Parent HPV Vaccine Perspectives and the Likelihood of HPV Vaccination of Adolescent Girls

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Abstract
The study is descriptive research aimed at identifying parents’ knowledge of HPV vaccination of their children, acceptance of the vaccination, and factors influencing the acceptance. In terms of results, in knowledge about cervical cancer and HPV vaccine, a significant difference was found between mothers and fathers with the former gaining the better score. Regarding hindrance to vaccination, mothers picked ‘worries over the effectiveness and side effects of the vaccine’ as the biggest barrier in this study and fathers ‘no knowledge’ about HPV vaccine. Fathers garnered significantly lower scores than mothers in ‘HPV vaccination rate,’ ‘HPV vaccinate rate of daughters,’ and ‘knowledge of cervical cancer and HPV vaccine’. All these results considered together suggest that education of not only mothers but also fathers is badly required to raise the HPV vaccination rate of middle and high school students who are at the best age to be vaccinated. Also in order to raise Korea’s HPV vaccination rate, which is much lower than those of advanced countries, vaccination subsidies and diverse government policy efforts, such as government-led education and promotional programmes, are required.

Keywords: adolescent, papillomavirus, parents, uterine cervical neoplasms, vaccination

Introduction
Cervical cancer is the second most common cancer in women [1], and women who smoke or start having sex young, or those infected with HIV or HPV, can develop cervical cancer. In particular, infection with human papilloma virus (HPV) is the main cause of the disease [1, 2]; but the problem is that HIV is passed on through sexual intercourse primarily. HPV affects not only women but also men [3], though men rarely show symptoms despite being infected with the virus [4]. This indicates that sexually active persons are at risk of being infected with HPV throughout their lifetime [5]. Fortunately, unlike other cancers, cervical cancer can be prevented thanks to the development of HPV vaccine—that is, vaccination against HPV is highly effective in preventing cervical cancer [6]. In addition, though infected with HPV, HPV vaccination can prevent the infection from developing into cervical cancer since the vaccination leads to a high level of immunity [7]. In addition, based on the fact that HPV is passed on through intercourse, the most effective vaccination time is being recommended [8]. In Korea, the Korean Society of Gynaecologic Oncology states that the age best for vaccination is 15 to 17, and recommends catch-up vaccination for women aged between 18 and 26 [9]. However, HPV vaccination rates of Korean teenagers and college students are very low: 12.9 per cent for female middle school students [10]; 2.2 per cent for female high school students [11]; and 26.5 per cent for female college students [12]. As described above, few people are being vaccinated against HPV despite the importance of HPV vaccination in preventing cervical cancer. In addition, it is reported that people have low knowledge of HPV and vaccination [13–15]. In particular, knowledge of HPV is highly significant since being knowledgeable makes people more willing to be involved in preventive activities and increases their acceptance of vaccination, leading to a high rate of vaccination [16, 17]. Results of recent studies conducted in Korea show that parents are highly interested in having their children vaccinated against HPV, though the latter are themselves less willing [18–20]. Those results indicate that parents’ knowledge and their acceptance of HPV vaccination are more important than anything in increasing the HPV vaccination rate of their children. HPV is related to penile cancer, anal cancer, oral cancer, and pharynx cancer in men as well as cervical cancer in women, rendering HPV a critical health issue for both men and women [3]. Against this background, efforts should be made to make people aware that HPV is an important health issue for both men and women, departing from the practice of focusing on the risk of HPV as a women only issue. In doing so, what should come first is the study of the level of knowledge of HPV and HPV vaccine, acceptance of HPV vaccination, and the degree of vaccination intention of parents who have teenage daughters. In Korea, there was a study on mothers’ knowledge of HPV vaccine and acceptance of HPV vaccination [21] and another on related factors [22]. Studies that recruit fathers as study subjects are scarce, however. This study is to investigate knowledge of cervical cancer and HPV vaccine, acceptance of the vaccination, and the factors influencing the acceptance among mothers and fathers with teenage daughters. In addition, the study is to provide base data for the development of HPV prevention programmes, so eventually contributing to raising HPV vaccination rates not only in teenagers but also in parents.
Study Method

A. Study Design

The study is descriptive research aiming at identifying parents’ knowledge of HPV vaccination of their children, acceptance of the vaccination, and factors influencing the acceptance.

B. Study Subjects and Data Collection

The study has recruited as study subjects parents who have daughters attending middle and high schools in three districts of D metropolitan city. In choosing study subjects, researchers reviewed the feasibility of the study execution and used a technique of convenience selection; the study was carried out from August 10 to October 10, 2013. This study went through the investigation process of institute life research and the institutional review board (IRB) of this university (IRB No.: 13–26). Before the study began, the researchers got permissions from those in charge in each organization, distributed instructions and letters of consent to prospective study subjects, explained to them the purpose of the study, the items to be investigated and the confidentiality obligation, and accepted as the actual study subjects those who agreed to participate in the survey voluntarily and gave their letters of consent. A total of 268 copies of a questionnaire distributed to the participating parents—260 copies, excluding eight incomplete copies—were used for the final analysis. The number of samples required for this study was a total of 17,286 per group when G*Power 3.1.7 was used to set significance level at .05, statistical power at .90, and t-test medium effect size at .50. Therefore, the sample size of this study can be considered appropriate.

C. Study Tool

i. Knowledge of Cervical Cancer

The tool developed by Jo [23] and supplemented by Kim and Choi [24] was used to assess knowledge of cervical cancer. This tool consists of ten questions, including causes and symptoms of cervical cancer, and Pap smear and its results. With a correct answer getting 1 point and a wrong answer and “don’t know” getting 0 (zero) points, a higher score is interpreted as higher knowledge of cervical cancer. The Kuder Richardson coefficient of reliability (K-R 20) in the preceding study [25] was .87 and the corresponding figure in this study was .72.

ii. Knowledge of HPV Vaccine

For the measurement of knowledge of the HPV vaccine, the HIV knowledge measurement tool developed by Kim and Ahn [25] and supplemented by this author was used. This tool consists of 16 questions, including the relationship between HPV and cervical cancer, the range of HPV symptoms, the latent period, the relationship between prognosis and immunity, affected age, infection route, examination and diagnosis, and prevention and treatment. With a correct answer given 1 point and a wrong answer and “don’t know” given 0 (zero) points, a higher score is interpreted as higher knowledge of cervical cancer. The Kuder Richardson coefficient of reliability (K-R 20) in the preceding study [25] was .87 and the corresponding figure in this study was .72.

D. Data Analysis

Using SPSS 21, all data were analysed in a two-tailed test at the significance level of α=.05. Frequency and percentages were used to analyse general characteristics of study participants, parent acceptance (whether their daughters are vaccinated or not, whether to have their daughters vaccinated or not), and influencing factors (factors leading to vaccination, factors hindering vaccination, factors leading to having vaccination intention and factors hindering vaccination intention). A T-test was conducted to compare knowledge of mothers and fathers about cervical cancer and HPV vaccine.

Study Results

A. Parents’ Knowledge of Cervical Cancer and HPV Vaccine

In knowledge about cervical cancer, a significant difference (t=10.935, p<.001) was found between mothers and fathers, with the former getting a total score (full mark is ten points) of 6.75 points (67.5 in percentile score) and the latter 3.68 points (36.8 in percentile score).

In knowledge of HPV vaccine, a significant difference (t=13.607, p<.001) was found between mothers and fathers with the former getting a total score (full mark is 16 points) of 6.85 points (42.8 in percentile score) and the latter 1.38 points (8.6 in percentile score).

The scores in this study were lower than the 78 points (percentile score) in the preceding study [25] that measured knowledge of mothers using the same tool. The score in mothers’ knowledge of HPV vaccine is higher than 24.2 points (percentile score) of the preceding study [18], but is still lower than 64.5 points (percentile score) of another preceding study [10]. The scores fathers obtained in the knowledge of cervical cancer and HPV vaccine are found to be much lower than those of mothers in this study. The scores of fathers in this study are also lower than the score fathers younger than 40 obtained in the preceding study (61.6 points in percentile score).
Table 1: Parents’ Knowledge of Cervical Cancer & HPV Vaccine (N=260)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mother (n=130)</th>
<th>Father (n=130)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of cervical cancer</td>
<td>6.75±1.95</td>
<td>5.68±2.56</td>
<td>-10.935</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Knowledge of HPV vaccine</td>
<td>6.85±3.67</td>
<td>1.38±2.75</td>
<td>-13.607</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

B. Acceptance of HPV Vaccination of Daughters (whether their daughters are vaccinated or not, whether there is intention to have their daughters vaccinated or not) and Influencing Factors (factors leading to vaccination, factors hindering vaccination, factors leading to having vaccination intention and factors hindering vaccination intention)

Of the mothers who chose ‘vaccinated’ (10%) on whether their daughters are vaccinated, the largest percentage (46.2%) picked ‘acquisition of knowledge’ when further asked what factor made them decide to get their daughters vaccinated, which is followed by vaccination recommendation (38.5%), free benefits or discount (15.4%), cost effectiveness (15.4%), and wish of their children (7.7%). Of the mothers who chose ‘not yet vaccinated’ (90%), 60.7% said worries over adverse side effects prevented them from having their daughters vaccinated, followed by high vaccination cost (35.9%), no knowledge (18.8%), taking a long time and complex (7.7%), and refusal by children (6.8%). Of the mothers who chose ‘have intention’ to have their daughters vaccinated (59.8%), the largest percentage (61.4%) picked ‘acquisition of knowledge’ when further asked what factor made them have the intention to have their daughters vaccinated, followed by vaccination recommendation (24.3%), free benefits or discount (24.3%), cost effectiveness (10.0%), and wish of their children (4.3%). Of the mothers who chose ‘no intention’ to have their daughters vaccinated (40.2%), 76.6 per cent said worries over adverse side effects prevented them from having their daughters vaccinated, followed by no knowledge (25.5%), high vaccination cost (17.0%), taking a long time and complex (2.1%), and refusal by children (2.1%). Of the fathers who chose ‘vaccinated’ (3.1%) on whether their daughters are vaccinated, 50.0 per cent picked ‘vaccination recommendation’ when further asked what factor made them decide to get their daughters vaccinated, while ‘free benefits or discount’, and ‘cost effectiveness’ accounted for 50 per cent each (duplicate answers allowed). Of the fathers who chose ‘not yet vaccinated’ (96.9%), 77.0 per cent said lack of knowledge prevented them from having their daughters vaccinated, followed by worries over adverse side effects (19.8%), high vaccination cost (7.9%), refusal by children (2.4%) and taking a long time and complex (1.6%). Of the fathers who chose ‘have intention’ to have their daughters vaccinated (31.0%), the largest percentage (71.8%) picked ‘acquisition of knowledge’ when further asked what factor made them have the intention to have their daughters vaccinated, which was followed by vaccination recommendation (59.0%), free benefits or discount (10.3%), cost effectiveness (2.6%), and wish of their children (0%). Of the fathers who chose ‘no intention’ to have their daughters vaccinated (69.0%), 75.9 per cent said lack of knowledge prevented them from having their daughters vaccinated, followed by worries over adverse side effects (19.5%), high vaccination cost (4.6%), refusal by children (2.3%), and taking a long time and complex (1.1%).

These results were similar to those in preceding studies [18, 26] in which large numbers of mothers picked acquisition of knowledge, vaccination recommendation, and free benefits or discount as the factors making them decide and have the intention to get their daughters vaccinated. In this study, the share of the mothers who picked ‘worries over adverse side effects’ as the factor that prevented them from having their daughter vaccinated is the largest at 46.7 per cent, while high vaccination cost accounts for the second largest share of 27.6 per cent, which is different from the results of preceding studies [6, 18, 26, 27] in which the unaffordable vaccination cost was cited as the biggest factor hindering vaccination. In previous studies, 19 per cent of mothers with teenage children [18], 16.5 per cent of female Korean adults [6] and 7.2 per cent of female college students [19] have worries over adverse side effects of the HPV vaccine, which is different from this study, which found that 76.6 per cent, the largest share, picked this factor. This result of the study might have been influenced by the new report related to the side effects of the HPV vaccine in Japan [28]. This suggests the necessity of adding adverse side effects of the HPV vaccine to educational or promotional content, instead of putting sole emphasis on the importance of the vaccination itself. In the study, ‘no knowledge’ took the top spot, followed by ‘worries over side effects’, in causing fathers to avoid having their daughters vaccinated or having the intention. Just as preceding studies [18, 20] stressed the importance of knowledge and acceptance of vaccination among parents in increasing the HPV vaccination rate of their children, the results of this study have once again confirmed the significance of educating fathers as well as mothers about HPV vaccination.

Table 2: Acceptance of HPV Vaccination of Daughters (whether their daughters are vaccinated or not), and Influencing Factors (factors leading to vaccination and factors hindering vaccination) (N=260)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Factors Leading to Vaccination</th>
<th>Vaccination Recommendation</th>
<th>Acquisition of Knowledge</th>
<th>Free Benefits/Discount</th>
<th>Wish of Children</th>
<th>Cost Effectiveness</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccination of Daughter</td>
<td>Vaccinated</td>
<td>-</td>
<td>13 (10.0)</td>
<td>4 (3.1)</td>
<td>117 (90.0)</td>
<td>126 (96.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Yet Vaccinated</td>
<td></td>
<td>117 (90.0)</td>
<td>2 (0.0)</td>
<td>117 (90.0)</td>
<td>126 (96.9)</td>
<td></td>
<td>0.00</td>
</tr>
<tr>
<td>Vaccination of Daughter</td>
<td>Vaccinated</td>
<td>Factors</td>
<td>5 (38.5)</td>
<td>2 (50.0)</td>
<td>6 (46.2)</td>
<td>2 (15.4)</td>
<td>2 (15.4)</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Not Yet Vaccinated</td>
<td></td>
<td>117 (90.0)</td>
<td>2 (0.0)</td>
<td>126 (96.9)</td>
<td>1 (1.0)</td>
<td>2 (15.4)</td>
<td>1.00</td>
</tr>
<tr>
<td>Vaccination of Daughter</td>
<td>Vaccinated</td>
<td>Factors</td>
<td>5 (38.5)</td>
<td>2 (50.0)</td>
<td>6 (46.2)</td>
<td>2 (15.4)</td>
<td>2 (15.4)</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Not Yet Vaccinated</td>
<td></td>
<td>117 (90.0)</td>
<td>2 (0.0)</td>
<td>126 (96.9)</td>
<td>1 (1.0)</td>
<td>2 (15.4)</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Duplicate answers allowed*
Table 3: Acceptance of HPV Vaccination of Daughters (whether to have intention to have their daughters vaccinated) and Influencing Factors (factors leading to having intention and factors hindering vaccination intention) (N=260)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Factor</th>
<th>Mothers (n=130)</th>
<th>Fathers (n=130)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention to have</td>
<td>Have Intention</td>
<td>Vaccination Rate</td>
<td>77 (59.8)</td>
<td>39 (31.0)</td>
</tr>
<tr>
<td>Daughter</td>
<td>No Intention</td>
<td></td>
<td>47 (40.2)</td>
<td>87 (69.0)</td>
</tr>
<tr>
<td>Vaccinated</td>
<td></td>
<td>Vaccination Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have Intention</td>
<td>Factors Leading to Having Intention</td>
<td>17 (24.3)</td>
<td>23 (59.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vaccination Recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acquisition of Knowledge</td>
<td>43 (61.4)</td>
<td>28 (71.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Free Benefits Discount</td>
<td>17 (24.3)</td>
<td>4 (10.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wish of Children</td>
<td>3 (4.3)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cost Effectiveness</td>
<td>7 (10.0)</td>
<td>1 (2.6)</td>
</tr>
<tr>
<td></td>
<td>No Intention</td>
<td>Factors Hindering Vaccination Intention</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Cost</td>
<td>8 (17.0)</td>
<td>4 (4.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Knowledge</td>
<td>12 (25.5)</td>
<td>66 (75.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Taking a Long Time and Complex</td>
<td>1 (2.1)</td>
<td>1 (1.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refusal by Children</td>
<td>1 (2.1)</td>
<td>2 (2.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worries over Side Effects</td>
<td>36 (76.6)</td>
<td>17 (19.5)</td>
</tr>
</tbody>
</table>

*Duplicate answers allowed*

**Conclusion**

This study was conducted to identify parents’ knowledge of the HPV vaccine, their acceptance of HPV vaccination of their children and factors influencing the vaccination, and, based on the study results, to provide base data for education and promotional programmes to raise HPV vaccination rates. In preceding studies, which mobilized mothers as study subjects, ‘mass media’ and ‘hospital’ took the top spots as the channel through which mothers heard of the HPV vaccine. Asked who influences HPV vaccination of their daughters the most, the largest percentage of them said ‘parents’, but the vaccination rate of their daughters was low. Regardless barriers to vaccination of their children, high vaccination cost took the top spot. This study has produced similar results in such items as the channel through which parents heard of the HPV vaccine; the person that has a decisive influence on vaccination; and the HPV vaccination rate of their children. Regarding hindrance to vaccination, however, mothers picked ‘worries over the effectiveness and side effects of the vaccine’ as the biggest barrier and fathers ‘no knowledge’ about the HPV vaccine in this study. Fathers garnered lower scores than mothers in ‘HPV vaccination rate’, ‘HPV vaccine rate of daughters’, and ‘knowledge of cervical cancer and HPV vaccine’.

This indicates that we need to actively utilize mass media and hospitals to carry out educational and promotional programmes in order to raise the HPV vaccination rate of children. In addition, educational content should include information about the adverse side effects of the HPV vaccine to assuage parents’ anxiety. Education about cervical cancer and HPV should be conducted for fathers who have less knowledge of the disease and the virus compared to mothers.

It is said that being knowledgeable is highly related to high vaccination rates, so educational and promotional programmes designed for parents will increase their willingness to have their children vaccinated, eventually increasing the HPV vaccination rate of teenage children [29].

All these results considered together suggest that education of not only mothers but also fathers is badly required to raise the HPV vaccination rate of middle and high school students who are at the best age to be vaccinated. More than anything, the education should provide detailed information about the causes and symptoms of cervical cancer, HPV infection routes, and effects and adverse side effects of the HPV vaccine, as well as advertising the safety of the HPV vaccine. In addition, in order to raise Korea’s HPV vaccination rate, which is much lower than those of advanced countries, vaccination subsidies and diverse government policy efforts, such as government-led education and promotional programmes, are required.

Lastly, this study is significant since it recruited as study subjects both mothers and fathers of teenage daughters who are at the best age to be vaccinated against HPV amidst a lack of studies investigating Korean adult men with regard to their knowledge of the HPV vaccine, their acceptance of HPV vaccination and the factors influencing that acceptance.

**References**

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