

Research Paper

Human Papillomavirus Vaccination Intention Among Female Students at Mazandaran University of Medical Sciences

Mosharafeh Chalesghar-Kordasiabi^{1*} Seyed Abolhassan Naghibi²

1. Department of Health Education and Promotion, Faculty of Health, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran.

2. Department of Public Health, Health Sciences Research Center, Faculty of Health, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran.



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ABSTRACT

Background and Purpose: Human papillomavirus (HPV) is a highly infectious virus transmitted mainly through sexual intercourse. The HPV vaccine is the most effective way to prevent HPV-related cancers. This study investigates the predictors of intention to receive the HPV vaccine among female students at Mazandaran University of Medical Sciences.

Materials and Methods: This study was a cross-sectional study conducted on female students at different faculties of Mazandaran University of Medical Sciences (2020-2021). The study participants (n=364) were selected through a quota sampling. The study tools comprised demographic information, a health belief model (HBM), and an intention questionnaire. The obtained data were analyzed using descriptive, multivariate linear regression, and correlation analyses using SPSS software version 20.

Results: The Mean±SD age of the students participating in the study was 23.96±5.18 years. Most were single (81%). Among the students, only 3 (0.8%) had received the HPV vaccine. The lowest score was related to perceived benefits 3.68±0.57, and attitude 3.64±0.57 had the highest average score. Based on the results, 33% of the intention to obtain the HPV vaccine was explained by the constructs of HBM. All constructs, except perceived barriers, had a statistically significant relationship with the HPV vaccine intention.

Conclusion: The beliefs and attitudes of the female students about HPV infection and vaccination were insufficient. So, there is a need to provide educational intervention by covering HPV issues and their complications in the curriculum of students before their graduation.

Keywords: Human papillomavirus, Health belief model, Mazandaran, Student

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* Corresponding Author:

Mosharafeh Chalesghar-Kordasiabi, Assistant Professor.

Address: Department of Health Education and Promotion, Faculty of Health, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran.

Tel: +98 (11) 33543619

E-mail: chalesghar288@gmail.com

1. Introduction

Human papillomavirus (HPV) is a prevalent sexually transmitted infection (STI) [1, 2]. About 6.2 million genital warts occur annually in people aged 14 to 44 years [3]. Data on the prevalence of genital warts (GW) varied among women in different countries. In a study, the prevalence of this disease among Indian women was reported to be between 14% and 25% [4]. GW is also prevalent among Iranian women [5-7]. Yousefzadeh et al. explored the prevalence of GW in 851 Iranian women and reported 265 cases afflicted with 19 different types of HPV, including GW [8].

HPV is a viral infection in the epithelial tissue. Besides genital warts, HPV infection can cause various types of cancer, such as anal cancer, head and neck cancer, oral and pharyngeal cancer in men and women, and especially cervical cancer [9-11]. According to some studies, HPV infection causes 60%-70% of oropharyngeal squamous cell carcinomas [12]. In 2020, 109741 new cases of cervical cancer and 59060 deaths were reported in China, corresponding to 18.2% of diagnoses and 17.3% of cervical cancer deaths worldwide [13], accounting for the most common cancer of the female reproductive system in China [14]. Men are also at risk for other HPV-related cancers, including penile, anal, and oral cancers [15]. HPV infection is a significant health threat and disease burden worldwide.

Vaccines account for the most effective interventions for infectious diseases [16]. The introduction of HPV vaccines in many countries has significantly reduced the prevalence of specific HPV infections. A recent meta-analysis, including 60 million people, showed that HPV vaccination has a significant effect on the incidence of HPV infection and related diseases [17], such as sexually transmitted infections [18-20]. Most studies on HPV vaccination attitudes in China currently focus on women, and few studies have analyzed men's and women's knowledge of the HPV vaccine. To our understanding, university students can process new knowledge and make decisions about receiving HPV vaccination independently [21].

Health education theories and models can be a great help in this issue. Health belief model (HBM) seeks the relationship between beliefs and behavior and is more involved in preventing diseases [22, 23]. HBM plays an essential role in improving preventive behaviors. This model delves into how perception can motivate us to behave a certain way. Based on HBM, to adopt preven-

tive behaviors, people should first perceive susceptibility to HPV. Then, they should recognize the severity of the disease and its negative consequences. People should also notice the cues to action from their internal or external factors and choose the benefits of the preventive behavior to the perceived barriers (physical, economic, or mental barriers). This construct influences perceived self-efficacy. Finally, the people will be able to adopt HPV preventive behaviors [24].

HPV is the most common sexually transmitted virus. Young university students, especially girls, who will be mothers in the future, have an essential role in preventing HPV. In addition to being the target group for vaccination, female students of the University of Medical Sciences can influence other groups in society due to their role in the health system [25, 26]. Despite various studies in this regard, there is no valid data on the beliefs of female students in Mazandaran Province, Iran, regarding the existing cultural, social, and economic differences regarding HPV intention of vaccination. Thus, this research was conducted to understand the intention of female students at Mazandaran University of Medical Sciences to receive the HPV vaccine and the influencing factors based on HBM. The researchers believe that identifying the predictors of HPV vaccination intention helps healthcare policymakers to provide educational interventions toward reducing the prevalence of HPV.

2. Materials and Methods

Study design and subjects

This cross-sectional study was conducted on female students of Mazandaran University of Medical Sciences. The study participants were selected by quota sampling. Students from different faculties were randomly included in the study according to the number of students in each faculty.

The sample size was calculated according to the correlation of perceived susceptibility (0.177) with an intention to HPV vaccination in the Bayrami study, estimated at 364 people, where $r=0.177$ and $n=2$ [27].

After obtaining permission, the researcher referred to each faculty and, at the end of the training classes, introduced himself and collected questionnaires from the students. The questionnaire collection lasted for 10 months (2020-2021).

Eligibility criteria

The inclusion criteria were female students aged 18-35 studying at Mazandaran University of Medical Sciences. The exclusion criterion includes participants who did not answer the questionnaire completely.

Study tools

The study questionnaire includes three parts. The first part is a demographic information questionnaire. The second part consisted of questions related to the beliefs of HPV vaccination based on HBM (perceived susceptibility, perceived severity, perceived self-efficacy, perceived benefit, perceived barrier, and social support). In the section related to the constructs of the HBM, a 5-point Likert scale (completely agree=5 points to completely disagree=1 point) was used. Perceived susceptibility includes 10 questions, the total scores ranging from 10 to 50. Perceived severity had 11 questions. The total score of this section ranges from 11 to 55. Perceived barriers had 9 questions, and the score ranged from 9 to 45. Perceived benefits had 8 questions, with a total score ranging from 8 to 40. Self-efficacy had 10 questions, with a total score ranging from 10 to 50, and social support had 4 questions, with total scores ranging from 4 to 20. The third part consisted of questions

related to the intention to receive vaccination. There were five questions about the intention to do vaccination, with a score of 5 for “completely agree” and 1 for “completely disagree.” The validity and reliability of the questionnaire by calculating the Cronbach alpha ($\alpha=0.8$) were confirmed by Bayrami et al., who designed and psychometrically tested it [27].

Statistical analysis

For data analysis, descriptive (frequency, Mean \pm SD) and analytical statistics (multivariate linear regression and the Pearson correlation) were used in SPSS software version 20. A $P=0.05$ or $P<0.05$ is considered statistically significant.

3. Results

The average age of the students participating in the study was 23.96 \pm 5.18 years. Most were single (81%), and 93.4% of the students had average income. Among the students, only 3(0.8%) had received Gardasil vaccine (Table 1). The Mean \pm SD, and range of HBM constructs are given separately in Table 2. The lowest score was related to perceived benefits 3.68 \pm 0.57, and attitude 3.64 \pm 0.57 had the highest mean score. Before making the regression analysis, its assumptions, includ-

Table 1. Demographic characteristics of the participants (n=365)

Variables		Mean \pm SD/No. (%)
Age (y)		23.96 \pm 5.18
Marital status	Single	294(81)
	Married	69(19)
College	Medicine	43(11.8)
	Dentistry	39(10.7)
	Pharmacy	25(6.9)
	Health	83(22.8)
	Nursing	72(19.8)
	Paramedical	102(28)
Income	Good	16(4.4)
	Moderate	340(93.4)
	Poor	8(2.2)
Number of vaccinated	Yes	3(0.8)
	No	361(99.2)

Table 2. Mean±SD of extended health belief model score among female students of Mazandaran University of Medical Sciences

Variables	Mean±SD	Min	Max
Perceived susceptibility	2.86±0.7	1	5
Perceived severity	3.40±0.63	1	5
Perceived efficacy	3.29±0.66	1	5
Perceived benefit	3.64±0.57	1	5
Perceived barriers	2.71±0.5	1	4
Social support	3.51±0.73	1	5
Attitude	3.68±0.58	2	5
Intention	3.29±0.74	1	5

ing the normality of the residuals, collinearity between the independent variables, the presence of outliers, the linearity of the relationship between the independent variables and the response, and the stability of the variance were checked, which were confirmed for all cases. A multivariate linear regression model was used to evaluate the relationships between the constructs of the HBM, including perceived susceptibility, perceived severity, perceived barriers, perceived benefits, perceived self-efficacy, and social support with the HPV vaccination intention. Based on the results, 33% of the intention to receive the HPV vaccine was explained by the 6 constructs of HBM. This statistical relationship was significant ($P<0.001$) (Table 3). Among the constructs of HBM, all except perceived barriers had a significant association with HPV vaccination intention. Furthermore, perceived self-efficacy ($r=0.30$, $P<0.001$) and perceived benefits ($r=0.24$, $P<0.001$) show a stronger relationship with the HPV vaccination intention. The Pearson correlation coefficient test also showed that perceived self-efficacy ($r=0.46$), perceived benefits ($r=0.38$), and social

support ($r=0.39$) also correlate with the intention to receive the HPV vaccine.

4. Discussion

This study examined the HPV vaccination intention among female students of Mazandaran University of Medical Sciences based on the HBM. According to the results, the students' HPV vaccination intention (31%) was low, in line with the results of different studies [28-31]. In various studies, 19% to 63% of American, European, and Asian students intended to get vaccinated [32]. Findings from different studies have shown non-standard approaches to evaluating vaccination goals and differences in various countries. Low vaccination rates are due to different reasons. First, the health education provided by the government and universities is not enough in terms of content and frequency, leading to a lack of knowledge about vaccination among girls. Second, HPV vaccination is expensive for most students, which leads to affordability issues with the increasing

Table 3. The relationship between health belief model construct and HPV vaccination intention

Variables	Standardized	Unstandardized	SE	P
Perceived susceptibility	0.12	0.13	0.05	0.008
Perceived severity	0.10	0.12	0.06	0.04
Perceived benefit	0.24	0.31	0.07	<0.001
Perceived barriers	-0.05	-0.07	0.08	0.34
Perceived self-efficacy	0.3	0.34	0.06	<0.001
Social support	0.17	0.17	0.05	0.001
Adjusted R ²				0.33

demand for HPV vaccination. Students with higher social and economic status (SES) have a good chance of being vaccinated, and the accessibility of the HPV vaccine is reduced to low SES population.

Based on our results, perceived sensitivity, perceived severity, perceived benefits, self-efficacy, and perceived barriers had significant relationships with the intention of HPV vaccination, which aligns with the results of Bayrami et al.'s study [27].

Among the model constructs, perceived benefits and self-efficacy had significant relationships with the HPV vaccination intention. The higher the level of self-efficacy, the greater the person's ability to control and reduce obstacles and perform health-related behaviors [33]. In various studies, self-efficacy was the strongest determinant of HPV vaccine intention [27, 34, 35]. Increasing self-efficacy by giving awareness about cervical cancer can play an essential role in controlling the barriers to vaccination. Based on the results of the above study, the more students believe that getting the vaccine is useful and effective, the more they intend to get vaccinated. In contrast, the students with more perceived barriers (pain, vaccine safety, and side effects) had a weaker intention to get vaccinated, which was in line with the results of other studies [19, 36, 37]. Vaccine safety and its side effects must be considered during education in carrying out educational interventions because such opinions and beliefs affect vaccine intention.

We found that students with heightened perceived benefits about vaccine safety had higher self-efficacy to cope with their barriers. This finding is consistent with other studies, claiming a need for educational intervention, capacity building, and improvement of positive attitude by providing information about the safety and effectiveness of the vaccine in infectious diseases [38-42]. In addition to these interventions, messages regarding risk factors, disease incidence and prevalence, disease severity (mortality), cervical cancer, and HPV infection should be stressed. Students can make informed health decisions by increasing knowledge, belief, and skills to overcome barriers and improve self-efficacy. Knowledge plays a vital role in creating sensitivity to HPV-related diseases and cervical cancer due to the different societies. However, knowledge of HPV has not improved in recent years [27, 43].

One of the variables influencing the HPV vaccination intention is the perceived susceptibility and severity of the disease and its complications. Our study results align with Bayrami's study [27]. Talbot et al. reviewed

the studies based on HBM and stated that perceived susceptibility has the most power in explaining the behavior [44]. Various studies have shown the role of perceived susceptibility in accepting the HPV vaccination [35, 41, 43]. When students perceive a chance of engaging genital HPV, cervical cancer, and genital warts, they want to get vaccinated and have a higher expectation of taking the HPV vaccination.

Unlike the results of this study, several studies reported the perceived barriers as determinants of vaccine acceptance. This discrepancy could be due to different communities' socioeconomic and cultural status and health policies [41, 45]. In addition to individual factors, one of the important factors is the role of social support in increasing HPV vaccine intention, which shows the influence of interactive and social networks, such as parents, doctors, friends, etc. on HPV vaccination intention. Several studies have reported the role of parents in HPV vaccination [32, 36, 38].

In the Ampofo study, girls whose peers and relatives had previously recommended the HPV vaccine to them had a stronger intention to get vaccinated. These results show the need to use peers and relatives in education as necessary influential people in HPV vaccination [36].

In the current study, the number of vaccinated people was very low (0.8%), which indicates the absence of HPV vaccination programs due to individual, cultural, social, and environmental factors. Nevertheless, the results of the above study indicate the HPV vaccine intention of students. If HPV vaccination is implemented in the country, the barriers to vaccination should be removed. The factors that caused doubts and reduced the HPV vaccination intention in various studies were concerns about the immunogenicity of the vaccine, insufficient information, low vaccine effectiveness, mistrust of health managers and doctors, and the novelty of the vaccine [19, 36, 46, 47].

Limitations of the study include the low generalizability of the study due to the questionnaire's self-reporting and the students' age limit.

5. Conclusion

Ultimately, an individual's behavior often depends on the person's perceptions of the benefits and barriers to health behavior. According to the evidence, restraining the barrier and emphasizing perceived benefits help people accept and perform healthy behaviors. Assessments based on the HBM help managers and policy-makers assess and prioritize health prevention needs.

Based on the result, the beliefs and attitudes of female university students about HPV infection and HPV vaccination are low. So, there is a need to provide education planning by covering HPV issues and their complications in courses through the curriculum before student's graduation.

Ethical Considerations

Compliance with ethical guidelines

The Ethics Review Committee of [Mazandaran University of Medical Sciences](#) approved this study (Code: IR.MAZUMS.REC.1398.4758).

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Authors contributions

Conceptualization, supervision, writing the original draft, review, and editing: Mosharfeh Chalesghar-kordasiabi and Seyed Abolhassan Naghibi; Data analysis and collection: Mosharfeh Chalesghar-kordasiabi.

Conflict of interest

The authors declared no conflict of interest

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