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Investigating the knowledge and attitude of mothers with teenagers toward human papillomavirus vaccine injection

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Abstract:

BACKGROUND: Human papillomavirus (HPV) is a large family of viruses and is considered the most common sexually transmitted infection. One of the effective and cost-effective primary prevention methods are vaccines made against the HPV. Considering the significant prevalence of HPV disease and the importance of its prevention, this study was prepared and compiled with the aim of determining the knowledge and attitude of mothers with teenagers toward the injection of the HPV vaccine and its related factors in order to increase the acceptance of this virus vaccination.

MATERIALS AND METHODS: The current research is a cross-sectional study (descriptive and analytical) that was conducted in the health and treatment centers of Pakdasht city in the year 2021. The sample size was calculated to be 407 people, which consisted of mothers with teenage girls or boys aged 11–16 years. The tools of data collection were information-demographic-medical form, questionnaire measuring knowledge, and attitude of mothers about HPV. Experiment and data analysis were done with SPSS version 26. Strobe checklist was also used to write the text of the article.

RESULT: The average age of mothers was 35.61 (6.11) and the average age of fathers was 41.61 (7.21). Most of the people (49.1%) had one child, and most of the children were girls (57.5%). The average knowledge score was 23.98 ± 3.22 , and the average attitude score was 10.04 ± 1.84 . The average total score of knowledge and attitude was 34.02 ± 4.12 (at the average level). The results of the Mann–Whitney test indicated that the mean average of knowledge and attitude according to the gender of the child, membership in virtual medical networks, place of residence, income adequacy, history of cervical cancer in the family, history of physical illness in teenagers, and history of genital warts mean ($P < 0.05$) were significant. Also, Spearman's test showed that there is a positive and significant correlation between mothers' knowledge and attitude toward the HPV vaccine ($R = 0.296$), which was statistically significant ($P < 0.05$).

CONCLUSION: The results of this study indicate that the acceptance of vaccination by mothers can be related to various factors. Therefore, it is expected that by knowing the factors related to the acceptance rate of mothers, we design support programs in line with increasing the acceptance of mothers to carry out adolescent vaccinations.

Keywords:

Adolescent, mothers, papillomavirus vaccines

Introduction

Human papillomavirus (HPV) is a large family of viruses and is considered the most common sexually transmitted

infection.^[1,2] In the majority of cases, HPV infection has no symptoms and is self-limiting. This infection is associated with benign or malignant proliferation of cobblestone mucosa.^[3]

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Approximately 65% of people who have an infected sexual partner develop a genital wart infection within three to eight months. Genotypes 16 and 18 of this virus cause cervical cancer. Cervical cancer is the fourth most common cancer among women in the world and ranks seventh among women's cancers.^[4] This cancer is the cause of 5.7% of cancer deaths among women in the world.^[5-7]

HPV infection is one of the main causes of sexually transmitted infections. About 35,000 people in the United States are affected by HPV-related cancer every year.^[8] Asia has a large share of cervical cancer with more than 51.6% of cases and 50.3% of deaths from all cases in the world, which occurred due to a lack of attention to screening despite high prevalence.^[9] The last meta-analysis conducted on the prevalence of HPV in healthy Iranian women and women with cervical cancer showed a prevalence of 9.4 and 77.4%, respectively.^[10-13]

Young age at first intercourse, having free sex with many people, and smoking are aggravating factors. On the other hand, by increasing the awareness of society, this disease can be prevented. In a study aimed at the effect of educating puberty health issues on the awareness, attitude, and performance of 14–12-year-old girls, they showed that one of the basic needs of puberty health and reproductive maturity is to improve the level of knowledge and awareness of young people about the cultural framework and religious beliefs of society.^[14,15] This cancer can be significantly reduced with the use of prevention methods. One of the effective strategies in controlling the disease is vaccination and immunization against HPV before the first sexual intercourse.^[16-18] One of the most effective and cost-effective primary prevention methods is the HPV vaccine. The results of some clinical studies indicate that HPV vaccination is effective in almost 100% of dysplastic changes and cervical cancer.^[14,19] Also, these vaccines are safe and have very limited side effects. In a study, the results showed that 1.83% of the studied students had obtained their data related to HPV from the academic course and medical courses.^[20] Also, in another research, it was shown that peer education is effective in increasing the knowledge and awareness of girls about the HPV vaccine and cervical cancer prevention, so that the average score of knowledge about the vaccine before the intervention was 94.12, which is significantly increased to 53/74.^[21] Determining awareness and level of attitude is a fundamental point in order to formulate a more appropriate strategy for effective programming.^[19-22] Considering the level of awareness and different attitudes in different societies, as well as the various factors involved in the acceptance of the vaccine, it seems that the way to inform the target group by the health care staff, especially doctors, is of the first importance.^[22-24]

According to the searches conducted, interventions based on parents have been done for their knowledge and attitude about the HPV vaccine; these interventions show the effect of education in increasing awareness about HPV and the vaccine,^[23,24] which has finally led to an increase in the decision to inject the HPV vaccine, so that this decision was three times higher in the parents who were trained than in the untrained group.^[25,26] In this way, examining the level of knowledge and attitude of parents and factors related to this variable can greatly help in the acceptance of vaccination by teenagers. Therefore, the aim of the current study is to determine the knowledge and attitude of mothers with teenagers toward HPV vaccination and related factors.

Materials and Method

Study design and setting

The present study is a descriptive and analytical cross-sectional study, which was conducted with the aim of determining the knowledge and attitude of mothers with teenagers toward HPV vaccination and its related factors in the health and treatment centers of Pakdasht city.

Study participants and sampling

The statistical population of the research is mothers with teenage girls or boys between 11 and 16 years old. Based on the investigations, no similar study was found, as a result, the sample size was calculated by considering (average score of knowledge and attitude) $P = 0.5$ and $d = 0.05$ and using the formula of estimating a ratio (formula below). The required number of samples was estimated to be 407 people considering a 20% dropout.^[27] The inclusion criteria were desire to participate in the study, literacy in reading and writing Farsi, mothers with teenage girls or boys aged 11–16, residents of Pakdasht city, mental and physical ability to complete the study questionnaires, necessary skill to use mobile, and access to smart phone. Exclusion criteria were unwillingness to participate in the study.

Data collection tool and technique

In this research plan, two tools were used to collect data, which include the following:

1) Informational-demographic-medical form

This form was designed with a comprehensive review of the texts and the opinion of the research team and includes questions in the following fields: demographic-social variables (mother's age (in years), teenager's age (in years), father's age (in years), adolescent's gender, mother's education, father's education, mother's occupation, father's occupation, number of children, place of residence, family income, membership in virtual medical networks) and medical variables (history of mental and physical illnesses in

the father, history of mental and physical illnesses in the mother, history of cervical cancer in the family, history of physical illness in the adolescent, duration of cervical cancer (in months), history of genital warts in the family, duration of genital warts in the family (in months)). This is demographic information, and based on a similar article, it was decided to examine these issues.^[28]

2) Questionnaire to measure mothers' knowledge and attitude about HPV

Persian version of THinK questionnaire was used to measure mothers' knowledge and attitude. This questionnaire was designed by Matranga 2019. Cronbach's alpha coefficient of this questionnaire was 0.82 in total, and for HPV knowledge dimension was 0.88 and attitude toward HPV vaccine was 0.78. In order to score the questions in the questionnaire, "yes" (4 points), "very much" (3 points), "somewhat" (2 points), "a little" (1 point), and "no" (0 points) are given. The average total score for this tool ranges from 0 to 64. For HPV knowledge, 5 items with an average score of 0–20, HPV vaccine knowledge with 5 items with an average score of 0–20, and attitude to the vaccine with 3 items and an average score of 0–12 have been proposed.^[29]

Determining the validity and scientific reliability of data collection tools.

The validity and reliability of the THinK questionnaire was conducted by Hamzeh Rohamedi and colleagues during the implementation of the approved plan at the Mazandaran University of Medical Sciences Research Center for Sexual and Reproductive Health with the code 8307 and the ethics committee code IRMAZUMS. Rec. 1400.8307. First, the questionnaire was translated with permission from its designer. Then all 16 questions were reviewed by expert team members. Based on face validity, all the questions scored an impact score higher than 1.5, so a question based on the item was not removed from the questionnaire due to the lack of face validity. In the content validity ratio, the ratios obtained for each item were compared with the Lavshe table (it was higher than 0.42) and the content validity ratio of the questionnaire was confirmed. The content validity index of the whole tool was equal to 1.034 (an average score higher than 0.9 is suitable). To check the reliability of the questionnaire in terms of internal consistency, Cronbach's alpha was calculated, which was reported as an average of 0.958 (Cronbach's alpha above 0.8 is desirable). The reliability of the tool was checked in terms of repeatability with an interval of two weeks. Reliability of the questionnaire was calculated in terms of reproducibility, Intraclass correlation coefficient (ICC). In this study, 0.82 (excellent reliability) was reported.

Ethical consideration

This study was conducted after the approval of the code of ethics from Mazandaran University of Medical Sciences (IRMAZUMS.Rec.1400.8307). Written informed consent was obtained from all study participants.

Data analysis

After checking for normality, the data were analyzed with statistical tests. A significance level of less than 0.05 was considered.

Result

The average age of mothers was 35.61 (6.11) and the average age of fathers was 41.61 (7.21). Most of the people (49.1) had one child, and most of the children's gender was girls (57.5). The distribution of demographic-social and medical variables is presented in Table 1.

The results show that the average knowledge score was 23.98 ± 3.22 and the average attitude score was 10.04 ± 1.84 . The mean of the total score of knowledge and attitude was 34.02 ± 4.12 [Table 2].

Due to the fact that the distribution of knowledge and attitude variables does not follow the normal distribution, nonparametric tests were used.

The results of the Mann–Whitney test showed that the average knowledge and attitude according to the gender of the child with membership in virtual medical networks, place of residence, sufficient income, history of cervical cancer in the family, history of physical illness in teenagers, and history of genital warts were significant [Table 3].

Spearman's test was used to check the correlation between knowledge score and attitude due to nonnormality of the data. The results of this test showed that there is a positive and significant correlation between the two variables of knowledge and attitude toward HPV vaccine in mothers [Table 4].

Discussion

The current study was designed and implemented with the aim of determining the knowledge and attitude of mothers with teenagers toward HPV vaccination and related factors. The mean total score of knowledge and attitude was 34.02 ± 4.12 . The results indicated that the average knowledge and attitude according to the child's gender had a significant relationship with membership in virtual medical networks, place of residence, income adequacy, history of cervical cancer in the family, history of physical illness in teenagers, and history of genital warts ($P < 0.05$).

Table 1: Frequency distribution of sociodemographic and medical characteristics in the participants

Variable		Mean±standard deviation
Mother's age		35.61±6.11
Father's age		41.61±7.21
teenage age		15.61±1.51
Duration of cervical cancer		10.58±0.31
Duration of genital warts		16.58±1.23
Variable		number (percentage)
Adolescent gender	Girl	234 (57.5)
	Boy	173 (42.5)
Mother's education	High school	16 (3.9)
	Diploma and postgraduate diploma	196 (48.1)
	Bachelor's degree and higher	195 (47.9)
Father's education	High school	105 (25.8)
	Diploma and postgraduate diploma	187 (45.9)
	Bachelor's degree and higher	115 (28.2)
Membership in virtual medical networks	Yes	80 (19.7)
	No	327 (80.3)
place of residence	City	315 (77.4)
	Village	92 (22.6)
Number of children in the family	1	200 (49.1)
	2	107 (26.3)
	3 and more	100 (24.6)
Mother's job	Employee	150 (36.9)
	other	28 (6.9)
	housewife	229 (56.2)
Father's job	Employee	137 (33.6)
	other	228 (56.01)
	Unemployed	22 (5.4)
	Retired	369 (90.7)
Income adequacy	Yes	109 (26.3)
	No	298 (73.2)
History of mental and physical diseases in father	Yes	38 (9.3)
	No	20 (90.7)
History of mental and physical diseases in the mother	Yes	16 (3.9)
	No	391 (96.1)
Family history of cervical cancer	Yes	143 (35.1)
	No	264 (64.9)
History of physical illness in teenagers	Yes	74 (18.2)
	No	333 (81.8)
Family history of genital warts	Yes	307 (75.4)
	No	100 (24.5)

In the current study, gender of children had a significant relationship with knowledge and attitude toward vaccination injection. In fact, people who had female children had higher knowledge and attitude scores. This case can be influenced by several factors: First, the number of people who had a girl child was more than the number of people who had a boy child. Second, the risk of this disease is higher in women than in men, and awareness of the risk of harming people can be effective in accepting the vaccine injection.^[12] Third, it has been stated in some studies that, according to the cultural context of our society, the concerns in raising girls are more than boys.^[28-30]

Another result of this study was the relationship between mothers' knowledge and attitude toward the

HPV vaccine. The current study showed that there is a correlation between the independent variables of knowledge and attitude, and this correlation is positive and strong. In this way, it can be said that with the increase of knowledge, it is expected to increase the attitude of people. This result can confirm the requirements of educational interventions to increase people's knowledge, which subsequently provides the basis for attitude change.

In line with the current research, Gamaoun *et al.* (2018) in the study titled "Investigation of awareness and attitude of medical students and other medical personnel regarding HPV vaccination" showed that factors such as education, gender, age are effective in the level of

awareness of people. However, in the current study, there is no relationship between parents' education and the amount of knowledge and attitude of mothers in accepting the HPV vaccine.^[17] In his study in 2023, Yoon Park stated that the child's gender can be one of the determining factors in the level of parents' knowledge about the HPV vaccine and their willingness to inject this vaccine. In the analysis of his results, he has pointed out that the threat of this risk is more for girls than for boys.^[31]

In the current study, medical records such as history of cervical cancer in the family, history of physical illness in teenagers, and history of genital warts were significant. In fact, it is not far from expected that people who have teenagers who are suffering from an underlying disease, because of their health concerns, have a higher attitude and knowledge toward vaccination, which is a way to maintain the health of their children. Also, people who have reported the history of this infection in their family or witnessed the progress of this disease in their family and family members are affected by cervical cancer disease, which increase their awareness in this field. As a result, their

knowledge and attitude toward maintaining health and ways to prevent cervical cancer increases.

In the current study, a significant relationship was found between social status and adequacy of monthly income and knowledge and attitude toward vaccines. In fact, in the analysis of this relationship, it can be said that having more income can make a person spend more time on his health and his family members. Because low income and economic problems due to pressure and stress on family members close the pores of thinking about health and people do not spend time to acquire knowledge for the health of themselves and their children. This finding was also confirmed in the study of Salimi *et al.*^[32] in 2021. In their study, they found that socioeconomic status has a significant relationship with willingness to accept the vaccine. Keshmiri *et al.* 2021.^[33] also achieved similar results in 2021. They stated that the acceptance of the vaccine, the willingness to do the vaccination, and the attitude and knowledge about it have a direct relationship with the economic and social class of people, and one of the criteria for their classification was the amount of household income and how they benefit from amenities.

In the current study, another finding that was obtained was the significant relationship between the place of residence and the knowledge and attitude toward the vaccine. The study shows that people who lived in the city had a higher average score than vaccination. This can be justified for a number of reasons. First, because of where they live, these people are exposed to various

Table 2: Average score of knowledge and attitude

Variable	Mean±standard deviation	95% confidence interval
Average knowledge score	23.98±3.22	18.76–19.20
Average attitude score	10.04±1.84	14.76–15.31
The total score of knowledge and attitude	34.02±4.12	33.62–34.42

Table 3: Comparing the average score of knowledge and attitude in the levels of demographic variables in the participants

Variable		Average knowledge score	Average attitude score	The total score of knowledge and attitude
Adolescent gender	Girl	27.63±3.23	10.55±2.06	38.18±4.47
	Boy	25.56±3.01	10.05±1.93	35.61±4.06
	Mann–Whitney significance level	0.603	0.007	0.499
Membership in virtual medical networks	Yes	28.72±2.99	11.15±1.71	39.88±3.85
	No	24.55±3.19	10.62±2.11	35.18±4.44
	Mann–Whitney significance level	0.022	0.025	0.036
Place of residence	Village	24.71±1.97	10.59±2.15	35.30±4.52
	City	26.57±3.18	11.80±1.99	37.38±4.26
	Mann–Whitney significance level	0.013	0.052	0.043
Income adequacy	Yes	27.84±2.99	11.86±2.01	39.24±4.36
	No	24.51±3.12	10.73±2.09	35.70±4.12
	Mann–Whitney significance level	0.047	0.025	0.032
Family history of cervical cancer	Yes	26.81±1.77	11.49±2.35	38.30±4.52
	No	23.67±2.18	11.70±2.99	35.38±4.26
	Mann–Whitney significance level	0.036	0.039	0.032
History of physical illness in teenagers	Yes	26.91±2.81	11.25±2.14	38.16±4.50
	No	24.57±3.17	10.81±2.01	35.38±4.28
	Mann–Whitney significance level	0.083	0.051	0.031
Family history of genital warts	Yes	27.58±3.15	10.73±2.06	38.31±4.25
	No	24.61±2.14	10.78±2.99	35.39±4.33
	Mann–Whitney significance level	0.070	0.049	0.041

Table 4: Investigating the correlation of knowledge and attitude variables

Variable	Mean±standard deviation	R	P	n
Average knowledge score	23.98±3.22	0.296	0.001	407
Average attitude score	10.04±1.84			407

information, billboards, and advertisements. Second, these people, due to the place where they live and the structure of their surrounding environment, feel more afraid in raising their children and try harder to keep their children healthy. During a study on parents of adolescents aged 9–18 years in China in 2023 in 23 provinces of the country, Hong Xie H *et al.* 2023^[34] found that the place of residence has a direct and significant relationship with the level of parental awareness of the HPV vaccine. Babi and colleagues conducted a study in Kazakhstan with the aim of measuring the knowledge and attitude of mothers toward the HPV vaccine and its related factors. The results of this study showed that, in general, the level of knowledge and attitude about HPV vaccination was low. Place of residence, family income, number of children, and self-vaccination refusal were related to mothers' level of knowledge and attitude toward HPV vaccine. These are in line with the current study. However, the gender of the children was not a significant determinant for the knowledge and attitude score in this study. The reason for the discrepancy between this result and the result of the current study on the relationship with the gender of the child can be due to the existing culture in the society.^[35-37]

Limitations and suggestions

This study was only conducted on mothers with teenage girls or boys aged 11–16 years, while conducting this study on the fathers of these teenagers or other age groups could have different results. For this purpose, it is recommended that future studies be conducted on a wider range of people and also in a comparative manner between fathers and mothers.

Conclusion

The results of this study indicate that the acceptance of vaccination by mothers can be related to various factors. Therefore, it is expected that by knowing the factors related to the acceptance rate of mothers, we design support programs in line with increasing the acceptance of mothers to carry out adolescent vaccinations.

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Conflicts of interest

There are no conflicts of interest.

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