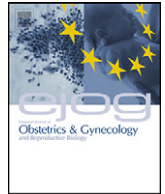




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Change in knowledge of women about cervix cancer, human papilloma virus (HPV) and HPV vaccination due to introduction of HPV vaccines

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ABSTRACT

Objectives: Test knowledge of HPV, cervix cancer awareness and acceptance of HPV vaccination of women now and a year ago.

Study design: Questionnaires were filled out by 305 women visiting four gynaecologists of the Regional Hospital Heilig Hart, Tienen, Belgium during two subsequent weeks. Fisher T or Chi² were used as statistical methods to compare the data with the survey of 381 women exactly one year before.

Results: Knowledge about HPV as a cause of cervix cancer and the presence of a vaccine rose from roughly 50% in 2007 to over 80% in 2008 ($p < 0.0001$). Level of education and having daughters, sons or no children no longer influenced the level of knowledge or willingness to accept the vaccine. Most parents favor the age group 12–16 years as an ideal time for vaccination. In contrast with the 2007 survey, women below 26 years had now acquired almost equivalent knowledge to older women about the virus, cervix cancer and the vaccine, but they were far less likely to accept the vaccine due to its cost, unless it would be reimbursed (OR 4.2 (1.6–11) $p = 0.0055$).

Conclusion: One year after introduction of the first two HPV vaccines, over 75% of women attending an ambulatory gynaecology clinic know HPV causes cervix cancer and that you can get vaccinated against it. Compared with a year earlier, young and lower educated women had dramatically improved their knowledge. However, women below 26 years are less prepared to pay the cost for vaccination if it is not reimbursed.

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1. Introduction

During the last 2 years, two vaccines were marketed to prevent cervical infection with human papilloma virus (HPV) types 16 and 18, one of them also covering HPV 6 and 11. In most countries worldwide, knowledge about HPV, cervix cancer and the benefits of vaccination is low in women in general, but also in patients suffering from dysplasia or cervix cancer, as well as in health care providers and physicians, necessitating intensive campaigns to make vaccination policies successful [1–9]. One year ago, we tested the level of knowledge of Belgian women who could consider the vaccine for themselves and/or their children [10]. Response rates were analyzed according to age, status of being parent of a daughter or son and the level of education. In order to test the

influence of a national awareness campaign launched since the introduction of the vaccines on the level of knowledge in these subgroups, we repeated the same questionnaire in a different sample from the same patient population group.

2. Material and methods

A questionnaire was offered to women presenting for routine outpatient gynaecology and obstetrics clinics at any of the four gynaecologists working at the general hospital H Hart in Tienen, a small town in the center of Belgium. During a period of 2 weeks, from January 15 to 31, 2008, every women presenting for a consultation was asked to fill out a questionnaire while waiting for consultation in the attendance room and to put it in a special sealed box at the physician's consultation room before starting the consultation.

The questionnaire was composed of 17 easy-to-understand questions that required only 5 min to answer, while waiting for the physician in the attendance room. The entire questionnaire and the

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analysis of the answers given during the same period of the year in 2007 were published elsewhere [10].

Like a year ago, the questionnaire was anonymous, and the physician they consulted was responsible to see that every patient put their questionnaire in the box, even if not completed properly or not at all. People who had not yet completed the questionnaire were encouraged to do so, and women that were not intending to participate were asked to hand over the questionnaire after crossing the option “not willing to cooperate”, “not interested” or “no time”. Women who had filled out the first questionnaire a year ago were not permitted to participate again.

Data were analyzed by using χ^2 or Fisher T as appropriate.

3. Results

During the 2 weeks 321 consecutive questionnaires were collected. Of them, 16 (5.0%) were not answered due to the following reasons: “not interested” ($n = 9$), “no time” ($n = 4$), or “not applicable” ($n = 3$). Mean age was 37.5 (sd 11.7) years, 66% had children and 119 of 305 had at least one son (39%), and 126 at least one daughter (41.3%). 1.4% had schooling to a maximal age of 12, 5.5% to the age of 16, and 23.0% finished high school at age 18. After the age of 18, 15% followed technical education, 45% non-university postgraduate school, and 10% had a university degree.

The majority (76% in 2008 vs. 69% in 2007, $p = 0.06$) were informed about the vaccine by the mass media (newspapers, television, radio). While in 2007, 21.5% had never heard of the vaccine, in the present study the corresponding figure was only 2.8% (OR 0.1 (CI 95%, 0.05–0.2), $p < 0.0001$). Young people of 25 years or less were today 5 times less likely to be unaware about the vaccine than a year ago (5.9% vs. 27.1% (OR 0.12 (CI 95%, 0.03–0.6), $p = 0.0002$), and there was no significant difference between the awareness of younger vs. older women in the current group of respondents. An equally low proportion of people with lower or higher education were ignorant about the existence of the vaccine (3% of both groups).

That cervix cancer is caused by a viral infection was correctly responded by 78% of the women, which is significantly higher than the 50.4% of women interrogated in 2007 (OR 4.1 (CI 95%, 2.9–5.8) $p < 0.0001$), and the knowledge that this viral disease is potentially preventable has risen from 41.7% in 2007 to 73.4% now (OR 4.4 (CI 95%, 3.1–6.1), $p < 0.0001$). Women answering they know nothing about the cause of cervix cancer decreased from 46.6% to 16.4% (OR 0.24 (CI 95%, 0.16–0.34) $p < 0.0001$). There was no significant difference between the knowledge of women of the cause of cervix cancer in women with lower education or with higher education, but in both groups the ignorance was only half when compared with 2007 (20.8% vs. 53%, $p < 0.0001$, and 13.9% vs. 38.6%, $p < 0.0001$). Although a higher proportion of women recognized HPV as a virus (51.1% vs. 29.3% in 2007, $p < 0.0001$), 10% still thought it was a cancer, 0.7% a bacterium (vs. 3% in 2007) and 38% still did not know what HPV stands for (vs. 60% in 2007). Although in each age group there was a dramatic improvement in knowledge about the virus as a preventable cause of cervix cancer ($p = 0.003$), there remained a significant trend towards lesser knowledge in young women below the age of 25 (26.5% no knowledge) and women of older age (16% of 25–40-year-olds and 11.5% of 40 plus year-olds) (p trend 0.049).

Two-thirds (67%) of all women would like to be vaccinated provided the vaccine was provided for free, and 28% need more information in order to consider it, vs. respectively 50% ($p < 0.0001$) and 44% ($p < 0.0001$) in 2007. In total 95% of women would be willing to accept the vaccination if it were provided for free. No one answered the vaccine is not necessary and only 5 (1.7%) consider it dangerous. In 2008, like in 2007, 42% would accept the vaccination if the vaccine has to be paid for yourself,

while another 45% (2007)–46% (2008) would await reimbursement to be put into place. Also like in 2007, the price was a problem causing rejection of the vaccination amongst young women below 25 years of age: it was rejected by 31/38 (80%) young women, vs. 132/233 (56%) older women, OR 0.26 (CI 95%, 0.1–0.6) $p = 0.0015$. The same attitude was seen in women without children, 67/101 (66%) rejecting the vaccination vs. 136/237 (53%) of women with children (OR 0.49 (CI 95%, 0.3–0.8) $p = 0.0059$), but not for lower educated women (54% rejection vs. 59% in higher educated). Refusal due to high price is a main reason for declining vaccination amongst young women (8/34, 23.5%), which is significantly more frequent than in older women (14/233, 6%, OR 4.2 (CI 95%, 1.6–11) $p = 0.0055$) and double as high as in the same age group in 2007 (23.5% vs. 10%, p ns). A similar proportion of women with a daughter (73.9%) or a son (69.9%) was willing to give the vaccination to their daughter (should they have one) than women without children (60.8%, p ns), which slightly differs from the situation in 2007 where only 46.3% of childless parents would vaccinate their daughter should they have one ($p = 0.07$). On the assumption of having a son, 32% of women with a daughter or a son answered that they would vaccinate their son, vs. 21% of women without children (p ns).

Half of women (51%) choose to have their daughter vaccinated at the age of 12–16 years of age and another 32% even before that age. There were no differences between age groups, number of children, and level of education, but more women aimed to vaccinate this age group than in 2007 (51% vs. 35%, $p < 0.0001$).

4. Discussion

The knowledge that HPV is the major cause of nearly 100% of all cervix cancers [11] rapidly led to the development of efficient vaccines against the most frequent and aggressive virus strains causing cervix cancer, the HPV genotypes 16 and 18 [12,13].

Exactly a year ago, we performed a questionnaire in a medium size gynaecology practice in a small town in the central part of Belgium, at the moment that the first vaccine was being introduced in the market. In the meantime, a massive awareness campaign raged through the country: professional guidelines were issued, professionals were educated, national folders and television spots dispersed and the government decided to reimburse the vaccine in the age group 12–15 years in Belgium. Recently, 10 months after this study was performed, this age range was extended with the age groups 16–18 years. We were interested to see whether the actions taken had a significant effect on the knowledge of women, and whether they increased the likelihood to accept to be vaccinated.

The demographics of the 305 women interrogated were grossly similar to those of the group of 381 women that were handed over the same questionnaire last year during the same time period of the year, although slightly less of the 2008 respondents were having children than the respondents in 2007 (66% in 2007 vs. 76% in 2007). Care was taken that women did not fill out the questionnaire in both years.

Awareness of the cause of cervix cancer and HPV vaccination is very high and above 78% in this population. Moreover, the knowledge has increased steeply since 2007. Only 2.8% of women in this survey said they had not yet heard about the vaccine, while in 2007 this was still 21.5%. Four out of five women are now aware that cervix cancer is caused by a virus, compared with only half of the respondents in 2007. Furthermore, three-quarters of interrogated women correctly identified it as a virus disease for which preventive measures can be taken, an increase of 35% when compared with 2007. Inversely, the women that claimed to have insufficient knowledge about cervix cancer and HPV decreased from 60% and 47% respectively to 38% and 16%. Fewer women were

aware of what HPV stands for, and only half knew it was a virus. Other surveys interrogating young students also faced the fact that despite high general knowledge some gross misunderstandings remain [14]. These authors found that sexually active young adults are more aware of HPV-related diseases than non-sexually active women of the same age.

Of interest, in 2007, lower educated women had much less knowledge and awareness when compared with higher educated women, but this difference was no longer visible in the present survey. The educational and nationwide campaigns do seem to have a large impact on women with lower education. Not unlikely, the large load of information delivered by the mass media (75% had obtained their information that way) is responsible for that.

Having a daughter did not influence the likelihood of being in favor of vaccination, when compared with either having a son or no children. The majority of all different subgroups (women with daughter, son, or no children, younger or older women, lower or highly educated women) would prefer to vaccinate their daughter at the age of 12–16 years. In Belgium, this age group gets reimbursement for vaccination since October 2007. Subsequent to this decision, a nationwide campaign was launched to make people aware of that decision, resulting in a free-will vaccination coverage of 56% of all 12–15-year-old girls after 6 months (IMS Health survey, April 2008), explaining why more than double of the women in 2007 now prefer this age group for vaccination of their children. As we discussed in our former paper, it also confirms the absence of large-scale opposition against vaccination, as has been encountered in some countries due to religious or other constraints [10].

Of considerable concern is the fact that young women especially seem to decline vaccination due to its cost. Twenty-three percent of women of 25 years or less declined the vaccine due to its price compared with only 10% in 2007. Although the greater lack of awareness and knowledge has dramatically diminished since 2007 in this age group, there still remains a lack of knowledge when compared with older women, suggesting that lack of interest and information may also play an important role. In a recent survey in the Netherlands, similar high general acceptance rates for HPV vaccination were obtained, and young women 'said yes to vaccination' significantly more often than older women [15]. However, it is not clear from their questionnaires if the young women realize the potential cost of full vaccination, especially if they fall outside the age ranges getting full reimbursement. Our study clearly shows that this issue is crucial for this age group and questionnaires about the willingness to accept vaccination should take this information into account. In some families, young people know the budget that parents spent for their free time is limited and risks suffering from the extra expenses needed for the vaccines. Also in Turkey, an acceptance rate of over 95% was achieved for vaccination for both girls and boys in a primarily university educated population, but only on the condition the vaccine would be provided free of cost [16].

So, the threat is real that the age group with the highest risk of acquiring HPV (16–25 years of age) [17,18] would decline the vaccination because of its price. Some insurance organizations organized partial reimbursement for this age group in Belgium, but the actions are incomplete, erratic and not well known to the bulk of these young women, and most likely, also not to their mothers. We hope policy makers will understand their role in eliminating this disease is crucial, and reimbursement of vaccination of women 16–25 would change the vaccination coverage dramatically. Also for these age groups, not only in Western, but even more so in developing countries, the companies manufacturing vaccines should find the courage to look into the possibilities to adapt the price the vaccines can be delivered to certain groups at high risk.

We conclude that the awareness and vaccination campaign following the introduction of HPV vaccines has been very successful in increasing the awareness and knowledge of women about cervix cancer, HPV as the cause of cervix cancer and the prevention of cervix cancer by a HPV vaccine. At the time of this study, girls between 12 and 16 years receive the vaccine for free and are being vaccinated at a high rate, with full consent of the parents. However, even though the full extent of the profit from the vaccination is not yet fully clear in the group of 16–25 years, it is definitely this group that carries the highest risk of acquiring HPV and later consequences of cervix cancer. Still, they are very reluctant to accept vaccination mainly due to the cost. We hope that policy makers and industry take the message.

5. Condensation

Knowledge about cervical cancer and HPV infection improved one year after introduction of HPV vaccines, but young women decline vaccination due its cost.

Conflicts of interest

None.

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