messages about the HPV vaccine were seldom associated with approval of the vaccine from people in the community and in the society as a whole.

Attribution of responsibilities to the self and support for the vaccine

Attribution of responsibilities to the self was another major group of variables for examination. Both attribution for the problem and the solution to the self significantly

predicted support for the HPV vaccination for males. In this study, the problem was defined as others (including females) getting HPV-related diseases such as cervical cancer. It is interesting that attribution for the problem to the self was negatively associated with support for the vaccine; in other words, those who agreed that they were responsible for others getting HPV-related diseases were less supportive for the HPV vaccine. Even men thought they could have reduced others' contraction of HPV-related diseases, they did not support the HPV vaccination for males. This implies that men actually did not associate getting HPV-related diseases with not being vaccinated. From the pre-survey interviews, it was common that men associated HPV with sexual permissiveness such as excessive sexual activities and multiple sex partners. More than one interviewee suggested that if they were loyal to their partner, they did not need the vaccine. With such thoughts, it is possible that people think they could have reduced others' infection of HPV-related diseases by safe sex and reducing the number of sexual partners. Male respondents perceived that they did not need the vaccine at all if they took up the responsibilities for reducing women suffering from HPV-related diseases.

As anticipated, attribution of responsibilities for the solution to the self was significantly associated with support for the HPV vaccine. When attribution of responsibilities to men was examined as dependent variables, meaningful results were found. The descriptive norm was found to be a significant predictor of attribution of responsibilities for the problem to the self. While the descriptive norm did not directly predict support for the HPV vaccination for males, it significantly predicted attribution of for problem to the self, which in turn, predicted attitudes toward the vaccine. This piece of finding provides important implication to the influence of presumed influence model –

the exposure->perceived effects->norm->attitude route did not go straight through, but the norm can produce indirect effect on the attitudes through attribution of responsibilities.

Interestingly, the descriptive norm was positively associated with attribution for the problem to the self, which was negatively associated with attitudes toward the vaccine. In other words, perceiving more people taking the HPV vaccine suggested to those men that they could reduce other people (including women) infected by the diseases, but then they became less supportive for the vaccine. How can it happen? This may be pointing to another underlying reason for the negative relationship between attribution of responsibilities for the problem to the self and support for the vaccine. The famous Darley and Latane's (1968) study of bystander intervention might help explain this. The experiment found that participants' helping was negatively related to the number of other people available to help, that is, the more bystander, the less helping. Although the HPV vaccination is different from situations of emergencies in the experiment, but it is possible that people follows similar logics – if many others have already taken the vaccine, transmission of the virus and the diseases could be controlled more easily, and they did not need to take the vaccine themselves. They might also perceive many others take the vaccine only because they were sexually permissive and needed to prevent HPV by the vaccine.

The descriptive norm and the injunctive norm were also found to be significant positive predictors of attribution of responsibilities for the solution to the self - the more perceived prevalence and the stronger perceived approval by others, the more likely the male respondents feeling responsible for taking the vaccine, which was associated with

support for the vaccine. Evidence from this study suggested that attribution of responsibilities was an important predictor of the attitude, and should not be ignored in the indirect media effects model.

Attribution of responsibilities to women and support for the vaccine

As predicted, attributing the problem of getting HPV-related diseases more to women themselves was associated with weaker support for the HPV vaccination for males. Men might be under an impression that those women who contracted HPV were more sexually permissive, so they were actually responsible for their diseases as a result of their sexual permissiveness. In other words, men should not be asked to bear the burden of the HPV vaccination for these women's diseases.

However, contrary to the hypothesis, attribution of the responsibility for the solution predicted support for the HPV vaccination for males positively, meaning that even male respondents thought that females should be responsible for taking the vaccine, they believed that males should get the HPV vaccine as well. It appears that those who were more supportive for the HPV vaccine supported the vaccination more to both men and women, and those who rejected the vaccine were less supportive for the HPV vaccination for both men and women. There was no obvious gender gap between the two genders regarding support for the HPV vaccination.

Model of Helping and Coping

Several tests were run to provide information on the model of helping and coping that the respondents used regarding the issue of HPV vaccination for males. For attribution of responsibilities to the self, the mean score of the solution was significantly higher than the mean score of the problem. Male respondents gave a higher score of

attribution of responsibilities for the solution, and a lower score of attribution of responsibilities for the problem to the self. In Brickman et al.'s (1982) Four Models of Helping and Coping, attribution of responsibilities to the self can be classified in the compensatory model. In the compensatory model, people view themselves as deprived and should assert themselves to get needed help, and they would work with other subordinates to mobilize and make changes. In the case of the HPV vaccination for males, such findings imply that respondents perceived that they should be provided with help for the HPV vaccination. Because they needed to take the vaccine even though they were not the cause of the diseases, other parties should help them concerning uptake of the vaccine. For instance, they might expect the government provide subsidies for the HPV vaccination.

Mean score of attribution of responsibilities for the solution to women were also significantly higher than that for the problem; however, the difference in mean scores were smaller than that of men. Male respondents gave relatively high scores to attribution of responsibilities to women, for both the solution and the problem, that is, they were more likely to use the moral model for attributions of responsibilities to women. In the moral model, people are perceived to have create their problems; if they were not able to solve the problems, it is just because they are lazy and lack of will. In other words, male respondents perceived that women should take greater care of their problems of HPV on their own. They perceived women had the abilities to deal with HPV and did not need others' help to prevent HPV. If men kept such attitudes, it might be more difficult to persuade them to take the HPV vaccine to help prevent women's contraction of HPV and related diseases such as cervical cancer.

Comparing the scores of attribution of responsibilities to women and to men, respondents attributed greater responsibilities to women than to men, for both the problem and the solution. This is in line with literature that HPV was largely perceived to be an issue related to women instead of men (eg. Reiter et al., 2011; Hunter & Weinstein, 2015). While women can contract HPV from sexual interactions with men, women were perceived to be responsible for their own diseases and should take the protection measure (i.e. vaccination) on their own. Further research can be done on investigating the underlying reason for such differences, but here are some possibilities. First, identification could lead to differences in attribution of responsibilities. Men were more likely to attribute the problem and the solution to the other gender as the out-group. Second, the society's culture of blaming the victim may have something to do with it. While HPV can actually be contracted even with only one sexual partner and intercourse for once, many people perceived that HPV was related to sexual permissiveness, according to the pre-survey interview. Therefore, those with HPV were to blame, for either being sexually permissive or not taking the vaccine on their own.

Perceived benefits and costs for the HPV vaccination

Findings in this study were generally in line with the health belief model, that is, the greater the perceived benefits, the greater support for the HPV vaccination for males. Such benefits included the benefits to the vaccinated, the benefits to the sexual partner, and the benefits to the society as a whole. Reliability of the three items was high, showing that respondents did not distinguish much among various benefits of the HPV vaccine. As shown in Bonafide and Venable's (2015) study, both altruistic motives and personal health benefits endorsed greater HPV vaccine acceptance. In this study, those

respondents who supported the HPV vaccination for males perceived the vaccine not only beneficial to them, but also beneficial to their sexual partner(s) and to the society. They were concerned with their own benefits and altruistic benefits as well.

Smaller perceived costs of taking the vaccine was also associated with greater support for the HPV vaccination for males, which is consistent with the health belief model. In the questionnaire, the monetary cost to take the vaccine suggested was 400 dollars; however, the actual cost paid by the vaccinated can be even greater if the vaccine was not covered by health insurance (American Cancer Society, 2014). 23.3% (n = 153) and 35.7% (n = 234) of the respondents reported that they were not willing and completely not willing to pay for 400 dollars for the HPV vaccine. The high cost remained to be one of the main barriers in persuading males to take the vaccine.

Discussion network and the perceived norm

Regarding the association of the respondents' discussion network for sexual matters with their perceived descriptive and injunctive norms, several findings are worth discussions. First, the size of the network was not associated with the norm. Even the respondents had discussed sexual matters with more people, they did not perceive the HPV vaccine being more prevalence or more approved. It implies that the HPV vaccination for males might not be a topic of discussion when the respondents discussed sexual matters with others. The average tie strength of the network was also not associated with the descriptive norm, implying that interpersonal relationships were not important sources of their perceived prevalence of the vaccine. Discussing sexual matters with closer alters did not affect people's perceptions of prevalence of the protective measure against sexually-transmitted HPV. As Granovetter (1982) suggested, weak ties

that allow individuals who communicate regularly but are not close to each other can bridge different groups and spread information throughout a community and population, so weak ties are more useful in transmitting information than strong ties of close relationships – possibly the same for information regarding the HPV vaccination for males. Descriptive statistics have also shown that the most popular information sources about the HPV vaccination for males were the Internet and social media (among media) and medical professionals (among interpersonal sources). Both sources were represented mostly by weak ties, that is, people seeing each other less frequently, being less close, and knowing each other for shorter. Having closer alters to discuss did not help influence perceptions of the normative actions.

However, the average tie strength with the discussants for sexual matters did significantly predict the injunctive norm. While people did not get the information about prevalence of the action from their closely-related ties, their perceived approval of the actions by others came from these closely-related ones. The closer alters were more important in affecting how they approved certain action. In particular, HPV is related to sex and thus highly related to a person's internal values. The injunctive norm is related to approval from surrounding people, so people are more likely to seek similarities in these internal values regarding the topic of the HPV vaccination.

Heterogeneity of the discussion network was also not related to the perceived descriptive norm. As suggested before, respondents obtained information about prevalence of the vaccine from sources other than the close alters.

On the contrary, heterogeneity in age and education level significantly predicted the perceived injunctive norm. The larger the age differences between the discussants and

the respondent, the more approval the respondents perceived regarding the HPV vaccination for males. Because the respondents were relative young, it can be implied that those young males who had discussed sexual matters with older people perceived more approval for the HPV vaccine.

Moreover, heterogeneity in education level negatively predicted the injunctive norm. The smaller the average difference in education level between the discussants and the respondents, the greater social approval for the HPV vaccination for males the respondents perceived. This suggested that talking to people with an education level less different than the self would lead to more approval for the HPV vaccine. One explanation can be the male respondents in this study were at the more educated side. People who were more similar to them may have relatively more medical knowledge about the HPV vaccination, thus providing more favorable information about the vaccine.

The number of females in the discussion network for sexual matters was not related to the perceived norms. Females in the discussion network, even most likely to be closely-related to the respondents, did not influence perceptions regarding the HPV vaccination at all. Most respondents might not have talked much about HPV with female discussants. While the topic of HPV was highly related to gender, females seemed not be an important information source for male respondents.

Finally, perceived support for HPV vaccination for males was found to be associated with both the descriptive norm and the injunctive norm – there is a significant association between perceived attitudes of people who were close to the respondents and the general others' attitudes.

Implications for future promotions for HPV vaccination

Exposure to the messages regarding the HPV vaccination at present was very low. More than 50% of the respondents never heard any messages from media, and more than 40% of the respondents never heard the messages from interpersonal sources. To promote the HPV vaccination for men, the first step is to let more people know about the vaccine. Among different media sources, the Internet and social media were found to be the most popular source of messages regarding the HPV vaccination for males. To target young adults who can decide the vaccination on their own, new media should be better-utilized. Medical professionals were found to be the major interpersonal sources of the information, but still, only around one-third of the respondents indicated hearing from medical professionals about the HPV vaccine. Closer cooperation with medical professionals should be organized for promoting the HPV vaccine. Also, only around 13% of the respondents had heard information from educational professionals. Much more could have been done in schools and colleges to increase exposure of young male adults to the information about the HPV vaccine.

Findings from this study were generally in line with the literature on the influence of presumed influence model. Exposure to the messages indirectly influenced people's support for the HPV vaccination for males through perceived effects and the perceived descriptive norm. Compared with the descriptive norm, injunctive norm was more directly associated with support for the HPV vaccination for males. Therefore, it is more important to promote the injunctive norm than the descriptive norm. For example, in messages regarding the HPV vaccination for males, instead of telling people the coverage of the vaccine, information should be given about how the vaccine is approved among

other males, and how people approve the vaccine because of its effectiveness in protecting the self and helping others. When people perceived that surrounding people also think they should take the vaccine, they might have a higher motivation to do so as well.

Although the descriptive norm did not directly predicted attitudes, it was associated with attribution of responsibilities to the self for the problem and for the solution, which were respectively negative and positive predictors of support for the HPV vaccination for males. Therefore, promotional messages about the HPV vaccination for males should also emphasize the responsibilities of males taking the vaccine as a solution for preventing HPV-related diseases and stopping transmission of HPV to other people. The messages should tell the target audience that they have to be the one to act, instead of relying on other people's actions to reduce HPV in the pool. It is also necessary to let people know that sexual permissiveness is not inevitably connected to HPV-related disease, because HPV can be transmitted even with only one intercourse and with one sexual partner. Messages should be clear that reducing the number of sexual partners or safe sex are not sufficient measures to stop transmission of HPV; instead, the HPV vaccine is a more effective and efficient measure to prevent HPV transmission.

Findings also suggest that attributing less of getting HPV-related diseases to the women was linked to greater support for the vaccine among males. Men viewed women's responsibilities in a moral model, but viewed the self's responsibilities in a compensatory model. Once again, audiences should receive clear information that women may be infected by HPV even they are not sexual permissive. HPV is not a punishment for women's own sexual permissiveness. As attributing greater responsibilities for the HPV

vaccine among women were associated with support for the HPV vaccination for men, women's support for the vaccine can also be included, even in messages targeting men; for example, right now the coverage rate of the vaccine is higher among females than among males. When men understand that many women have fulfilled their responsibilities for taking the HPV vaccine, they might be more willing to take their turn to act.

Besides, as men supposed they were not that responsible for the problem of transmitting HPV-related diseases but only responsible for taking the vaccine, they might expect more help from others regarding vaccine uptake. Emphasis on how health organizations and insurance companies provide support for the HPV vaccination for males might be useful in persuading men to take actions.

As predicted, emphasizing the benefits of the HPV vaccine and reducing the cost would help promoting the vaccination among males. One thing that should be noted is benefits of the vaccine include both benefits to the self, benefits to the sexual partner(s), and benefits to the society as a whole. Many respondents had not been exposed to the messages regarding the HPV vaccination for males, and they might not have enough knowledge on how the vaccine was beneficial to them, and how being vaccinated can help their sexual partners and others in the society, like their future sexual partners. Of course, promoting insurance coverage of the vaccine would certainly help increase coverage. Insurance companies should be informed the HPV vaccination for males is something crucial and very beneficial to reduce future medical costs. As a relatively new vaccine, the public should be provided more safety information about the vaccine as well.

Investigation on the discussion network for sexual matters indicated that promoting the HPV vaccination for males through weak ties such as social media and professionals might be efficient. However, it should not be neglected that properties of the discussion network was highly related to approval perceived by the respondents. Encouraging male individuals to discuss matter regarding HPV, or generally sexual matters with people who are more different to them in terms of age can allow them to know more about others' perspective, which may in turn lead to greater support for the HPV vaccination for males. Promotions of the vaccine through social media might take up an important role regarding discussions about the HPV vaccine in the future, because social media are capable of linking people with weak ties.

Limitations and further research directions

There are several limitations of this study to be stated. Regarding sampling, the study used Amazon MTurk as a platform to recruit respondents. Although Amazon MTurk is open to all residents in the United States, only those who had Internet access and had registered an account on Amazon could take part in this survey. Also, only workers with an approval rate greater than 85% were eligible to do the survey. Sampling was not random, and in spite of the screening questions there were no way to prove the identities of the respondents in such an online survey.

Moreover, the composition of the respondents in the sample was slightly different from the general population in the nation. For example, the percentage of African American participants (8.1%) in this survey was lower than the national population (12%), and the percentage of White (65.6%) and Asian participants (11.9%) were higher than the national population (62% and 6%) (Census gov, 2015). As ethnicity might be a

factor associated with acceptances for the HPV vaccine, for example, African American men were shown to oppose vaccination more than White men (Ferris et al., 2009), further studies can investigate promotions of the HPV vaccination among the ethnic groups with lower vaccination rates.

The sample in this study was slightly skewed toward the older respondents along the 18-26 range of age. While this fits the purpose of the study for investigation of people's attitude toward the HPV vaccination for males when they can decide for vaccination on their own, further research can be done on younger males and their parents to provide implications for promotions of the vaccine to the target group (young boys and girls before being sexually active).

Also, the majority of the respondents were heterosexual. Past studies have shown that gay and bisexual men were more aware of the HPV vaccine and more willing to take the vaccine (Gilbert et al., 2011). While this studies could provide implications mainly on promotions of the vaccine to heterosexual men, further research on comparing social influence about the HPV vaccination among groups of different sexual orientation would be useful for tailored promotions.

Another limitation is that awareness to the HPV vaccination was still relatively low. A paragraph with information of the HPV vaccination had to be provided for respondents so that they had enough knowledge to answer the question. Therefore, this study only tested attitudes toward the HPV vaccination for males under the circumstance that people had been provided basic knowledge regarding the issue. Attitudes may be different under a natural setting when people do not know much about the HPV vaccination for males, as the pre-survey interviews suggested. Further research can also use an experimental

design, in which participants are randomized into groups with and without information provided, to determine how providing the message about the HPV vaccination influences participants' performance in the study.

Regarding the discussion network for sexual matters, this survey only asked for the first three discussants in the respondents' list. Although the mean number of people in the list was only 1.78 which was lower than three, any influence from people outside the top three in the list was omitted. Further research can investigate a complete network for discussion of sexual matters and how it influences people's attitudes toward the HPV vaccination.

CHAPTER 6

CONCLUSION

Summary of significant findings

After surveying 656 males aged 18-26 in the United States, there are several significant findings in this study. Social influence were found to play an important role in gaining men's support for HPV vaccination. Significant findings include:

1. The perceived injunctive norm was found to be more strongly associated with support the HPV vaccination for males than the perceived descriptive norm;
2. The perceived descriptive norm was indirectly associated with support for the vaccine through attribution of responsibilities for HPV-related diseases and uptake of the vaccine;
3. Attributing greater responsibilities for uptake of the vaccine to the self and to females would predict greater support for the vaccine, but attributing greater responsibilities for HPV-related diseases would predict less support;
4. Men were more likely to use different models when they attributed responsibilities to males and to females regarding the issue of HPV vaccination. They might expect more assistance to men's uptake of the vaccine than women;

Both greater perceived benefits to the self and benefits to others predicted greater support for the vaccine, while greater perceived monetary costs and health costs predicted smaller support;

5. People were more likely to deduce the perceived descriptive norm from people who discussed sexual matters with them. And their injunctive norm were also related to characteristics of the discussion network: those who talked to people with greater differences in age with them, and people with greater tie strength with them, perceived greater approval for the vaccine from others.

In sum, this study contributes to the literature in social influence, in particular, the model of influence of presumed influence, by examining two types of perceived norms, the perceived descriptive norm and the perceived injunctive norm. Attribution of responsibilities were also examined to make the indirect media effects model more comprehensive. Investigation from the discussion network provides exploratory findings, and is worth further research.

Summary of suggestions for future promotions

Based on the findings, the following suggestions are proposed for future promotions of the HPV vaccination for males:

1. Inform people that not only sexually permissive people will be infected with HPV;
2. Increase exposure of information about the vaccine, in particular, cooperate with educational institutions;
3. Emphasize approval for the vaccine in the society;
4. Emphasize taking the vaccine is a more important preventive measure of HPV than reducing the number of sexual partners;
5. Supply information on the support provided by health organizations and insurance companies regarding the HPV vaccine;

6. Tell everyone that they are responsible to act on their own instead to relying on others action to prevent HPV;
7. Promote the vaccine through weak ties using social media.

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APPENDIX A – INTERVIEW GUIDE

Thank you for participating in this interview. Today I want to know more about your thoughts regarding the HPV vaccination for males. All information will be used only for research purposes.

1. Can you tell me a little bit about yourself?
2. Do you know what HPV is? Can you tell me something you know about it?

If YES: When and where did you get this piece of information?

If NO:

Tell him - HPV is a virus that can be transmitted through vaginal, anal, or oral sex, or other close skin-to-skin touching during sexual activity with someone who carries the virus. The most common types of cancer caused by HPV include cervical cancer (around 12,000 cases per year), anal cancer (around 7,000 cases per year), and penile cancer (around 600 cases per year). HPV can also cause genital warts and warts in the throat.)

3. Do you know that males aged 9-21, and bisexual and gay males through age 26 are recommended to get the HPV vaccine by the Centers for Disease Control and Prevention (CDC)?

If YES: How did you know about it? Have you ever read any information about the HPV vaccination for males on mass media? How do you feel about recommendation of the vaccine to males?

If NO: Now how do you feel about this piece of information?

4. What is your opinion regarding the HPV vaccination to men? Are you for or against it? Why?
5. Do you think the HPV vaccine is beneficial to you? Why? Does this affect your decision of getting the vaccine or not?
6. Do you have any final words to tell me about what you think of the HPV vaccine?

This is the end of the interview. Thank you for your help!

APPENDIX B – QUESTIONNAIRE

If you are a MALE AGED BETWEEN 18 AND 26 living in the United States, I sincerely invite you to participate in my survey, which includes questions related to the HPV vaccination. The survey will only take you around 10 minutes. Your participation is voluntary, but I would greatly appreciate it if you could help. No identifiable information will be collected from you, and all your answers are confidential and will be used only for research purposes. This study has been approved by the Institutional Review Board at University of South Carolina. If you have any questions regarding this survey, please email Wan Chi Leung leung@email.sc.edu.

There are no right or wrong answers. I would appreciate it if you could give your honest answers.

1. Are you currently living in the United States?

Yes

No (Thank you for your participation. Please do not go on answering the questions.)

2. What is your gender?

Male

Female (Thank you for your participation. Please do not go on answering the questions.)

3. Your age:

Part 1

4. On average, how long do you spend reading the NEWSPAPER (INCLUDING ONLINE VERSION OF NEWSPAPERS) every day?

_____hours_____minutes

5. On average, how long do you spend watching TV every day?

_____hours_____minutes

6. On average, how long do you spend using the INTERNET and SOCIAL MEDIA every day?

_____hours_____minutes

Please read the following information carefully.

Human papillomavirus (HPV) is a virus that can be transmitted through vaginal, anal, or oral sex, or other close skin-to-skin touching during sexual activity with someone who carries the virus.

The most common types of cancer caused by HPV include cervical cancer (around 12,000 cases per year), anal cancer (around 7,000 cases per year), and penile cancer (around 600 cases per year). HPV can also cause genital warts and warts in the throat.

Females aged 9-26, males aged 9-21, and bisexual and gay males through age 26 are recommended to get the HPV vaccine by the Centers for Disease Control and Prevention (CDC).

The HPV vaccine costs around USD400, not including the doctor's charge. Some insurance plans cover the cost of the vaccine, but it depends.

The following questions are concerned with HPV vaccination FOR MALES, NOT for females.

7. In the past year, how many times did you see information about the HPV vaccination FOR MALES in NEWSPAPERS?

Never

Once or twice

3-5 times

6-10 times

More than 10 times

8. In the past year, how many times did you see information about the HPV vaccination FOR MALES on TV?

Never

Once or twice

3-5 times

6-10 times

More than 10 times

9. In the past year, how many times did you see information about the HPV vaccination FOR MALES on WEBSITES and SOCIAL MEDIA?

Never

Once or twice

3-5 times

6-10 times

More than 10 times

10. Have you ever heard information about the HPV vaccination FOR MALES from the sources below?

Please choose all options that apply.

Family members and relatives

Friends

Member of the same group / organization / school / housing community

Teacher / Other educational professionals

Doctor / Other medical professionals

I haven't heard information about the HPV vaccination from any of the above sources.

Others (Please specify)

Please indicate your attitude toward the following sentences by choosing from the following options: 1 (totally disagree), 2 (somewhat disagree), 3 (neutral), 4 (somewhat agree), or 5 (totally agree).

11. Promotion of HPV vaccination for males has been effective in raising intentions to receive the vaccine AMONG MALES.

12. Promotion of HPV vaccination for males has been effective in creating greater awareness of the vaccine AMONG MALES.

13. Promotion of HPV vaccination for males has been effective in removing any misunderstandings regarding the vaccine AMONG MALES.

14. Uptake of the HPV vaccine is prevalent AMONG MALES in this nation.

15. Uptake of the HPV vaccine is prevalent AMONG MALES in the community where I live.

16. Uptake of the HPV vaccine is prevalent AMONG MALES in the organization where I work / the institution where I study.

17. MALES in the nation think they should avoid transmission of HPV to others by receiving the vaccine.

18. MALES in the community where I live think they should avoid transmission of HPV to others by receiving the vaccine.

19. MALES in the organization where I work / the institution where I study think they

should avoid transmission of HPV to others by receiving the vaccine.

20. I support the CDC's recommendation of the HPV vaccine to MALES.
21. I support an increase in MALES receiving the HPV vaccine.
22. I support more promotions of HPV vaccination for MALES.
23. I am personally responsible for other people (including females) getting HPV-related diseases such as cervical cancer.
24. I could have prevented other people (including females) getting HPV-related diseases such as cervical cancer.
25. I could have controlled other people (including females) getting HPV-related diseases such as cervical cancer.
26. This is an attention-checking question. Please indicate "totally agree" for this question.
27. I am personally responsible for receiving the HPV vaccine to stop transmission of the virus to other people (including females).
28. If I receive the HPV vaccine myself, I could stop the transmission of the virus to other people (including females).
29. If I receive the HPV vaccine myself, I could control the transmission of the virus to other people (including females).
30. My uptake of the HPV vaccine benefits ME a lot.
31. My uptake of the HPV vaccine benefits MY SEXUAL PARTNER(s) a lot.
32. My uptake of the HPV vaccine benefits the SOCIETY in general a lot.
33. FEMALES are personally responsible for their getting HPV-related diseases such as cervical cancer.
34. FEMALES could have avoided their getting HPV-related diseases such as cervical cancer.
35. FEMALES could have controlled their getting HPV-related diseases such as cervical cancer.

36. FEMALES are personally responsible for receiving the HPV vaccine to prevent infection of the virus.
37. If FEMALES receive the HPV vaccine themselves, they could prevent infection of the virus.
38. If FEMALES receive the HPV vaccine themselves, they could control infection of the virus.
39. I am willing to pay around \$400 for the HPV vaccine.
40. I have doubts on the long-term safety of the HPV vaccine.
41. I have doubts on the short-term side-effects of the HPV vaccine.

Part 2

Now, please look back over the last six months—who are the people with whom you discussed sexual matters? Just tell me their first names or initials. Their identities will not be revealed. You can list as many persons as you can think of.

If you haven't discussed sexual matters with anyone over the last six months, please write "nobody."

1a. Now please think of the FIRST PERSON on your list. How is the FIRST PERSON on your list connected to you?

Please choose all that apply.

Parent

Sibling

Spouse

Other family members

Classmate/Schoolmate

Member of the same group (eg. Fraternity)

Roommate

Neighbor

Co-worker

Friend

Teacher

Others (please specify)

I haven't discussed sexual matters with anyone.

1b. How close do you describe your relationship with him/her?

Absolutely not close

Not so close

Somewhat close but not too close

Quite close

Very close

1c. On average, how frequent was your contact with him/her? (Including face-to-face and other types of contacts by phone calls, social media, mobile apps, etc.)

No more than once a year

Around once every few months

Around once every few weeks

Around once every few days

Every day

1d. How long have you known him/her?

Less than 6 months

6-12 months

More than 1 year - 2 years

More than 2 years – 5 years

More than 5 years – 10 years

More than 10 years

1e. How likely does this person support the HPV vaccination FOR MALES?

Completely unlikely

Somewhat unlikely

Maybe, but not so sure

Somewhat likely

Very likely

1a. Gender of this person:

Male

Female

Others (Please specify)

1b. His/her age:

1c. His/her level of education:

Grade 8 (Middle school) or below

Grade 9 -12 (High school)

College
Graduate School
Others

2a. Now please think of the **SECOND PERSON** on your list. How is the **SECOND PERSON** on your list connected to you?

Please choose all that apply.

Parent
Sibling
Spouse
Other family members
Classmate/Schoolmate
Member of the same group (eg. Fraternity)
Roommate
Neighbor
Co-worker
Friend
Teacher
Others (please specify)

2b. How close do you describe your relationship with him/her?

Absolutely not close
Not so close
Somewhat close but not too close
Quite close
Very close

2c. How frequent was your contact with him/her? (Including face-to-face and other types of contacts by phone calls, social media, mobile apps, etc.)

No more than once a year
Around once every few months
Around once every few weeks
Around once every few days
Every day

2d. How long have you known him/her?

Less than 6 months
6-12 months
>1 year-2 years

>2 years-5years

>5 years

2e. How likely does this person support the HPV vaccination FOR MALES?

Completely unlikely

Somewhat unlikely

Maybe, but not so sure

Somewhat likely

Very likely

2f. Gender of this person:

Male

Female

Others (Please specify)

2g. His/her age:

2h. His/her level of education:

Grade 8 (Middle school) or below

Grade 9 -12 (High school)

College

Graduate School

Others

3a. Now please think of the THIRD PERSON on your list. How is the THIRD PERSON on your list connected to you?

Parent

Sibling

Spouse

Other family members

Classmate/Schoolmate

Member of the same group (eg. Fraternity)

Roommate

Neighbor

Co-worker

Friend

Teacher

Others (please specify)

3b. How close do you describe your relationship with him/her?

Absolutely not close

Not so close

Somewhat close but not too close

Quite close

Very close

3c. How frequent was your contact with him/her? (Including face-to-face and other types of contacts by phone calls, social media, mobile apps, etc.)

No more than once a year

Around once every few months

Around once every few weeks

Around once every few days

Every day

3d. How long have you known him/her?

Less than 6 months

6-12 months

More than 1 year - 2 years

More than 2 years – 5 years

More than 5 years – 10 years

More than 10 years

3e. How likely does this person support the HPV vaccination FOR MALES?

Completely unlikely

Somewhat unlikely

Maybe, but not so sure

Somewhat likely

Very likely

ef. Gender of this person:

Male

Female

Others (Please specify)

3g. His/her age:

3h. His/her level of education:

Grade 8 (Middle school) or below

Grade 9 -12 (High school)

College
Graduate School
Others

Part 3

42. Your birthday:

43. Your gender:

Male

Female

Others (please specify):

44. Your ethnicity:

Hispanic or Latino

American Indian or Alaska Native

Asian

Black or African American

Native Hawaiian or Other Pacific Islander

White

Others (please specify)

45. Which state are you currently living in?

Alabama/Alaska/Arizona/Arkansas/California/Colorado/Connecticut/Delaware/District of Columbia/Florida/Georgia/Guam/Hawaii/Idaho/Illinois/Indiana/Iowa/Kansas/Kentucky/Louisiana/Maine/Maryland/Massachusetts/Michigan/Minnesota/Mississippi/Missouri/Montana/Nebraska/Nevada/New Hampshire/New Jersey/New Mexico/New York/North Carolina/North Dakota/Ohio/Oklahoma/Oregon/Pennsylvania/Puerto Rico/Rhode Island/South Carolina/South Dakota/Tennessee/Texas/Utah/Vermont/Virgin Islands/Virginia/Washington/West Virginia/Wisconsin/Wyoming/Others (Please specify)

46. Your sexual orientation:

Heterosexual

Homosexual

Bisexual

Others (please specify)

47. Your religion:

Protestant

Catholic

Other Christian

Jewish

Buddhist
Muslim
Hindu
Unaffiliated
Others (specify)

48. Your level of education:
Grade 8 (Middle school) or below
Grade 9 -12 (High school)
College
Graduate School
Others

49. How long have it been since you were sexually active?
I have never been sexually active.
Less than 6 months
6-12 months
More than 1 year - 2 years
More than 2 years – 5 years
More than 5 years – 10 years
More than 10 years

50. In the past year, how often did you use protection during sexual activities?
Never
Less than 50% of the time
Around 50% of the time
More than 50% of the time, but not always
Always
I have never had sexual activities.

51. Have you ever received the HPV vaccine?
Yes
No
a. If yes, year received:
b. If no, how likely will you get the vaccine in the future?
Completely unlikely
Somewhat unlikely
Maybe, but not so sure
Somewhat likely
Very likely
I already received the HPV vaccination