HPV Vaccination: Attitude and Knowledge among German Gynecologists

HPV-Impfung: Einstellung und Wissensstand unter Gynäkologen in Deutschland

Abstract

Purpose: In order to achieve a higher vaccination rate, education on HPV as well as options for prophylaxis performed by doctors is of great importance. One opportunity to increase the protection against HPV would be vaccinating boys. This study evaluated attitude and knowledge among German gynecologists regarding HPV vaccination, especially in boys.

Material and Methods: A questionnaire with 42 questions about demographics, attitude and knowledge about HPV and HPV vaccination was sent to members of the German Society for Gynecology and Obstetrics (DGGG).

Results: 998 out of 6567 addressed gynecologists participated. Knowledge about HPV, associated diseases and possible HPV vaccines was high among participants. The attitude towards vaccination in boys as well as girls was positive. Only 8.2% refused to vaccinate their sons whereas 2.2% refused to do this for their daughters. However, only few gynecologists vaccinated their daughters and sons against HPV. Main reason for girls was an age outside of vaccination guidelines; for boys it was the lack of cost coverage.

Conclusion: The willingness of gynecologists to perform HPV vaccination in boys is as high as for girls. However, sons of gynecologists are only rarely vaccinated against HPV. Main reason is the lack of cost coverage. Vaccinating boys could decrease the disease burden in males, as well as protect women by interrupting ways of transmission. Since the main argument against vaccination of boys is only of financial nature, the necessity of a vaccination recommendation for boys needs to be re-evaluated taking into account the cost-reduced 2-dose vaccination scheme.

Zusammenfassung


Methoden: Ein Fragebogen mit 42 Fragen zu demografischen Daten sowie Haltung und Wissen über HPV und die HPV-Impfung wurde an Mitglieder der Deutschen Gesellschaft für Gynäkologie und Geburtshilfe (DGGG) versendet.


were designed according to similar literature already published. A few questions was used. A self-designed questionnaire containing 42 multiple-choice questions was created in the program SPSS, version 22 (SPSS Inc., Chicago, IL, USA). The questionnaire was divided into three sections. The first section containing 11 questions surveyed demographic data of the participants (age, gender, nationality, smoking status, education, working experience). The second section containing 16 questions focused on the attitude of the participants towards vaccination (own vaccination status, reasons against vaccination) in general and vaccination against HPV for girls and boys in particular. The third section containing 15 questions was designed as a quiz about HPV and the HPV vaccination in order to evaluate the level of knowledge of the participants concerning these topics (relevant HPV types, HPV-related diseases, risk factors for HPV-related diseases, incidence and prevalence of HPV infection in females and males, details about specific vaccinations).

Process of data collection
The survey was sent to members of the German Society for Obstetrics and Gynecology (DGGG) as an online questionnaire. The DGGG supported the survey by creating the electronic version of the questionnaire and sending the link for the inquiry via their mailing list to all members. The participants were informed that the survey was part of a scientific study. Participation in the inquiry was anonymous and voluntary. The inquiry was open for participation between November 2015 and February 2016. One reminder was sent out after 1.5 months. Participation was possible only once due to IP address recognition.

Statistics
An entry mask for data collection and evaluation of the returned questionnaires was created in the program SPSS, version 22 (SPSS Inc., Chicago, IL, USA).

Results
Demographics
A total of 998 out of 6567 addressed physicians (15.2%) agreed to participate in the study and returned the questionnaire. 768 of the participants were female (77.4%) and 224 were male (22.6%). The median age was 41 (23–83) years. 733 (76.8%) have children and 929 (93.6%) have a German nationality. 73 (7.4%) are active and 105 (10.6%) were former smokers. The majority of 918 respondents (92.8%) attended university in Germany. 35 (3.5%) participants absolved the major part of their residency in private practice, 214 (21.6%) in hospitals with basic care, 245 (24.7%) in hospitals with specialized care and 478 (48.2%) in hospitals with maximum care. 208 (21.0%) are not yet board-certified, whereas 265 (26.7%) have been board-certified for 0–5 years, 208 (21.0%) for 5–10 years, 183 (18.5%) for 10–20 years and 127 (12.8) for more than 20 years. The majority of 86.2% indicate a positive attitude towards scientific trials whereas only 9.4% have a negative attitude towards it. An overview of demographic data is given in Table 1.

Attitude towards vaccinations including HPV
The majority of 953 (98.2%) respondents agree with the STIKO (Ständige Impfkommission = permanent vaccination commission)
Kolben TM et al. HPV Vaccination: Attitude that their daughter who did not or would not vaccinate their daughters argumented and 398 (43.1%) do not have a daughter. 144 (80.9%) of those 17 (1.8%) Cervarix, 321 (34.8%) did not vaccinate their daughters against HPV, 198 (21.5%) used Gardasil, 75 (8.2%) would not vaccinate their own son against HPV, 21 (2.2%) would decline to vaccinate their own daughter, 808 (83.2%) have not received HPV vaccination for themselves. 21 (2.2%) would decline to vaccinate their own daughter, whereas 75 (8.2%) would not vaccinate their own son against HPV. Of all three vaccines, most participants would use Gardasil, followed by Gardasil-9 and finally Cervarix to vaccinate their children, regardless of their sex. When asked if they actually did vaccinate their daughters against HPV, 198 (21.5%) used Gardasil, 17 (1.8%) Cervarix, 321 (34.8%) did not vaccinate their daughters and 398 (43.1%) do not have a daughter. 144 (80.9%) of those who did not or would not vaccinate their daughters argued that their daughter’s age does not lie within the official guideline. Three (1.7%) indicated negative experiences with vaccination as their reason and 3 (1.7%) were afraid of side effects. 489 (52.9%) did not vaccinate their sons, 375 (40.6%) do not have a son and 58 (6.3%) performed HPV vaccination of their son using Gardasil. Of those who answered that they did not vaccinate their sons, the following reasons were named: age not within the recommendations (63.9%), no cost coverage (23.5%), HPV-associated diseases mainly affect women (4.2%), side effects (2.5%). An overview is given in Table 2.

Participants’ level of information on HPV

When asked what diseases were possibly caused by HPV the following answers were given: 922 (99.9%) cervical cancer, 842 (91.2%) penile cancer, 835 (90.5%) anal cancer, 806 (87.3%) oropharyngeal cancer, 727 (78.8%) vaginal cancer, 782 (84.7%) vulvar cancer, 378 (41.0%) rectal cancer, 355 (38.5%) esophageal cancer, and 901 (97.6%) condylomata acuminata. HPV 6 and 11 were correctly indicated as cause for condylomata acuminata by 734 (80.9%), and 753 (83.0%), respectively. HPV 16 and 18 were named by 171 (18.9%) and 173 (19.1%), respectively, to cause anogenital warts. When asked about possible risk factors associated with HPV-related diseases, more than 85% correctly identified smoking, promiscuity, immunosuppression and HIV infection. Fewer participants named a low educational level (64%) and usage of oral contraceptives (43%) as associated factors. 177 (19.5%) of respondents believed that after a genital infection with HPV 16 or 18, there is an effective antibody titer either for 10–20 years or even lifelong, whereas 163 (17.9%) indicated that they do not know an answer to this question. When asked the same question regarding immunity after vaccination instead of infection, 729 (80.1%) correctly answered that there is an immunity for at least 10–20 years. Most participants knew that Gardasil is targeted against HPV types 6 (85.0%), 11 (86.7%), 16 (96.9%) and 18 (98.5%). When asked which types Cervarix is targeted at, about 93% indicated HPV types 16 or 18, but also type 6 (12.2%) and type 11 (13.6%) were named. The same question was asked for Gardasil-9 and only 23.1% respectively 35.5% chose the wrong answers HPV type 13 or 35. 65.1% do not know that Gardasil-9 is EMA-approved for females. 316 (37.6%) believe that Cervarix is EMA-approved in males, whereas only 162 (19.3%) know that Gardasil-9 is EMA-approved in males. 218 (25.9%) believe that neither Cervarix nor Gardasil nor Gardasil-9 is EMA-approved. Almost all participants knew that there is a recommendation by the German permanent vaccination commission for Cervarix and Gardasil in girls, whereas 154 (17.8%) believe that it is the same for Gardasil-9. 618 (73.0%) knew that there is no such recommendation for boys. 403 (46.0%) respectively 405 (46.2%) indicate that the STIKO-recommendation is for girls aged 9–14 and 9–17 years. The remaining 68 (7.8%) believe that 12–17 years is the correct answer to this question. An overview is given in Table 3.

Discussion

In this study, we aimed to determine the level of knowledge on HPV infection and vaccination as well as the attitude of gynecologists towards HPV vaccination. Knowledge regarding HPV-associated diseases was high among the participants. Most respondents correctly identified all HPV-associated diseases, even if they were non-gynecological like oropharyngeal cancer (87.3%). Although almost 20% believed that

Table 1 Demographic data.

<table>
<thead>
<tr>
<th></th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (years)</td>
<td>43 (100.0)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>768 (77.4)</td>
</tr>
<tr>
<td>Male</td>
<td>224 (22.6)</td>
</tr>
<tr>
<td>n.a.</td>
<td>6</td>
</tr>
<tr>
<td>Nationality</td>
<td></td>
</tr>
<tr>
<td>German</td>
<td>929 (93.6)</td>
</tr>
<tr>
<td>Other</td>
<td>71 (7.2)</td>
</tr>
<tr>
<td>n.a.</td>
<td>5</td>
</tr>
<tr>
<td>Smoker</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>73 (7.4)</td>
</tr>
<tr>
<td>No</td>
<td>813 (82.0)</td>
</tr>
<tr>
<td>Not anymore</td>
<td>105 (10.6)</td>
</tr>
<tr>
<td>n.a.</td>
<td>7</td>
</tr>
<tr>
<td>Place of study</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>918 (92.8)</td>
</tr>
<tr>
<td>Other</td>
<td>96 (9.7)</td>
</tr>
<tr>
<td>n.a.</td>
<td>9</td>
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<tr>
<td>Highest academic title</td>
<td></td>
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<tr>
<td>None</td>
<td>275 (27.7)</td>
</tr>
<tr>
<td>Dipl. med.</td>
<td>28 (2.8)</td>
</tr>
<tr>
<td>Dr. med.</td>
<td>627 (63.3)</td>
</tr>
<tr>
<td>PD Dr. med.</td>
<td>24 (2.4)</td>
</tr>
<tr>
<td>Prof. Dr. med.</td>
<td>37 (3.7)</td>
</tr>
<tr>
<td>n.a.</td>
<td>7</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
</tr>
<tr>
<td>Private practice</td>
<td>35 (3.5)</td>
</tr>
<tr>
<td>Hospital with basic care</td>
<td>214 (21.6)</td>
</tr>
<tr>
<td>Hospital with specialized care</td>
<td>245 (24.7)</td>
</tr>
<tr>
<td>Hospital with maximum care</td>
<td>478 (48.2)</td>
</tr>
<tr>
<td>Other</td>
<td>20 (2.0)</td>
</tr>
<tr>
<td>n.a.</td>
<td>6</td>
</tr>
<tr>
<td>Years passed since board examination</td>
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</tr>
<tr>
<td>0–5 years</td>
<td>265 (26.7)</td>
</tr>
<tr>
<td>5–10 years</td>
<td>208 (21.0)</td>
</tr>
<tr>
<td>10–20 years</td>
<td>183 (18.5)</td>
</tr>
<tr>
<td>&gt; 20 years</td>
<td>127 (12.8)</td>
</tr>
<tr>
<td>Not yet board-certified</td>
<td>208 (21.0)</td>
</tr>
<tr>
<td>n.a.</td>
<td>7</td>
</tr>
<tr>
<td>Children</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>221 (23.2)</td>
</tr>
<tr>
<td>No</td>
<td>733 (76.8)</td>
</tr>
<tr>
<td>n.a.</td>
<td>44</td>
</tr>
</tbody>
</table>

n.a. = no answer.
Table 2  Attitude towards vaccinations (incl. HPV).

<table>
<thead>
<tr>
<th>Total n (%)</th>
</tr>
</thead>
</table>
| My willingness to participate in clinical trials as a doctor is:  
| Absolutely positive | 371 (37.4)  
| Rather positive | 485 (48.8)  
| Rather negative | 88 (8.9)  
| Absolutely negative | 5 (0.5)  
| I don’t know | 44 (4.4)  
| n. a. | 5  
| My attitude towards the STIKO-recommendations is:  
| Absolutely positive | 718 (74.0)  
| Rather positive | 235 (24.2)  
| Rather negative | 12 (1.2)  
| Absolutely negative | 1 (0.1)  
| I don’t know | 4 (0.4)  
| n. a. | 28  
| I am vaccinated according to the STIKO-recommendations (HPV excluded):  
| Yes, completely | 809 (83.6)  
| Yes, partially | 123 (12.7)  
| I don’t know | 23 (2.4)  
| No, because ... | 13 (1.3)  
| n. a. | 30  
| I have received a HPV vaccination for myself:  
| No | 808 (83.2)  
| Yes, with Gardasil | 135 (13.9)  
| Yes, with Cervarix | 24 (2.5)  
| Yes, with Gardasil-9 | 1 (0.1)  
| Yes, with: other | 3 (0.3)  
| n. a. | 27  
| I counsel female patients on HPV vaccination:  
| Yes | 850 (87.8)  
| No | 118 (12.2)  
| n. a. | 30  
| I perform HPV vaccination in female patients (multiple answers possible):  
| Yes, with Gardasil | 384 (39.6)  
| Yes, with Cervarix | 38 (3.9)  
| Yes, with Cervarix and Gardasil | 173 (17.9)  
| Yes, with Gardasil-9 | 22 (2.3)  
| No, because: there is no demand | 131 (13.5)  
| No, because: fear of side effects | 1 (0.1)  
| No, because ... (free text) | 291 (30.0)  
| n. a. | 29  
| I counsel male patients on HPV vaccination:  
| Yes | 151 (15.7)  
| No | 809 (84.3)  
| n. a. | 38  
| I perform HPV vaccination in male patients (multiple answers possible):  
| Yes, with Gardasil | 31 (3.2)  
| Yes, with Gardasil-9 | 7 (0.7)  
| No, because: there is no demand | 139 (14.4)  
| No, because: vaccinating women is sufficient | 2 (0.2)  
| No, because: health insurance does not bear the costs | 62 (6.4)  
| No, because: HPV vaccination for men is medically not advisable | 3 (0.3)  
| No, because: fear of side effects from medical perspective | 0 (0.0)  
| No, because: gynecologist | 734 (76.2)  
| No, because ... | 97 (10.1)  
| n. a. | 35  

Table 2  Attitude towards vaccinations (incl. HPV). (Continued)

<table>
<thead>
<tr>
<th>Total n (%)</th>
</tr>
</thead>
</table>
| I would agree to vaccinate my own children according to the STIKO-recommendations (HPV excluded):  
| Yes, completely | 861 (91.6)  
| Yes, partially | 63 (6.7)  
| I don’t know | 4 (0.4)  
| No, because ... (free text) | 12 (1.3)  
| n. a. | 58  
| At least one of my daughters is vaccinated against HPV (multiple answers possible):  
| I don’t have a daughter | 398 (43.1)  
| No | 321 (34.8)  
| Yes, with Gardasil | 198 (21.5)  
| Yes, with Cervarix | 17 (1.8)  
| Yes, with: other | 27 (2.9)  
| n. a. | 75  
| I would agree to vaccinate my own daughter/s against HPV (multiple answers possible):  
| No | 21 (2.2)  
| Yes, with Gardasil | 597 (63.9)  
| Yes, with Cervarix | 159 (17.0)  
| Yes, with Gardasil-9 | 435 (46.6)  
| Yes, with: other | 18 (1.9)  
| n. a. | 64  
| Reasons not to vaccinate my own daughter/s against HPV (multiple answers possible):  
| Negative experience with vaccinations | 3 (1.7)  
| Fear of side effects | 3 (1.7)  
| Belief in ineffectiveness of vaccinations in general | 0 (0.0)  
| Belief in ineffectiveness of HPV vaccination | 0 (0.0)  
| Daughter’s age does not lie within the official guidelines | 144 (80.9)  
| Religiously motivated | 0 (0.0)  
| Other | 33 (18.5)  
| n. a. | 820  
| At least one of my sons is vaccinated against HPV (multiple answers possible):  
| I don’t have a son | 375 (40.6)  
| No | 489 (52.9)  
| Yes, with Gardasil | 58 (6.3)  
| Yes, with: other | 10 (1.1)  
| n. a. | 74  
| I would agree to vaccinate my own son/s against HPV (multiple answers possible):  
| No | 75 (8.2)  
| Yes, with Gardasil | 538 (59.0)  
| Yes, with Gardasil-9 | 445 (48.8)  
| Yes, with: other | 22 (2.4)  
| n. a. | 86  
| Reasons not to vaccinate my own son/s against HPV (multiple answers possible):  
| Negative experience with vaccinations | 1 (0.4)  
| Fear of side effects | 7 (2.5)  
| Belief in ineffectiveness of vaccinations in general | 0 (0.0)  
| Belief in ineffectiveness of HPV vaccination | 2 (0.7)  
| Son’s age does not lie within the official guidelines | 182 (63.9)  
| Vaccinating girls is a sufficient protection for men | 3 (1.1)  
| HPV-associated diseases affect mainly women | 12 (4.2)  
| No health benefit for boys | 5 (1.8)  
| Missing assumption of costs | 67 (23.5)  
| Religiously motivated | 0 (0.0)  
| Other | 53 (18.6)  
| n. a. | 713  

n. a. = no answer; STIKO: Ständige Impfkommission (permanent vaccination commission of Germany).
Table 3  Participants’ level of information on HPV. (Continued)

<table>
<thead>
<tr>
<th>HPV Vaccination for girls is recommended by the STIKO ...</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between the age of 9–14</td>
<td>403 (46.0)</td>
</tr>
<tr>
<td>Between the age of 9–17</td>
<td>405 (46.2)</td>
</tr>
<tr>
<td>Between the age of 12–17</td>
<td>68 (7.8)</td>
</tr>
<tr>
<td>n. a.</td>
<td>122</td>
</tr>
</tbody>
</table>

EMA: European Medicines Agency; STIKO: Ständige Impfkommission (Permanent vaccination commission of Germany); n. a. = no answer.
genital warts were caused by high-risk HPV types 16 and 18, the majority of more than 80% identified types 6 and 11 as the correct answers. Typical risk factors like smoking, promiscuity, immunosuppression and HIV infection were named correctly by more than 85%, but only 43% knew that a low educational level is a risk factor, too. Still, compared to similar surveys, the level of information regarding HPV infection is high [23,24]. A study in the United Kingdom showed that up to 55% of respondents had a lack of knowledge about the etiology of cervical cancer [25]. One of the reasons for this discrepancy could be that most surveys were performed among pediatricians and family care doctors in addition to gynecologists instead of gynecologists alone. Compared to these two subspecialties, gynecologists are more often confronted with the consequences of HPV infection, such as genital warts or cervical cancer. In contrast, vaccinations are typically performed at the office of pediatricians or general practitioners, so the question arose, how much knowledge gynecologists do have on HPV vaccination. On the one hand most participants knew which HPV types are targeted by Gardasil and Cer- varix, and even Gardasil-9, which was EMA-approved only in 2015, is already well-known. On the other hand, more than a third of the participants were not informed properly about an effective antibody titer after HPV infection; almost 20% of the respondents wrongly believe that there is an effective antibody titer either for 10–20 years or even lifelong after an HPV infection with types 16 or 18, whereas additional 18% indicate that they do not know the answer. In fact, around 50% of women do not develop an antibody response after natural infection and in those who do, the extent and the duration of protection against HPV infection is still unknown [26,27]. These findings could indicate that there is no effective natural immunity after HPV infection and emphasize the necessity of HPV vaccination even for women who already experienced HPV infection. In awareness of the known low HPV vaccination coverage rate in girls, vaccinating boys could represent an additional option to optimize protection for women, too. Vaccinating boys is effective and could also help to reduce HPV-associated disease burden in males [28]. Interestingly, only 8.2% of respondents refused to vaccinate their sons against HPV compared to 2.2% in daughters. However, 52.9 vs. 34.8% did not vaccinate their sons respectively their daughters. The main reason besides the fact that the age of their children did not fit into the age recommendations, was with 23.5% the missing cost coverage for males. Additionally, 42% think that HPV vaccination in males is not necessary since associated diseases mainly affect women. Presently, in Germany there is a STIKO vaccination recommendation regarding HPV for girls aged 9–14 years only. Men are excluded from this recommendation and therefore vaccination is not covered by general insurance. In contrast, Australia, Canada, Austria and the USA already have guidelines that recommend vaccination in boys, too [29–32]. The decision if HPV vaccination should also be recommended for boys needs a thorough cost-benefit analysis. Previous modeling studies have shown that in case of high vaccination coverage of girls, sufficient protection for boys would be generated, too [33]. However, coverage in Germany is low which could partially be attributed to the lack of school-based vaccination programs. In order to achieve higher protection for girls, vaccinating boys could represent a useful supplement that would also help decrease the disease burden in men, too. Since recent analyses showed that depending on the age of patients also two doses of vaccine provide sufficient immune response, re-calculation regarding cost
efficacy for HPV vaccination in men needs to be done. Still, irrespective of a possible cost coverage of HPV vaccination by health insurances, counseling also male patients about the disease as well as possible ways of protection is crucial to further decrease HPV-associated disease burden. Especially young people gather their information about health-related topics oftentimes through the internet [17,18]. Unfortunately, electronic media is frequently not monitored for correctness and sometimes fails to provide reliable and transparent information [34]. One way to overcome this difficulty could be the introduction of certain standards that might help readers to identify correct and reliable sources. In addition, the discussion about health topics with their primary physician is irreplaceable. However, gynecologists only rarely counsel male patients during their daily work-routine. Besides general practitioners mostly pediatricians get in touch with young men and get the chance to discuss the issue of HPV vaccination with them. Therefore, a similar survey performed among pediatricians would be highly valuable.

Conclusion ▼
In conclusion this inquiry demonstrates that gynecologists in Germany are very well informed about HPV and available HPV vaccines. Furthermore, there is a very positive attitude of these specialists towards the vaccination against HPV, even in males. However, sons of gynecologists are only rarely vaccinated against HPV, mainly due to the lack of cost coverage. Vaccinating boys could not only decrease the disease burden in males, but also protect women by interrupting ways of transmission. In light of the fact that vaccination coverage in Germany is low, alternatives to increase protection need to be evaluated. One possible option represents vaccination of males, which is performed already by several countries. This survey showed that the main argument of gynecologists against vaccination of boys is only of financial and not of medical nature. However, the necessity of a vaccination recommendation for boys needs to be re-evaluated taking into account the cost-reduced 2-dose vaccination scheme.

Note ▼
This publication is part of the dissertation of Karin Baltateanu.

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Conflict of Interest ▼
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