

# ***Exploring an Impact of Digital Media Platform on HPV Vaccination Intentions of College Women***

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**Abstract:** Taking the theory of planned behavior as the framework, to understand the willingness and influencing factors of social media apps As on female college students' HPV vaccine behavior, and concerning the measurement of self-efficacy in Keeho-Park's research, combined with this study and modified, the "Influence Analysis Questionnaire of Social Media on Female College Students' HPV Vaccination Willingness" was made. 224 female college students (17-<24 years old) were investigated, and the factors influencing the willingness to vaccinate were investigated by a one-sample variance analysis. Results: The behavioral willingness to score of 224 female college students to receive the HPV vaccine was (4.59) points. Media contact frequency, cognitive level, attitude, subjective norm, and perceived behavioral control were also factors affecting female college students' willingness to receive the HPV vaccine.

**Keywords:** HPV(human papilloma virus), HPV vaccine, Female college students, Theory of Planned Behavior(TPB).

## **1. Introduction**

Human papilloma virus(HPV) is one of the most common infectious agents in the reproductive system. Low-risk HPV (such as 6, 11) causes genital warts; high-risk HPV (such as 16, 18) is not only associated with some cancers in the vulva, penis, perianal, upper aerodigestive tract, etc <sup>[1]</sup>. but also causes Cervical cancer. High-risk HPV (HR-HPV)-16, -18 infection can cause cervical cancer and precancerous lesions in more than 70% of infected patients <sup>[2]</sup>. According to the latest figures given by the PRC's National Health Commission, cervical cancer is the second most common gynecological malignancy, only after breast cancer. In 2020, there will be about 110,000 new cervical cancer cases and nearly 60,000 deaths in China, accounting for about 18.3% and 17.6% of the global incidence and deaths, respectively. That is to say, my country's cervical cancer patients account for one-fifth of the world's(National Health Commission of the PRC) <sup>[3]</sup>. It can be seen from the above that HPV, as the fundamental factor in the morbidity of cervical cancer in women, seriously affects the physical and mental health of women in my country. Therefore, the prevention of HPV infection is the main way to prevent and treat cervical cancer. The successful development of the HPV vaccine has made a huge breakthrough in the prevention of cervical cancer <sup>[2]</sup>.

The HPV preventive vaccine is the only vaccine on the market that can prevent cancer. It can block the persistent infection of high-risk HPV, thereby effectively reducing the probability of cervical cancer and precancerous lesions. At present, the best vaccination period for the nine-valent vaccine on the market is women under the age of 26 who have never had sex, but women at this age are in college years, so it is particularly important to explore the HPV vaccination intentions of female college students. Nowadays, in the era of information explosion, people can obtain information anytime and anywhere only through online media, especially the social media apps that play a major role in young people. Therefore, it is of great reference value to explore whether the dissemination rate and popularity of HPV-related knowledge on social media apps will affect female college students' HPV vaccination willingness. Moreover, how to use relevant scientific knowledge to effectively disseminate, guide and intervene is a problem that needs to be solved quickly today.

## **2. Literature Review**

### **2.1. Introduction of the Theory of Planned Behavior**

Icek Ajzen proposed the Theory of Planned Behavior, a behavior decision model that is primarily used to predict and analyze human behavior<sup>[4]</sup>. The Theory of Planned Behavior is built on the Theory of Reasoned Action's progress and refinement. Because the Theory of Reasoned Action posits that an individual's action is the result of complete voluntary control, ignoring the individual's inner decisions (such as moral, ethical, and other criteria), Ajzen added the third element, Perceived Behavior Control, in 1988<sup>[4]</sup>. According to Ajzen (1985), all elements that impact behavior indirectly affect behavior performance through behavior intention. Three elements influence behavior intention: attitude, subjective norms, and perceived behavior control.

Attitude is the evaluation of how much the individual likes or dislikes performing a specific behavior. In this study, the "behavior" of this theory refers to the attitude of female college students towards HPV vaccination. Bagozzi and other scholars believe that the Theory of Planned Behavior should not only pay attention to the instrumental components of attitude (useful – harmful, valuable – worthless, etc.), but also emphasize its emotional components (like – dislike, pleasure – pain, etc.)<sup>[5]</sup>. In this study, when exploring the attitude of female college students towards HPV related information in the new media platform, the instrumental and emotional components of their attitude will be measured through the questionnaire.

Subjective norm refers to the social pressure that individuals perceive when deciding whether to implement a specific behavior. It reflects the influence of the important people or groups on individual's decision-making. In this study, we mainly collected the influence of "significant others" (relatives, friends, medical staff) on female college students' willingness to be vaccinated with HPV through questionnaire.

More researchers have discovered that the measuring items of perceptual behavior control are loaded on two factors in recent years, one of which is related to the confidence of completing behavior ability and the other to behavior control, using factor analysis. According to Ajzen, the first element reflects self-efficacy beliefs, while the second factor reflects control beliefs. He used the terms self-efficacy and control force to describe the two aspects<sup>[6]</sup>. In this study, we mainly explore the self-efficacy of female college students about HPV vaccination after browsing the new media platform.

## **2.2. Application of the Theory of Planned Behavior**

### **2.2.1. Researches based on the Theory of Planned Behavior abroad on willingness of HPV vaccination**

The Theory of Planned Behavior has been widely used in many behavioral fields abroad, and has been proved to significantly improve the explanatory and predictive power of research on behavior. A large number of foreign studies have proved that TPB can successfully predict and explain the health behavior of HPV vaccination, help people understand the intention of physical examination better, promote people's willingness and effect of physical examination, and better prevent and detect diseases.

Lee, Kyu Eun (2014) used TPB to determine the factors affecting female college students' decision to receive HPV vaccination. The results show that the three elements of TPB are important factors for undergraduate girls to receive HPV vaccination, and emphasize that the subjective norms and perceived behavior control strategies of undergraduate girls to receive HPV vaccination should be taken into account when formulating health education plans <sup>[7]</sup>.

Hannah priest Catalano (2017) used a model based on TPB to predict the intention and completion of HPV vaccination among college students. The results show that non vaccinators with a more positive attitude and greater subjective norms have a greater willingness to complete the vaccination. Also, female college students and those who have a greater willingness are more likely to complete the series.

Therefore, it can be further concluded that subjective norms and positive attitudes are important factors of behavior intention. For female college students who are under more social pressure or have a positive attitude towards the vaccine, their behavior intention to take HPV vaccination is stronger. It is assumed that strengthening social pressure in subjective norms, such as improving their acceptance of authoritative information on Cervical Cancer Prevention published on social media platforms, can improve their vaccination behavior <sup>[8]</sup>.

### **2.2.2. Researches based on the Theory of Planned Behavior on willingness of HPV vaccination in China**

The application of planning theory by domestic researchers is also increasing, and the research content gradually begins to expand to the aspects of public personal health and social activities. However, the overall situation is still in its infancy compared with foreign countries, and the application of TPB in cervical cancer vaccination intention is still in the preliminary exploration stage, which needs more in-depth exploration. At present, only one study has been found that applies the planned behavior theory to the cervical cancer vaccination intention of college students. In her master's thesis, Yu Xuan, based on the relevant research data on cognitive psychology, HPV vaccine and cervical cancer at this stage, combined with technology acceptance model (TAM) and planned behavior theory (TPB), and supported by the results of questionnaire survey, investigated the cognitive level of college students on HPV and HPV vaccine, and explored the important influencing factors in the promotion of HPV vaccine <sup>[9]</sup>.

## **3. The Result and Analysis of the Study**

### **3.1. Survey Method**

The research method is the questionnaire survey. With the use of Sojump, questionnaire is drawn up and distributed among the college students. Overall, 224 valid questionnaires are backed from the female college students of each region.

### 3.2. The Scale of Planned Behavior

To assess the frequency of media use, the knowledge of HPV infection, female university student's attitude, perceived behavioral control and subjective norm concerning the intention of getting a vaccination among the female undergraduates. Questionnaire includes demographic information such as the distribution of female university students in different grades.

Survey data collection was divided into five sections. Demographic information consist of 1 question querying participants on personal information about what year you are in university. Firstly, the frequency of media use consisted of 5 questions focused on how often women undergraduate search for the information about the HPV across a variety of platforms such as social platform, short video platform, search engines, mass media, online media platform. Secondly, the knowledge of HPV information contained 11 questions aimed at gauging women undergraduates' understanding of human papillomavirus, associated symptoms, infection prevention measures, and current vaccination recommendations. Thirdly, the attitude of HPV information aimed at evaluating if women undergraduates will paying attention to the HPV information from new media platform, and if they think that new media platform should enhance increasing penetration of the HPV information. Forthly, subjective norm means that individual may sense social pressure before taking action or making decision, reflecting how important one or group of people exert a vital influence on one's particular behavior. In this study, it aims to evaluate how parent, doctor, media worker, friend and information in the new media will affect the personal attitude in a certain extent. Fifthly, perceptual control means that people may abide by a certain behavioral norm, whereby they can help them act appropriately when encounter different situations. In this study, it aims to gauge cues to action, women's perceived benefits of the HPV vaccination, and barrier that might deter them from vaccinating HPV. Questions that explore that searching information with reference to HPV on the website might have affected women undergraduate's ability to seek vaccination for their children in the past, for example, satisfy their fundamental information requirements of the HPV or exert an great threat to human health or facilitate vaccination.

### 3.3. Statistical Method

Social sciences (SPSS) were adopted to analyze collective data. Descriptive statistics and Crombach's alpha were used to describe the distribution characteristics of the data and delve into the result of correlation analysis in reference with the multilevel bivariate models between the influence of mass media and the intention to get a HPV vaccine based on the theory of the Theory of Planned Behavior (TPB). Questions were classified into five core concepts commonly defined in the literature: the frequency of media use, the knowledge of HPV infection, female university student's attitude, perceived behavioral, control subjective norm. The latter three are derived from TPB while the former two are the most considerable elements that may influence the intention of getting a HPV vaccine. Those five construct will be directly applied as independent variable while the behavioral intention as dependent variable. After construing that, statistical analysis were used to determine if significant association exist between the five core concept categories and a vaccination inclination.

### 3.4. Reliability and Validity Test of the Scale

In table 1, the descriptive statistics for the variables adopted within this study are presented such as: the mean, standard deviation, minimum value and maximum value.

Table 1: Descriptive Statistics.

Construct	N	Minimum Value	Maximum Value	Mean Value	Standard Value
Perceived Control	224	1.83	5.00	3.9059	0.62109
Subjective Norm	224	1.00	5.00	3.9179	0.77288
Attitude	224	1.27	5.00	3.9939	0.69389
The Frequency of Media Use	224	1.00	5.00	2.8268	0.91269
Knowledge	224	1.00	5.00	4.1339	0.71962

According to the above table, from the perspective of mean value and standard deviation, all items is uniformly distributed on the interval from 2.8268 to 4.1339, signifying that all of the variable belongs to superior middling. In the stage of the frequency of media use, the average for this value is 2.8268, which is lowest among other values, reflecting that the frequency of media use is relatively low. In the stage of attitude toward HPV vaccination, the average for all these values is 4.1339, which was in the first place among other values, signifying that women undergraduates had a consistently positive attitude about the HPV vaccination. In the stage of perceived control with a total of 12 items, the average for this value is 3.9059, demonstrating people's strong awareness of getting a vaccination based on individual's different resources and conditions from the point of searching information on new media platform. The understanding of HPV information and subjective norm each have five items, which are respectively 3.9939 and 3.9179, illustrating that respondents have been greatly influenced by significant others.

Table 2: Correlation Coefficients.

Construct	Cronbach's $\alpha$
The frequency of media use	0.453
Knowledge about the HPV information	0.914
Attitude	0.590
Subjective norm	0.891
Perceived control	0.902

Note. \* Cronbach's  $\alpha$  was used in a survey questionnaire of 214 vaccine-eligible undergraduate females to carry out validity and reliability test.

\*\*Correlation coefficient is significant at the  $P < 0.01$  level.

Commonly, a value of  $r$  greater than 0.7 signify a strong correlation. As shown in the results above the table, the results showed that the scale has high reliability, which can be applied to the research as contributing factors facilitating HPV vaccination among female college students.

### 3.5. Results and Discussion

Table 3: Pearson Product-Moment Correlation Coefficients.

Construct	Pearson's <i>r</i>
The frequency of media use	0.453
Knowledge about the HPV information	0.391
Attitude	0.488
Subjective norm	0.263
Perceived control	0.370

\*\*Pearson Product-Moment Correlation Coefficients was applied to demonstrate a linear correlation between the five construct and the behavioral intention of getting a HPV vaccine. (n = 214)

**(1) The first assumptions: the more women undergraduates search information on new media platform, the more probability they may get a vaccination.**

There were significant differences between the frequency of media use and the inclination of HPV vaccination ( $P=0.000<0.001$ ). The correlation coefficient of 0.263 is considered as a weak correlation between the rate of media use and behavioral attitude. Further analysis of the findings found that time spent searching HPV information on new media platform likely contributed to the inclination of HPV vaccination. The main reason lies in convenience of computers and internet, which made information handling much easier for them. Via the internet, they are exposed to infinite information. New media platform involving short video platform, searching engine expose people minds to new information of the HPV vaccination. All of these platforms popularized among the young people have a variety of platform strategy, rich media resources, great influence on spreading maximum information. Continued contact with health care information from the new media platform provided further opportunities for prevention messages and interventions. Therefore, the frequency of media use may increase the probability of getting a vaccination.

**(2) The second assumptions: the more women undergraduates know about the HPV on the new media platform, the more probability they may get a vaccination.**

There were significant differences between the understanding of HPV information and the inclination of HPV vaccination ( $P=0.000<0.001$ ). the correlation coefficient of 0.37 is considered as a weak correlation between the rate of media use and behavioral attitude. Further analysis showed that the probability of getting a vaccination was directly related to the extent that women undergraduates have a profound understanding of HPV information. It can be ignored that women undergraduates' level of understanding of HPV information strengthen their awareness of health knowledge, whereby it can guide them to get a vaccination. The risk of cervical cancer is closely associated with the persistent HPV infection. When receiving valuable information provided by multiple platform, it can greatly enhance undergraduates' understanding of hygienic knowledge and importance of improving hygienic standards in HPV prevention such as having a HPV testing regularly. The more they have a awareness of the HPV information, the stronger they have sensitive cognition on HPV infection. Therefore, it is partly due to the understanding of HPV information that make them tend to get a vaccination.

**(3) The third assumptions: the more women undergraduates believe the HPV information uploaded on new media platform, the more probability they may get a vaccination.**

There were significant differences between the understanding of HPV information and the inclination of HPV vaccination ( $P=0.000<0.001$ ). The correlation coefficient of 0.488 is considered

as a weak correlation between the rate of media use and behavioral attitude. Women undergraduates get the HPV and treatment information they need from the health information sources they can trust. Considering that, women undergraduate's reliance on HPV information on new media platform strengthen people trust in the HPV vaccine. Therefore, maintaining a positive attitude and taking time for searching relevant information will increase the probability of getting a vaccination.

**(4) The fourth assumptions: the more women undergraduates' important person believe the HPV information on the new media platform, the more probability women undergraduate may get a vaccination.**

There were significant differences between the understanding of HPV information and the inclination of HPV vaccination( $P=0.000<0.001$ ). the correlation coefficient of 0.391 is considered as a weak correlation between the rate of media use and behavioral attitude. Further analysis established that important person exert an subtle influence on women undergraduates. As we know, subjective norm means that individual may sense social pressure before taking action or making decision, reflecting how important one or group of people exert a vital influence on one's particular behavior. Significant others is a concrete figure who has great impact on the socialization of the individuals. By exploring how significant others promote individual's goal commitment, the finding of study revealed that significant others like parent, friends, doctor response to the HPV vaccine would affect people insight into the HPV vaccination and encourage them to pursue their perfect state. The main reason is that the major barriers for the HPV vaccination were concerning about side effects and cost. Taking nine-valent HPV vaccine as an example, the price of vaccines that can be vaccinated in China is relatively high, which is around 2000 yuan. As for college students who have not been financially independent, it is hard for them to afford it by themselves. If not supported by their parent, they may bear considerable pressure on paying the price, whereby women undergraduates' parents may place blatant influence on whether their children will get a vaccination. For parents who could afford the cost of vaccine and have their toddlers immunized with three separate jabs, their children to a certain extent may take initiative in HPV vaccination. In the meanwhile, doctors or health care workers who recommended people to get a vaccination on new media platform may bred people' courage and confidence on the HPV vaccination. Besides, interpersonal communication exerts great influence on the college student in several aspects, in particular self-consciousness. Compared with other older youth, college student have bear more influence upon interpersonal relation. Therefore, the more positive the attitude of important others of female college students towards new media information about HPV, the more subjective norms of female college students will be strengthened. Based on that, women undergraduates will be prompted to vaccinate against HPV in terms of the positive attitude of important others toward the HPV vaccine.

**(5) The fifth assumptions: the less barrier women undergraduates achieve information on the new media platform, the more probability women undergraduate may get a vaccination.**

There were significant differences between the understanding of HPV information and the inclination of HPV vaccination( $P=0.000<0.001$ ). The correlation of 0.453 is considered as a weak correlation between the rate of media use and behavioral attitude. Extensive forensic analysis of the study has, in a way, brought the influence of perceived control to a familiar place. Compared with other people, university students show more progress in critical thinking, complex reasoning and open-mindedness. On the one side, at the basis of acknowledging that college students are the most active group of people who employ internet, internet may influence student's awareness of things and living in a large scale. On the other side, women undergraduates who are generally open-minded and are more likely to accept new things, whereby they may take a decisive measures to prevent themselves from HPV infection. Compare to other senior people, younger women who are well-



educated may have information obtaining ability and a better cognitive competence. Based on that, the harmfulness of HPV infection may be inculcated into their mind. In the final analysis, the treatment compliance of HPV infection is closely related with their educational level. The educational level of the student closely associated with the requirement for disease may help them enhance self-protection consciousness and STD prevention consciousness. Survey results indicated that women undergraduates' perceived control has a large impact on the probability of getting a vaccination.

#### 4. Reference Text and Citations

HPV vaccination rates have long been a world concern. Noel T Brewer McRee, Paul L Reiter and Annie-Laurie published a study on Parents' Information about HPV Vaccine studies. They came to their conclusion after interviewing teenager's parents. Their parents have access to information about HPV on the Internet, which has a positive effect on their HPV vaccination<sup>[10]</sup>. Zhong Wenjiang, Duan Jianfang et al., in Shanghai Qingpu district primary school girls' parents' awareness of HPV and HPV vaccination willingness survey also reached a similar conclusion<sup>[11]</sup>. The main factors influencing parents' willingness to vaccinate their children were whether they had heard about the HPV vaccine, whether children had been educated about sexual health, and whether they or their loved ones had been vaccinated against HPV. And 55.61% of parents learned about HPV-related information through mobile news, health apps or wechat. We turn our attention to college students. A considerable number of college students lack knowledge about human papillomavirus (HPV) diseases and vaccines. Recommendations found that a considerable number of college students did not have the awareness of HPV vaccination, among which female students accounted for nearly 55%<sup>[12]</sup>. The main reason for this is that the local college students are not aware of the relevant information about HPV. Although they have abundant information resources, they have not been exposed to HPV related information for many reasons, resulting in a low vaccination rate and low awareness of HPV vaccine. Guo Lu's influence of social media on HPV-related health behaviors of contemporary female college students mentioned that social media can affect HPV risk perception and self-efficacy of female college students, and even affect the health behaviors of female college students. These studies explored the impact of new media platforms providing HPV-related information on different groups<sup>[13]</sup>. Through consulting, we also found that new media platform can have an impact on relevant users' attitudes, subjective behavior norms and perceived behavior control. For example, new media platforms can influence parents' attitude towards varicella vaccine and consumption behavior of relevant groups<sup>[14][15]</sup>. These relevant studies have inspired us to analyze the impact of new media platform on willingness of female college students to be vaccinated against HPV.

#### 5. Conclusions

We have presented the bilateral test results of Pearson correlation between the five variables, Subjective Norm, Perceived Behavioral Control, Cognitive Level, Media Contact Frequency, Attitude and HPV vaccination willingness of female college students in China. Our findings agree with the predictions. We found positive correlations between the mentioned five variables and the willingness of HPV vaccination.

The higher the frequency of female college students contacting HPV information on the new media platform, the more willing they are to be vaccinated against HPV. The more female college students understand the HPV information on the new media platform, the more willing they are to be vaccinated against HPV. The more female college students trust the HPV information published on the new media platform, the more willing they are to be vaccinated against HPV. The more positive the attitude of important others of female college students towards HPV information on the new media platform, the more willing female college students are to be vaccinated against HPV. The less



obstacles female college students have in obtaining HPV information on the new media platform, the higher their willingness to HPV vaccination.

Our research uses Theory of Planned Behavior to emphasize the importance of new media platforms for female college students' willingness to HPV vaccination. In the future, doctors and hospitals can pay more attention to the impact of the new media platform on the audience when promoting HPV vaccination. At the same time, the Theory of Planned Behavior is a good way to study various factors affecting vaccination willingness. By improving the dissemination rate and popularity of HPV related knowledge on the new media platform, female college students will have a clearer understanding of their health. And through the clear and effective dissemination, guidance and intervention of relevant scientific knowledge, Chinese society will attach more attention to women's HPV vaccination.

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