

Factors Influencing the Intention of Getting the HPV Vaccine among College Women: An Application of the Reasoned Action Approach

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Abstract

Purpose: Although at high risk for contracting HPV, less than half of college women have been vaccinated. The purpose of the current study was to examine underlying factors influencing college women's intention to get the HPV vaccine using the Reasoned Action Approach (RAA). **Methods:** Data were collected from two different samples of college women at a large Mid-west university via two phases. In Phase 1, a salient-belief elicitation survey based on the RAA was utilized to collect quantitative and qualitative data from 43 college women. Phase 1 data were then utilized to create a quantitative closed-ended instrument, which was administered to a large sample (n=279) of female college students in Phase 2. **Results:** Results indicated that the perceived consequences of getting the vaccine, such as protection against HPV and cervical cancer, were primary determinants influencing intention to get the HPV vaccine. Participants perceived healthcare providers and mothers as salient referents influencing their vaccination decisions. Attitude towards the act and perceived norm were the major predictors of intention to get a vaccine. **Conclusions:** Results suggest the importance of attitudes and perceived norms (especially mothers and healthcare providers) in predicting intention to get the HPV vaccine. Utilizing theory-based approaches to design interventions may be beneficial to increase vaccination rates among college women. Such interventions could focus on the attitudes and perceived norms of college students' regarding getting the HPV vaccine.

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Introduction

Human papillomavirus (HPV) is a salient public health issue. In the US, approximately 20 million individuals are infected with HPV, with approximately 6.2 million new genital HPV infections occurring each year (Cutts et al., 2007; Centers for Disease Control and Prevention [CDC], 2000). Women under the age of 25 are at highest risk for HPV infection with the prevalence rate of about 27% compared to other age groups, ranging from 3 to 12% (Cutts et al., 2007; CDC, 2010; Moyer, 2012). HPV is the leading cause of cervical cancer and genital warts and is considered to be the single most important risk factor associated with anogenital cancers in women. Cervical cancer is responsible for approximately 5% of all cancers

worldwide and led to nearly 4,000 deaths in the US in 2008 (Olsen, Woods, Austin, Luskin, & Bauchner, 2005; Moscicki, 2008). The vast majority of these deaths are preventable. Researchers estimate that approximately 1.5 million American women currently have an HPV-associated disease (i.e. condyloma, cervical intraepithelial neoplasia, and cervical cancer) which often requires invasive treatment procedures; costs associated with such treatments are estimated to be \$4 billion in the US (Insinga, Dasbach, & Elbasha, 2005; Moscicki, 2008). The World Health Organization (WHO) states that nearly one-third of costs associated with cancer could be alleviated via early detection and prevention mechanisms (World Health Organization [WHO], 2009).

The HPV vaccine, Gardasil (Merck & Co. Inc.) and Cervarix™ (GlaxosmithKline), can help reduce the spread of HPV as well as alleviate costs associated with the disease. Gardasil provides protection against four of the most common strains of HPV (6, 11, 16, 18) which account for approximately 70% of cancer causing strains (16, 18) and 90% of the wart causing strains (6, 11) (Munoz et al., 2004; Lowy & Schiller, 2006). In addition, research indicates that the implementation of the HPV vaccine could incur significant healthcare savings (Goldie et al., 2004; Taira, Neukermans, & Sanders, 2004).

Gardasil has been approved by the Food and Drug Administration (FDA) for use among 9-26 year old females since 2006 (Lowy & Schiller, 2006), and was approved for use among males in 2009 (CDC, 2010). Research efforts have primarily focused on 9-13 year old girls. Young girls have been the primary target population for vaccination because Gardasil is most effective prior to sexual initiation (CDC, 2010), as the majority of young people are sexually active by their late teens and early 20s (Gray et al., 2008).

Gardasil may be particularly important for college students as they tend to engage in higher risk sexual behaviors and are at an increased risk of contracting sexually transmitted infections (STI) compared to the general population (Burak & Meyer, 1997). Additionally, less than half of female college students reported that they had received at least one shot of the vaccine; among those even fewer have completed all three shots (Jones & Cook, 2008; Licht et al., 2010). Furthermore, college students are often in a position to make healthcare decisions without parental supervision for the first time in a new environment, away from home (Wood, Read, Mitchell, & Brand, 2004). Therefore, it is important to understand why female college students decide to go to the doctor to ask (or not to ask) for the HPV vaccine.

There is a lack of research addressing factors influencing female college students' decision to get vaccinated. Previous HPV vaccination research has mainly focused on parental awareness and acceptability (Waller, Marlow, &

Wardle, 2006; Ogilvie et al., 2008; Rosenthal et al., 2008) as well as vaccination practices for other STIs exclusive of HPV (Liddon et al., 2005; Liao, Zimet, & Fortenberry, 1998; Mays, Sturm, & Zimet, 2004). Although most parents and adolescent females had positive attitude towards the vaccine (Waller, Marlow, & Wardle, 2006; Lenselink et al., 2008), little research exists which has used a theory-based approach to examine the underlying determinants which influence women's intention to get vaccinated. In order to address this gap, the current study aimed to identify the determinants of female college students' intention to go to their doctor to ask for the HPV vaccine using a theory driven methodology, the Reasoned Action Approach (RAA) as a framework.

Conceptual Framework The RAA can be used to identify underlying factors that influence intention to engage in various health behaviors. The RAA is the most recent formulation of the Theory of Reasoned Action, the Theory of Planned Behavior, and the Integrated Behavioral Model (Fishbein & Ajzen, 2010). The RAA proposes that intention is the immediate determinant of behavior; that attitude toward the act, perceived norm, and self-efficacy combine as global components to determine intention. The RAA has also been utilized in other studies to understand behaviors such as condom use (Albarracín, Johnson, Fishbein, & Muellerleile, 2001), physical activity (Hagger, Chatzisarantis, & Biddle, 2002; Downs & Hausenblas, 2005), and other health behaviors as well as to develop interventions for such behavior (Hardeman et al., 2002).

Salient-belief elicitation is the first step of RAA. The RAA indicates that there is a belief structure underlying the three global components (attitude, perceived norm, and perceived behavioral control) that influence behavioral decisions. However, not all consequences, referents, and circumstances are important. Instead, this approach emphasizes that researchers should identify the salient determinants using a salient-belief elicitation. Salient consequences, referents and circumstances are determined by the most frequently mentioned responses from the

participants. Conducting a salient-belief elicitation before applying the RAA to a new population and new behavior helps ensure that the instrument is relevant and culturally appropriate to the population and context. As such, elicitation is a rapid, theory-based, open-ended, qualitative, formative research technique designed to understand the cognitive structure underlying people's decisions to perform a behavior (Fishbein & Ajzen, 2010). The present study examined the behavior of college female students to go to their doctor to ask for the HPV vaccine. More specifically, the goals of the study were to (1) utilize a salient elicitation technique to determine the salient consequences, referents and circumstances associated with going to the doctor to ask for the HPV vaccine, (2) create a theory-based quantitative instrument using RAA constructs, and (3) examine the influence of the global constructs (i.e., attitude, perceived norm, and perceived behavioral control) of the RAA on intention to get the HPV vaccine.

Methods

Study Design and Data Collection

This study was conducted in two phases utilizing two waves of data collection. In Phase 1, a salient-belief elicitation survey was administered to a convenience sample of female college students (n = 43); in Phase 2 an RAA-based quantitative instrument was developed based on the findings from Phase 1 and administered to a different sample of female college students (n = 279). For both phases of the study, participants were recruited from a large Mid-western university and participation was voluntary. The university had a population of approximately 40,000 students who were mostly white, middle-class, and between the ages of 18-23. In Phase 1, female college students were recruited from an undergraduate women's health course. Eligibility requirements included being female and between the ages of 18-23 in order to be included in the study. Fifty-one questionnaires were distributed and 45 were returned. Six students did not participate due to ineligibility. The final sample included 43 participants; two participants had incomplete data and were thus removed from the study. As an incentive for participation, students had the opportunity to

enter their name into a pool for a chance to win one of four \$20 gift cards. In the second phase, participants were recruited from undergraduate elective health courses (n=14) frequently taken by students across a variety of course majors. Three hundred and ten questionnaires were distributed and 290 were returned. The final sample included 279 participants; 11 participants were removed due to excessive incomplete data that could not be recovered via data replacement techniques. In Phase 2, participants were also given the opportunity to enter their name into a pool for a chance to win a \$20 gift cards. All study protocols were reviewed and approved by Institutional Review Board at the academic institution where data collection occurred.

Measures

The Phase 1 participants filled out a questionnaire including open-ended and closed-ended items. The questionnaire for the Phase 1 contained 20 items including demographic variables, (i.e., age, race, class standing, relationship status), elicitation items, and items assessing participants' awareness of the HPV vaccine, how participants heard about the HPV vaccine, whether or not they had received the vaccine, and where they would go to get the vaccine. Participants were also asked questions regarding their health insurance coverage and perceptions of the university health center.

The elicitation items included six open-ended questions: (1) "What are the advantages of going to the doctor to ask for the HPV vaccine? What good things may happen?" (2) "What are the disadvantages of going to the doctor to ask for the HPV vaccine? What bad things may happen?" (3) "Who approves/supports you of going to your doctor to ask for the HPV vaccine?" (4) "Who doesn't approve or support you of going to your doctor to ask for the HPV vaccine?" (5) "What makes it easy for you to go to your doctor to ask for the HPV vaccine? What circumstances or conditions?" (6) "What makes it hard for you to go to your doctor to ask for the HPV vaccine? What circumstances or conditions?" The results from Phase 1 were used to construct the Phase 2 quantitative closed-ended instrument to examine whether the major constructs of RAA predict intention to get the

HPV vaccine. The Phase 2 instrument included 98 questions including demographic variables and RAA constructs. Examples of RAA constructs include: Intention-“I will go to my doctor to ask for HPV vaccine in the next 6 months (7-point Likert scale: extremely unlikely to extremely likely),” attitude towards the act-“My going to my doctor to ask for HPV vaccine in the next 6 months is (7-point Likert scale: extremely unpleasant to extremely pleasant),” perceived norm-“Most people who are important to me think I should go to my doctor to ask for HPV vaccine in the next 6 months (7-point Likert scale: extremely disagree to extremely agree),” and perceived behavioral control- “My going to my doctor to ask for HPV vaccine in the next 6 months is (7-point Likert scale: not at all under my control to completely under my control).”

Analytic Methods

Closed-ended responses from Phase 1 were entered in SPSS version 19.0 and the open-ended responses were entered verbatim into Microsoft Word 2007. A content analysis was conducted of the six open-ended items to identify common categories of responses for consequences, referents and circumstances. Then the most commonly mentioned, similar responses from participants were coded into categories for each construct. Like responses were combined into individual categories for each construct of the RAA. Responses and categories were re-organized based on discussion among the authors during which they came to a final consensus. All three authors initially did the content analysis process individually, then met and reached consensus on the results. After reaching consensus, a frequency analysis was conducted to identify the percent of participants who mentioned each response category.

The closed-ended responses from Phase 2 were also entered in SPSS version 19.0. Factor analysis and reliability analysis verified the two-item measure of intention (Cronbach’s $\alpha = 0.72$), a two-item measure of attitude (Cronbach’s $\alpha = 0.82$), a three-item measure of perceived norm (Cronbach’s $\alpha = 0.74$), and a four-item measure of perceived behavioral control (Cronbach’s $\alpha =$

0.69). The results of the principal factors extraction with varimax (performed through SPSS) extracted four factors (Intention, attitude, perceived norm, and perceived behavioral control). The factor loadings for each item ranged from 0.62 to 0.79; no items were eliminated. Measures for intention and the three global components of attitude, norm, and control were constructed by calculating the average of the items that were confirmed by factor analysis and reliability analysis. The dependent variable for the regression analysis was the “intention to go to your doctor to ask for the HPV vaccine.” It is important to mention that the dependent variable (Intention) used in regression model was an ordinal measure; however Likert responses used for these items were treated as continuous variables (response options were coded from -2 to +2) (Winship & Mare, 1984).

Results

Participant Characteristics

Participants from both phases were predominately white (83.7% for Phase 1; 68.6% for Phase 2) similar to the demographics of the institution. A majority of participants in Phase 1 indicated they were freshmen and sophomores with an age range of 18-23 and the mean age of 19.6 (SD = 1.1). Phase 2 participants also ranged in age, between 18 and 23 years with a mean of 20.33 (SD = 1.5), and class standing, with 23.2% participants indicating they were freshmen, 24.7% sophomores, 22.5% juniors and 29.7% seniors.

Phase 1

According to Table 1, a majority (74.4%) of participants from Phase 1 had received at least one shot of the HPV vaccine. In fact, a majority of Phase 1 participants received all three shots (53.5%) and 93% of the participants had heard of the HPV vaccine. Participants indicated hearing about the vaccine primarily via television/television commercials (53.5%), their healthcare providers (48.9%) and their mothers (21%). When asked where they would go to get further information about the HPV vaccine, they mainly mentioned going to their healthcare providers (88.4%), the Internet (39.5%), and the university health center (25.6%).

Table 1

HPV Vaccination Information and Awareness (n=43)	
Category Label	n (%)
Have you heard about vaccine?	
Yes	40 (93.0)
No	3 (7.0)
Have you had the vaccine?	
3 Shots	23 (53.5)
2 Shots	3 (7.0)
1 Shot	6 (13.9)
No	11 (25.6)
How did you hear about the HPV vaccine? ^a	
Television	23 (57.5)
Healthcare Provider	21 (52.5)
Mother	9 (22.5)
School	4 (10.0)
Other Media (newspaper, Radio)	4 (10.0)
Friend	3 (7.5)
Where would you get information? ^a	
Healthcare Provider	38 (88.4)
Internet	17 (39.5)
University Health Center	11 (25.6)
Mother	4 (9.3)
Friend	3 (7.0)

Percentages sum to 100%

^a Participants were allowed to give more than one response.

Table 2 presents the results of the perceived consequences of going to the doctor to ask for the HPV vaccine. Findings indicate that the main perceived advantage of getting the vaccine was protection: protection from HPV (51.2%) and protection from cervical cancer (32.6%). A number of the perceived advantages included a mention of the healthcare provider-patient relationship: the doctor providing accurate information, the doctor being honest, and the doctor providing a recommendation. For example, one participant stated, *“I not only get the obvious benefits (cancer prevention, wart prevention) but I also get my doctor's honest opinion about what's on TV about getting the vaccine.”*

In response to disadvantages of going to the doctor to ask for the HPV vaccine, a majority of the participants mentioned there were no disadvantages, however a few mentioned that some doctors may provide biased information regarding the vaccine. Other disadvantages mentioned by participants included: having side effects, having pain, and costing too much.

As can be seen in Table 3, the participants were

also asked to identify their perceived referents or those who would approve or disapprove of them going to the doctor to ask for the HPV vaccine. Participants mentioned their family members, especially their mothers, as primary perceived approving referents as demonstrated by the following quote: *“My mom approves. She always encourages me to prevent disease.”* In addition, participants mentioned their friends and healthcare providers as other perceived approving referents. Participants did not perceive any referents disapproving the behavior of going to the doctor to ask for the HPV vaccine, as exemplified by the following quote: *“No one would disapprove of protecting myself – why would anyone disapprove of getting this vaccine?”*

Table 2

Percent Mentioning Consequences for Going to the Doctor to Ask for the HPV Vaccine (n=43)

Advantages	n	%
It will protect me against HPV	22	51.2
It will protect me against cervical cancer	14	32.6
Doctor will provide me with accurate information	11	25.6
Doctor will be honest with me	4	9.3
I will feel more protected	4	9.3
Doctor will provide me with a recommendation	3	7.0
Other advantages	5	11.6
Disadvantages		
It will have side effects	9	20.9
It will be painful	4	9.3
It will cost too much	4	9.3
I will feel embarrassed	4	9.3
It will take too much time	3	7.0
Some doctors will be biased	3	7.0
Other disadvantages	5	11.6
No disadvantages	10	23.2

Participants were allowed to give more than one response.

Lastly, participants were asked what would make it easier or more difficult to go to the doctor to ask for the HPV vaccine. As can be seen in Table 4, having the knowledge that the vaccine will protect participants and improve their health was the most frequently mentioned circumstance. Consistent with our previous findings, characteristics of healthcare providers were frequently mentioned under the construct of circumstances: having a doctor that will be accurate, having a doctor that would make a

recommendation and having a doctor that would make them feel comfortable as can be seen in the following quote: “*My doctor and I have a good relationship and I feel comfortable asking him questions.*”

Although the majority of the participants stated that there were no barriers to getting the HPV vaccine, some of the participants mentioned time, cost, and feeling embarrassed as some of the perceived barriers.

Table 3

Percent Mentioning Approving Referents for Going to the Doctor to Ask for the HPV Vaccine (N=43)

Category Label	n	%
Mother	17	39.5
Parents	10	23.3
My family	4	9.3
My friends	3	7.0
My doctor	3	7.0
Everyone	3	7.0
Myself	10	23.3
Other referents	3	7.0

Participants were allowed to give more than one response.

Phase 2

Using the results of Phase 1, the items for the Phase 2 quantitative instrument were developed. A standard multiple regression was performed to determine whether the intention to get the HPV vaccine could be predicted by the global constructs of RAA (attitude, perceived norm, and perceived behavioral control). As can be seen in Table 5, the multiple R was significantly different from zero ($F_{(3, 279)} = 91.4, p < 0.001$) with R^2 at 0.498 and the adjusted R^2 value of 0.493. All three regression coefficients (i.e. attitude, perceived norm, perceived behavior control) were significantly different from zero. The adjusted R^2 indicates that approximately 49.3% of the variability in intention to get the HPV vaccine was predicted by the three global components of attitude ($\beta = 0.361, p < 0.01$), perceived norm ($\beta = 0.412, p < 0.01$), and perceived behavioral control ($\beta = 0.109, p < 0.05$).

Discussion

Phase 1: Vaccination Awareness

A majority of the participants in this study had heard about the HPV vaccine. Similar to previous research (Caron, Kispert, & McGarth, 2009) most participants had heard about the HPV vaccine either through mass media (television, television commercials, radio, and magazines), their healthcare provider or their mothers. In addition, participants reported that healthcare providers, the Internet, and the university health center were the primary sources they would utilize for information about the HPV vaccine. Media may raise awareness about the vaccine but students seemed to seek out other sources (i.e. healthcare providers and mothers) to gain additional information.

Table 4

Percent Mentioning Barriers and Facilitators of Going to the Doctor to Ask for the HPV Vaccine (N=43)

Facilitators	n	%
Knowing that the vaccine will help me/will improve my health	11	25.6
Having the vaccine being covered by insurance	6	14.0
Having a doctor that is knowledgeable and accurate	6	14.0
Having a doctor makes me feel comfortable and trusting	5	11.6
Having a doctor that recommends the vaccine	4	9.3
Having my mother’s support	4	9.3
Having the vaccine be available and convenient to get	3	7.0
Other facilitators	6	14.0
Barriers		
Taking time	6	14.0
Costing too much	5	11.6
Feeling embarrassed and uncomfortable	4	9.3
Other barriers	6	14.0
No Barriers	15	34.9

Participants were allowed to give more than one response.

Construction of Phase 2 Instrument

Behavioral Determinants. This study used a theory-based approach to identify salient consequences, referents and circumstances in Phase 1. The objective was to determine what influences female college students’ decision to get the vaccine to drive the design of the Phase 2 instrument. Protection emerged as one of the main factors that influenced female college students to go to the doctor to ask for the HPV vaccine. Improving health and protection from cervical cancer and HPV came up as both

perceived advantages and facilitators of getting the vaccine. Consistent with previous research, Phase 1 findings emphasize the importance of knowledge regarding protection against cancer and HPV as a determinant in predicting intention to go to the doctor to get vaccinated (Jones & Cook, 2008; Rosenthal, Lewis, Succop, Bernstein, & Stanberry, 1999). Based on the results of Phase 1, the quantitative instrument for Phase 2 included perceived consequences items such as being protected and getting information about the vaccine.

Table 5

Regression Analysis Summary for Intention to get the HPV Vaccine (N=279)

Variable	B	SE B	Beta	T	P
Attitude towards the act	0.696	0.094	0.361	7.418	<0.001
Perceived norm	0.565	0.068	0.412	8.324	<0.001
Perceived behavioral control	0.136	0.057	0.109	2.397	0.017

Note 1: $F(3, 279) = 91.4, p < 0.001$; Note 2: $R^2 = 0.498$; the adjusted $R^2 = 0.493$.

In Phase 1, a variety of aspects related to the patient-provider relationship also emerged as salient factors influencing vaccination. Given that the role of healthcare providers came up under perceived consequences, approving referents and circumstances, they seem to play an important role in influencing women to get the HPV vaccine. Such findings are consistent with previous research that explored the role of providers' influence on patients' decision to get vaccinated (Caron, Kispert, & McGarth, 2008; Ogilvie et al., 2008; Rosenthal et al., 1999). Based on the results of Phase 1, items (such as the ones listed) were constructed for the Phase 2 quantitative instrument: perceived consequences-“my going to the doctor to ask for the HPV vaccine in the next 6 months will provide me with doctor’s recommendation (7-point Likert scale: extremely unlikely to extremely likely), and ” normative belief- “my mother thinks that I should go to my doctor to ask for the HPV vaccine in the next 6 months (7-

point Likert scale: extremely unlikely to extremely likely).

Conversely, some women mentioned that healthcare providers may be biased in terms of providing information or recommendations about the vaccine as a perceived disadvantage of going to the doctor to get the vaccine. This demonstrates the importance of the provider-patient relationship particularly among college women as previous research has demonstrated (Abbott, Berry, Meredith, 1990). As such, an item was included in the Phase 2 quantitative instrument to measure the influence of this relationship on getting the HPV vaccine: perceived power-“having a doctor that makes me feel comfortable will make it (7 point Likert scale: extremely difficult to extremely easy).”

In addition to healthcare providers, other individuals may influence college women’s intention to get the HPV vaccine. In Phase 1, participants reported parents, other family members, friends and significant others as approving referents. Like healthcare providers, mothers seem to play an important role in terms of vaccination as they came up as perceived salient referents, perceived salient facilitators (mother’s approval), as a source of information and how women heard of the vaccine. Such findings have been supported by previous research (Ogilvie et al., 2008; Olsen et al., 2005; Rosenthal et al., 2008). Perhaps mothers emerged as one of the most influential people in this decision making process because women may be more comfortable seeking out their maternal parent when getting information, advice, or approval for health issues of sensitive nature such as sexuality related information. Additionally, female college students tend to seek their mother’s advice regarding healthcare information and inquiries in general as opposed to their father (Ogilvie et al., 2008; Rosenthal et al., 2008; Waller et al., 2006). The Phase 2 quantitative instrument included items to measure the influence of mothers on the intention of college female students: normative belief-“my mother thinks that I should go to my doctor to ask for the HPV vaccine in the next 6 months (7-point Likert scale: extremely unlikely to extremely likely).”

Although most participants from Phase 1 stated that there are no disadvantages, disapproving referents and barriers of going to the doctor to ask for the HPV vaccine, some participants did mention some perceived disadvantages and barriers. A few participants mentioned time, cost, side effects, pain, and feeling embarrassed as perceived disadvantages and barriers consistent with previous research (Caron et al., 2009; Rosenthal et al., 1999). Although cost was reported as a perceived disadvantage and barrier, having the vaccine covered by insurance was the second most common perceived facilitator. The Phase 2 quantitative instrument included items to measure the influence of cost, health insurance, and time on the intention of college female students to get the HPV vaccine.

Phase 2: Intention to go to the Doctor to ask for the HPV Vaccine

The results from Phase 2 revealed that all three global constructs of the RAA significantly predicted intention to get the HPV vaccine among college female students. The adjusted R^2 of 0.493, indicated that 49.3% of variability in intention to go to the doctor to ask for the HPV vaccine could be explained by attitude, perceived norm, and perceived behavioral control. The size and direction of the standardized coefficients suggest that women are more likely to intend to get the HPV vaccine if: (1) they have a positive attitude towards getting the vaccine, (2) they perceive that their salient referents would want them to get the HPV vaccine, and (3) they perceive that getting the vaccine is under their control. Perceived behavioral control had the lowest regression weight relative to perceived norm and attitude, indicating that societal norms and attitudes towards getting the vaccine seem to play a more important role in the decision making process of female college students. Previous studies have also suggested the importance of attitude (Kang & Moneyham, 2010; Kahn, Rosenthal, Hamann, & Bernstein, 2003) and perceived norms (Kahn et al., 2003; Conroy et al., 2009) in regard to HPV vaccination.

Limitations

This study was not without limitations, which are important to note. First, for Phase 1, women

were recruited from a women's health class at a large Midwest university, therefore results are not generalizable to all women at this university nor are they representative of all college women in US. Given that this sample was recruited from a women's health class, such women may be more apt to engage in health seeking behaviors such as vaccination which may account for higher rates of vaccination compared to other data. In addition, the convenient sample may have limited the investigators to learn about a wide range of reasons that women do not have a positive attitude towards getting the HPV vaccine. However, because most women were familiar with the HPV vaccine, they were able to provide useful data for the construction of the Phase 2 instrument. For Phase 2, women were recruited from health courses primarily taken as electives by students with a wide variety of course majors and programs of study at the large Mid-west university. Although Phase 2 data are not representative of all college women, we believe the sample provides a somewhat diverse sample of students at that particular university. However, both samples were somewhat homogenous in regard to race/ethnicity which mimics the racial demographics of the university.

Implications & Future Research

Although the current study has the above limitations, authors provide suggestions for the design of public health interventions and conducting of future research. Health educators could design interventions in order to change women's attitude and perceived norm towards getting the vaccine. For instance, health educators can utilize mothers as potential natural helpers to provide different types of social support (informational, emotional, and instrumental). Additionally, public health professionals could concentrate on creating components of programs that could educate students about how to discriminate between reliable and unreliable information on the Internet and other media.

Although salient consequences, referents, and circumstances of female college students to go to their doctor to ask for the HPV vaccine were identified, more rigorous and extensive research

is needed to further confirm these determinants. Future studies should utilize the Phase 2 quantitative instrument to further investigate the decision making process of female college students as well as males. Further analysis of underlying determinants of three global constructs of the RAA could be beneficial in designing appropriate interventions to increase the rate of HPV vaccination among college students.

In summary, the theory-based approach used in the current study effectively and successfully identified perceived consequences, referents, and circumstances of college female students' decision to go to their doctor to ask for the HPV vaccine. In addition to intrapersonal factors, beyond the individual determinants such as the influence of family members/friends, healthcare

providers, insurance policies, and media emerged as potential factors that influence vaccination decisions. In review of all these determinants, it seems that the Social Ecological Model (SEM) may be a useful conceptual framework for addressing the vaccination behavior from both the standpoint of research and intervention. This is due to the fact that SEM proposes that the health behavior is influenced by determinants at multiple levels (McLeroy, Bibeau, Steckler, & Glanz, 1988): intrapersonal (female college students), interpersonal (students' family, friends, and healthcare providers), organizational (university and university health center), community, and policy (insurance coverage). Incorporating multiple levels of determinants may result in the development of more specific and effective public health interventions.

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