



# Knowledge of actively practising nurses regarding HPV and cervical cancer – a questionnaire study

Wiedza czynnych zawodowo pielęgniarek na temat HPV oraz raka szyjki macicy – badanie ankietowe

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## Abstract

**Introduction and Objective.** Patient education is a crucial element of preventive health care, requiring appropriate knowledge from medical personnel. The human papillomavirus (HPV) poses a global threat, and one of the most effective methods of preventing infection is vaccination against HPV. The aim of this study was to examine the level of knowledge among nurses regarding cervical cancer prevention and HPV vaccinations.

**Materials and Method.** A survey was conducted from January – March 2024 among nurses randomly selected from hospital wards in the Górnośląsko-Zagłębiowska Metropolis in Upper Silesia, Poland. A total of 215 individuals participated in the study, with 200 being eligible for further analysis. The inclusion criteria were active employment as a nurse and consent to participate in the study. The questionnaire contained questions aimed at assessing the knowledge and attitudes of nurses towards the HPV virus and cervix cancer. Data were collected using a self-designed questionnaire and analyzed with Microsoft Excel.

**Results.** The study showed that the majority of nurses were not vaccinated against HPV. Knowledge about HPV vaccination and cervical cancer prevention was insufficient among the participants. However, nurses in the 22–35 age group demonstrated a higher level of knowledge compared to those in the 46–65 age group.

**Conclusions.** Education on cervical cancer prevention and HPV infection prevention is still unsatisfactory, although it is most efficient if introduced already during nursing studies and continuously updated throughout professional working life.

## Key words

nurses, vaccination, Pappilomavirus infection

## Streszczenie

**Wprowadzenie i cel pracy.** Edukowanie pacjenta jest ważnym elementem profilaktyki zdrowotnej. Skuteczne przekazywanie informacji możliwe jest jedynie wtedy, gdy personel medyczny posiada wystarczającą wiedzę z danej dziedziny. Wirus brodawczaka ludzkiego jest poważnym i rozprzestrzeniającym się globalnie zagrożeniem. Metodą zapobiegania infekcji są szczepienia przeciwko HPV (ang. Human Papillomavirus). Celem pracy było zbadanie poziomu wiedzy pielęgniarek z wybranych szpitali na temat profilaktyki raka szyjki macicy oraz szczepień przeciwko wirusowi HPV.

**Materiał i metody.** Od stycznia do marca 2024 roku wśród pielęgniarek pracujących w wybranych losowo szpitalach Górnośląsko-Zagłębiowskiej Metropolii prowadzono badanie ankietowe. Za pomocą kwestionariusza ankiety własnego autorstwa zebrano odpowiedzi 215 pielęgniarek. Następnie uzyskane dane przeanalizowano przy udziale programu Microsoft Excel.

**Wyniki.** W badaniu wykazano, że zdecydowana większość pielęgniarek nie jest zaszczepiona przeciw HPV. W badanej grupie wiedza na temat szczepień przeciwko HPV oraz profilaktyki raka szyjki macicy nie jest wystarczająca. Pielęgniarki z grupy wiekowej 22–35 lat wykazały się wyższym poziomem wiedzy niż te w wieku 46–65 lat.

**Wnioski.** Edukacja na temat profilaktyki raka szyjki macicy i profilaktyki zakażenia wirusem brodawczaka ludzkiego wciąż nie jest wystarczająca. Najlepszy efekt przynosi rozpoczęcie kształcenia w tym kierunku już na etapie studiów, a następnie kontynuowanie go (i aktualizowanie wiedzy) w czasie aktywności zawodowej.

## Słowa kluczowe

pielęgniarki, szczepienia ochronne, zakażenia wywołane przez wirus brodawczaka ludzkiego, Human papillomavirus

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## INTRODUCTION

Nurses make up more than 50% of the medical staff worldwide [1]. Over the years, the caregiving role of the profession has expanded to include education and health promotion among patients [2]. A vaccination recommendation from medical personnel is the primary reason patients decide to get vaccinated [3].

Vaccinations are one of the most important methods of disease prevention worldwide, characterized by high effectiveness and cost-efficiency in public health [4, 5]. In Poland, there is a mandatory vaccination programme that includes vaccinations against tuberculosis, hepatitis B, and tetanus, among others. Every year, over 100 million vaccine doses are administered to children in Poland. In addition to mandatory vaccinations, citizens can opt for additional vaccines, such as those against influenza, COVID-19, or HPV [4, 5].

The national vaccination coverage in Poland for diseases included as obligatory in the Vaccination Schedule allows for the maintenance of herd immunity, but at the county level, it sometimes drops to 85%–89% [6]. This is due to the increasing number of vaccination refusals [7]. The insufficient vaccination rate can be attributed to the growing wave of misinformation. Public opinion is shaped by entrenched beliefs, which are reinforced by the voices of the anti-vaccine movement [5]. Since the COVID-19 pandemic, this movement has gained significant media attention in Poland, negatively affecting the perception of vaccines [8].

The Human Papilloma Virus (HPV) is a small DNA virus belonging to the Papovaviridae family. Nearly 200 types of the virus have been identified, most of which are pathogenic to humans. It is one of the risk factors for genital warts. Types 16 and 18 are considered the most dangerous as they can cause cancers of the cervix, anus, and penis, as well as the oral cavity [3]. In most cases, HPV infection is asymptomatic and resolves spontaneously within two years, but there is a risk of it becoming chronic, which can lead to cancer development. There is no treatment for HPV infection itself, but there are ways to prevent transmission of the virus and development of disease [9]. These include education, early detection of precancerous conditions and early stages of cervical cancer, and their treatment [10]. Vaccinations reduce the risk of cervical cancer and other cancers associated with HPV infection [11].

In Poland, three types of HPV vaccines are registered: bivalent vaccine (HPVv2, Cervarix) and nine-valent vaccine (HPVv9, Gardasil 9). A nationwide free vaccination programme against HPV is available for girls and boys aged 11–13. Also children aged 9–18 who do not qualify for the free vaccinations can receive the subsidized Cervarix vaccine (2vHPV). Adults are eligible for a 50% subsidy on the Gardasil9 vaccine, which is also available for purchase in pharmacies for individuals not covered by the vaccination programme [3].

HPV vaccines have been used worldwide for over 15 years. Australia was a pioneer, introducing universal and free vaccinations for girls in 2007 and expanding the programme to boys six years later. Thanks to consistent vaccination and screening efforts, Australia may become the first country to eliminate cervical cancer as a health issue by 2028 [3].

In Poland, awareness of HPV vaccinations is insufficient. A study conducted in February 2022 found that over 67% of

respondents were unaware of the existence of the vaccine, and more than half were not informed about the diseases associated with HPV [12].

The aim of the study was to assess the knowledge of nurses working in selected hospitals in the Upper Silesian Metropolis regarding cervical cancer prevention and HPV vaccinations.

## MATERIALS AND METHOD

From January 2024 – March 2024, a survey was conducted among nurses working in randomly selected hospital wards. The study was conveyed in wards such as emergency medicine, general surgery, internal medicine, paediatrics, obstetrics and gynaecology, cardiology, ophthalmology, operating theatres, neurology, urology, intensive care medicine, trauma and orthopaedic surgery, and medical clinics. A total of 215 individuals participated in the study, with 200 being eligible for further analysis; 15 surveys were rejected due to incorrectly completed questionnaires. The inclusion criteria were active employment as a nurse, consent to participate in the study, and correctly completed questionnaire. Hospitals were selected based on this number; however, not all responded to the submitted application or agreed to participate in the study.

A custom-designed anonymous questionnaire was used which consisted of 23 single- and multiple-choice questions, divided into 3 sections: demographic data (4 questions), information on HPV and cervical cancer prevention (8 questions), assessment of nurses' knowledge about the Human Papilloma Virus (8 questions), and 3 additional questions.

The nurses' knowledge of the HPV virus and the vaccine was assessed using a 10-point knowledge test. A correct answer to a single-choice question earned 1 point, while multiple-choice questions could score up to 2 points. Collected data was analyzed using Microsoft Excel. Statistical analysis was performed using Cramér's V coefficient and the chi-square test.

## RESULTS

The study included 200 women. The largest group, 43% (N=86), was aged 46–65, 36.5% (N=73) were aged 22–35, 18% (N=36) were aged 36–45, and the smallest group, 2.5% (N=5), was over the age of 66. The average age of the participants was 42.6 ( $\pm$  11.8). Table 1 presents the characteristics of the study group in terms of education, place of residence, and the hospital ward where the respondents work.

Table 2 presents data on HPV vaccination, the frequency of gynaecological consultations among respondents, and the timing of their last Pap smear. A small group of respondents, only 19.5% (N=39), had been vaccinated against HPV. Less than half, 45% (N=90), reported having a gynaecological visit once a year, and 56.5% (N=113) had undergone a Pap smear within the last 12 months.

The primary reason all vaccinated respondents (N=39) decided to get the vaccine was fear of developing cancer. Of those, 59% (N=23) were encouraged by various public campaigns, 23% (N=9) decided to vaccinate on the recommendation of a doctor, and 13% (N=5) were influenced by their families.

**Table 1.** Characteristics of the Study Group (N=200)

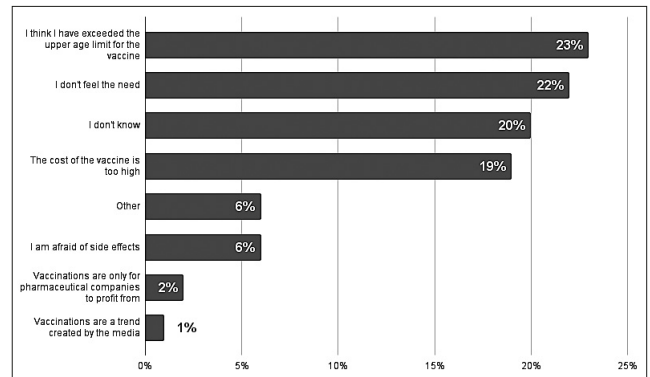
| Variable                       | N          | %          |
|--------------------------------|------------|------------|
| Education                      |            |            |
| Secondary                      | 61         | 30.5       |
| Bachelor's Degree              | 55         | 27.5       |
| Master's Degree                | 79         | 39.5       |
| Postgraduate Studies           | 5          | 2.5        |
| <b>Total:</b>                  | <b>200</b> | <b>100</b> |
| Place of residence             |            |            |
| City                           | 178        | 89         |
| Village                        | 22         | 11         |
| <b>Total</b>                   | <b>200</b> | <b>100</b> |
| Department                     |            |            |
| Emergency Department           | 4          | 2          |
| General Surgery                | 37         | 18.5       |
| Internal Medicine Department   | 53         | 26.5       |
| Paediatrics                    | 16         | 8          |
| Gynaecology and Obstetrics     | 29         | 14.5       |
| Cardiology                     | 15         | 7.5        |
| Ophthalmology                  | 7          | 3.5        |
| Operating Theatre              | 15         | 7.5        |
| Neurology                      | 10         | 5          |
| Urology                        | 7          | 3.5        |
| Trauma and Orthopaedic Surgery | 3          | 1.5        |
| Intensive Care Unit            | 3          | 1.5        |
| Outpatient Clinic              | 1          | 0.5        |
| <b>Total</b>                   | <b>200</b> | <b>100</b> |

**Table 2.** Administered vaccinations, frequency of gynaecologist visits, and regularity of performing cervical cytology in the context of cervical cancer prevention among respondents (N=200)

| Variable                                | N          | %          |
|-----------------------------------------|------------|------------|
| Administration of the HPV vaccine:      |            |            |
| Yes                                     | 39         | 19.5       |
| No                                      | 156        | 78         |
| I didn't know there was such a vaccine. | 0          | 0          |
| I don't remember                        | 5          | 2.5        |
| <b>Total</b>                            | <b>200</b> | <b>100</b> |
| Frequency of gynaecologist visits       |            |            |
| More frequently than once a year        | 38         | 19         |
| Once a year                             | 90         | 45         |
| Every 2 years                           | 59         | 29.5       |
| I don't see a gynaecologist             | 13         | 6.5        |
| <b>Total</b>                            | <b>200</b> | <b>100</b> |
| Date of last cervical cytology          |            |            |
| Within the last 12 months               | 113        | 56.5       |
| Not earlier than 3 years ago            | 49         | 24.5       |
| More than 3 years ago                   | 31         | 15.5       |
| I have never had a cytology             | 7          | 3.5        |
| I don't understand                      | 0          | 0          |
| <b>Total</b>                            | <b>200</b> | <b>100</b> |

Only 18% of respondents (N=36), representing 20.5% of unvaccinated women, expressed a desire to be vaccinated in the future. Figure 1 shows the reasons for not receiving the HPV vaccine among unvaccinated individuals.

The largest group of vaccinated nurses were respondents aged 22–35, with 42% (N=31) of them receiving the vaccine.

**Figure 1.** Knowledge of nurses in various age groups regarding cervical cancer prevention and HPV vaccinations (N=200)

In contrast, none of the respondents over the age of 66 had been vaccinated.

Most respondents, 56.5% (N=113), reported that they recommended the HPV vaccine to their patients. In contrast, 28.5% (N=57) stated that they had never recommended the vaccine, and 15% (N=30) were unsure if they had done so.

A total of 63.5% (N=127) of respondents had never undergone an HPV test. Of those who had, 16.5% (N=33) had undergone it once, 6.5% (N=13) several times, and 6.5% (N=13) were unaware of the existence of such a test. Additionally, 7% (N=14) could not recall whether or not they had had the test.

Among those who had undergone HPV testing, 34% (N=18) did so due to an abnormal Pap smear result, 26.4% (N=14) during pregnancy, 9.4% (N=5) for preventive reasons, and 3.8% (N=2) cited other reasons. Additionally, 26.4% (N=14) did not know the reason for their HPV test.

In assessing their own knowledge, 10.5% (N=21) of respondents rated their understanding as very good. Nearly half, 49% (N=98), rated it as good, 37% (N=74) as average, and 3.5% (N=7) as poor.

The majority, 55% (N=110), obtained their knowledge about the Human Papilloma Virus and vaccinations from gynaecologists. Other sources included social media (45%, N=90), scientific articles and government websites (37.5%, N=75), books or newspapers (35.5%, N=71), television (14.5%, N=29), midwives (13%, N=26), other doctors (11.5%, N=23), acquaintances (10%, N=20), and the Internet (2%, N=4).

The last 8 questions of the questionnaire aimed to assess knowledge about the Human Papillomavirus and the HPV vaccine. Table 3 presents a comparison of the knowledge levels among different age groups.

**Table 3.** Level of knowledge among nurses in different age groups regarding cervical cancer prevention and HPV vaccinations (N=200)

| Age group | Average score | Evaluation   |
|-----------|---------------|--------------|
| 22–35     | 5.2           | Average      |
| 36–45     | 3.8           | Insufficient |
| 46–65     | 3.8           | Insufficient |
| 66+       | 3.6           | Insufficient |

Most nurses, 71.5% (N=143), correctly indicated that both women and men can be vaccinated against the Human Papilloma Virus. However, 21.5% (N=43) incorrectly believed that the vaccine is only for women, and 7% (N=14)

admitted to not knowing the correct answer. Only 39% (N=78) of participants knew that there is no upper age limit for receiving the vaccine. In contrast, 32.5% (N=65) provided the incorrect answer, claiming that such a limit exists, while 28.5% (N=57) responded with 'don't know'. A clear majority, 77.5% (N=155), of respondents correctly indicated that an HPV infection is not equivalent to developing cancer, while 9.5% (N=19) incorrectly believed that an HPV infection is the same as developing cancer.

Among the respondents, 71% (N=142) correctly answered that completing a full vaccination cycle does not eliminate the need for regular cervical cytology. However, 17% (N=34) of respondents believed that vaccination allows for less frequent Pap smears. Additionally, 8% (N=16) admitted they did not know the answer, and 3% (N=6) thought that vaccination completely eliminates the need for cervical cytology.

66% (N=132) of nurses indicated that condoms only reduce the risk of HPV infection, while 12.5% (N=25) believed that condoms provide complete protection against exposure. Additionally, 17% (N=34) thought that condoms do not protect against HPV at all. In a 2015, study by H. Patel, 87.2% of the surveyed nurses knew that condoms reduce the risk of HPV infection, which is a higher result compared to the 66% found in the study of respondent nurses [21].

Most respondents, 90.5% (N=181), were aware that the HPV vaccine protects against cancers of the female reproductive organs and penile cancers. However, only 27% (N=54) knew that HPV can also cause cancers of the oral cavity, and just 22% (N=44) were aware that the virus can lead to sexually transmitted diseases, such as genital warts. Additionally,

13.5% (N=27) incorrectly attributed the ability to cause colorectal cancer to HPV. Only 29% (N=58) of respondents correctly indicated that individuals who are already infected with the virus can still receive the vaccine. Conversely, 37% (N=74) gave the incorrect answer, suggesting that those infected cannot receive the vaccine, while 34% (N=68) admitted they did not know the answer to this question.

The association between the age group of the nurses and their knowledge about who is eligible for HPV vaccination was examined. Due to the violation of the assumption of minimum expected values, the results showed a statistically significant relationship between the variables analyzed (Tab. 4). It was found that nurses in the 22–35 age group correctly answered the question more frequently than statistically expected, indicating better education compared to nurses in the 46–65 age group, who less frequently provided the correct answer. The Cramér's V value indicates a moderate strength of the observed effect.

A correlation was verified between the age group of nurses and their responses regarding the timing of their last cervical cytology. The assumption of minimum expected values was violated. Based on the results presented in Table 5, a statistically significant relationship was identified between the analyzed variables. According to the adjusted standardized residuals, it was found that participants belonging to the age groups 22–35 and 36–45 had their last cytological examination within the past 12 months. On the other hand, membership in the age group of 46 years and above was associated with having the examination more than 3 years ago. The Cramér's V value indicated a moderate strength of the observed effect.

**Table 4.** Correlation between age group and knowledge about the HPV vaccination.

| Age group | HPV vaccination applies to |               |              | Level of significance p | Cramér's V |
|-----------|----------------------------|---------------|--------------|-------------------------|------------|
|           | only women                 | women and men | I don't know |                         |            |
| 22–35     | n                          | 9             | 63           | 0.0011                  | 0.235      |
|           | % of the total             | 4.5%          | 31.5%        |                         |            |
| 36–45     | N                          | 6             | 28           |                         |            |
|           | % of the total             | 3.0%          | 14.0%        |                         |            |
| 46–65     | N                          | 25            | 50           |                         |            |
|           | % of the total             | 12.5%         | 25.0%        |                         |            |
| 66+       | N                          | 3             | 2            |                         |            |
|           | % of the total             | 1.5%          | 1.0%         |                         |            |

X<sup>2</sup> = 22,145

**DISCUSSION**

According to worldwide WHO data from 2023, the vaccination rate among girls was 27%, indicating an increase compared to the 20% vaccination rate in 2022 [13]. A similar trend can be observed when comparing the results of own research with those from a study conducted by E. Kostrzewa-Zabłocka in 2013. Research by the authors of the current study found that 19.5% of surveyed nurses had been vaccinated against human papillomavirus, whereas the Kostrzewa-Zabłocka study reported only a 2% vaccination rate [14].

Among the unvaccinated individuals in the survey group, 18% expressed a willingness to receive the HPV vaccine in the future. This is a higher percentage compared to the 2% reported by T. Cheung in a study conducted among nurses in Hong Kong in 2017 [15].

**Table 5.** Correlation between the age group of nurses and their performance of cervical cytology

| Age group | Performance of cervical cytology |                              |                       |                                     | Level of significance p | Cramér's V |
|-----------|----------------------------------|------------------------------|-----------------------|-------------------------------------|-------------------------|------------|
|           | Last 12 months                   | Not earlier than 3 years ago | More than 3 years ago | I have not had a cytology performed |                         |            |
| 22–35     | N                                | 48                           | 19                    | 4                                   | 0.000002                | 0.267      |
|           | % of the total                   | 24.0%                        | 9.5%                  | 2.0%                                |                         |            |
| 36–45     | N                                | 23                           | 8                     | 2                                   |                         |            |
|           | % of the total                   | 11.5%                        | 4.0%                  | 1.0%                                |                         |            |
| 46–65     | N                                | 42                           | 22                    | 20                                  |                         |            |
|           | % of the total                   | 21.0%                        | 11.0%                 | 10.0%                               |                         |            |
| 66+       | N                                | 0                            | 0                     | 5                                   |                         |            |
|           | % of the total                   | 0.0%                         | 0.0%                  | 2.5%                                |                         |            |

Due to the widespread use of false information, countries such as Denmark, the United Kingdom, and Japan have seen a decline in acceptance of the HPV vaccination program [3]. This issue is particularly pronounced in Japan, where universal vaccination for youth was introduced in 2010, leading to a vaccination rate of 70%. However, misinformation caused a crisis 3 years later, resulting in the withdrawal of vaccination recommendations and a dramatic drop in the vaccination rate to 1% [16]. It was only in 2021 that recommendations were reinstated, thanks to the significant impact of educational campaigns that corrected the false information [3].

Among the surveyed nurses, the effects of misinformation about vaccinations were also observed. Extreme opinions emerged, suggesting that vaccines serve only pharmaceutical companies to make profits or that they are a trend created by the media. Additionally, it was noted that nurses did not receive the HPV vaccine due to the fear of side-effects which, in fact, are rare and mainly affect the injection site [17]. Fear of adverse effects is the most common reason for medical personnel not getting vaccinated, as highlighted in the study by A. Nitsch-Osuch and L. Brydak regarding flu vaccination among healthcare staff [18].

In the current study, as well as in the study by A. Nitsch-Osuch and L. Brydak on flu vaccinations among healthcare staff (with vaccination rates ranging from 33%–93%), the most common reason for getting vaccinated was the fear of falling ill [18].

HPV vaccination does not exempt individuals from the need for regular screening tests, a fact recognized by 71% of the surveyed nurses [3]. A higher result was found among Medical University of Warsaw students in U. Błazucka's study, where 94% of the respondents knew that preventative measures should not be neglected after vaccination [19]. In contrast, research by A. Stefanek and P. Durka conducted among women from across Poland showed that 89.8% of the respondents are aware that screening tests should not be discontinued after vaccination [20]. In U. Błazucka's study among nursing students at the Medical University of Warsaw, 93% of the surveyed women knew that HPV can be transmitted through sexual contact, which is a higher result compared to the 80.5% found in the current study [19]. A similar result, 94.7%, was reported in H. Patel's study conducted in England [21]. A significantly higher percentage of nurses, compared to the U. Błazucka study – 47%, are aware of the possibility of transmitting HPV to a child during childbirth [19].

The primary goal of the National Programme for Active Cervical Cancer Prevention is to conduct regular cytological examinations every 3 years [17]. Among the surveyed nurses, 81% had undergone such an examination within the last 36 months. This result is higher than that found in 2013 study by E. Kostrzewa-Zabłocka's, where 44% had been tested within the past 3 years [14]. In contrast, A. Stefanek and P. Durka's study revealed that 65.24% of women from across Poland had undergone a cytological examination within the last 3 years [20].

The knowledge of nurses regarding HPV infection prevention is insufficient and often based on non-scientific and unreliable sources and beliefs. The positive aspect is that most of them regularly visit a gynaecologist and undergo cytological examinations.

## CONCLUSIONS

1. A significant majority of nurses participating in the study were not vaccinated against HPV.
2. Knowledge within the studied group regarding HPV vaccinations and cervical cancer prevention is insufficient.
3. The research findings indicate that younger nurses have better knowledge about HPV vaccinations, emphasizing the need for education on cervical cancer prevention and HPV infection prevention to be introduced during academic studies, and continuously updated throughout their professional careers.

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