THE GLOBAL PREVALENCE OF HUMAN PAPILLOMAVIRUS CAUSING CERVICAL CANCER: A LITERATURE REVIEW

A.R. SATANOVA1, D.R. KAILARDOVA1, E.K. KUKUBASSOV1, R.O. BOLATBEKOVA1, D.B. KALDYBEKOV1, O.O. BERTLEUOV1

1 «Kazakh Institute of Oncology and Radiology» JSC, Almaty, the Republic of Kazakhstan

ABSTRACT

Relevance: Human papillomavirus (HPV) is the most common sexually transmitted virus in sexually active men and women. The direct and proven relationship between HPV infection and cervical cancer development HPV global epidemiological studies to ensure prevention in areas with high HPV prevalence.

The study aimed to analyze the global age-related HPV prevalence over the past decade.

Methods: Sources for the literature review were obtained from the PUBMED and MEDLINE databases for the past ten years by the keywords “human papillomavirus,” “prevalence,” and “cervical cancer.” The review included randomized trials, systematic reviews, and meta-analyses.

Results: HPV rates were the highest in Africa (24%), Eastern Europe (21.4%), and Latin America (16.1%). The most common HPV types worldwide were HPV 16 (3.2%), 18 (1.4%), 52 (0.9%), 31 (0.8%), and 58 (0.7%).

HPV prevalence in the Republic of Kazakhstan is underexplored since epidemiological studies were conducted only in some regions. HPV high-risk types 16 and 18 prevail in the Republic of Kazakhstan.

Conclusion: The analysis of the global HPV epidemiology revealed its high prevalence in low- and middle-income countries. HPV’s higher prevalence in young women justifies the need to improve and implement HPV vaccination programs.

Keywords: human papillomavirus (HPV), HPV prevalence, cervical cancer.
carriers of oncogenic high-risk HPV types (HR-HPV) such as HPV16 and HPV18 [8].

Two meta-analyses showed high rates of HPV infection in young women and a decrease in HPV prevalence in older women. An analysis of the prevalence of HPV types worldwide showed that HR-HPV16 and HR-HPV18 are the most common [8, 11]. The highest majority of HPV16 is observed in Germany (77%), while the lowest is reported in Japan (33-39%). HPV18 is the second most common type/ The overall rate of HPV18 worldwide is 8% [12-14].

HPV52, HPV31, HPV58, HPV39, HPV56, and HPV51 are also among the most common HPV types after HPV16 and HPV18. HPV31 is common in Europe and Latin America [14-16].

There are differences in the prevalence of HPV types across regions. In Europe, HPV33 is a common type of HPV, while in Asia, HPV52 and HPV58 are the dominant types. In South Africa, the following prevalence of HPV types is reported: HPV16 – 11.7%, HPV58 – 10.3%, HPV51 – 8.9%, HPV66 – 8.6%, and HPV18 – 7.6% [17, 18].

In a study by L. Bruni et al. of 215,568 women with normal cytology infected with HPV, the most common HPV types were 16, 18, 52, 31, 58, 39, 51, and 56, which are the most oncogenic [19].

In the analysis of low-risk HPV, HPV6 is the most common type accounting for 0.85% worldwide and across countries, 0.2% in Asia, 0.9% in Latin America, and 2.0% in North America [20-22].

There are differences in the prevalence of HPV infection among women with normal cytology across regions. In Europe, HPV33 is a common type of HPV, while in Asia, HPV52 and HPV58 are the dominant types. In South Africa, the following prevalence of HPV types is reported: HPV16 – 11.7%, HPV58 – 10.3%, HPV51 – 8.9%, HPV66 – 8.6%, and HPV18 – 7.6% [17, 18].

In a study by L. Bruni et al. of 215,568 women with normal cytology infected with HPV, the most common HPV types were 16, 18, 52, 31, 58, 39, 51, and 56, which are the most oncogenic [19].

In the analysis of low-risk HPV, HPV6 is the most common type accounting for 0.85% worldwide and across countries, 0.2% in Asia, 0.9% in Latin America, and 2.0% in North America [20-22].

According to a meta-analysis by L. Bruni et al., the prevalence of HPV infection among women with normal cytology is about 11-12%, with the highest prevalence in Sub-Saharan Africa (24%), Eastern Europe (21%) and Latin America (16%) [8]. In countries of Western, Southern, Northern, and Central Europe, the prevalence of HPV is low (<30%), but it is high in Eastern Europe (21.4%) [23-25]. In Africa, HPV prevalence is high in many regions except for North Africa, where it is 9.2%. This data shows a higher level of HPV infection in developing countries (42.2%) compared to developed countries (22.6%) [26].
Several studies in different regions present information on HPV prevalence in the Republic of Kazakhstan. Y. Bekmukhambetov et al. conducted a retrospective analysis of data from laboratories that conducted PCR for HPV in 4 regional centers of the Republic of Kazakhstan: Aktobe, Mangystau, Atyrau, and West Kazakhstan. The analysis showed that the total number of HPV-positive patients is 26.0% (286: N=1098). The prevailing types of HPV were as follows: HPV16 (10.7%), HPV39 (5.83%), and HPV51 (5.27%). HPV prevalence was high in the 16-29-year-old age group (62.4%) and tended to decrease with age [27].

In another study by L. Niyazmetova et al., in Nur-Sultan, from December 2015 to April 2016, 61 out of 140 women were HPV-positive. HR-HPV16 (18.4%) and HR-HPV18 (9.22%) were the most common types [28].

R.O. Bolatbekova conducted the most recent study of HPV prevalence in the Republic of Kazakhstan as part of the thesis research in 4 regions of Kazakhstan with the participation of 2,408 women. The study was conducted in 39 antenatal clinics in Nur-Sultan, Almaty, and Aktobe, as well as in the East Kazakhstan region. The analysis found 681 (28.3%) HPV-positive women. HR-HPV45 and HR-HPV18 prevailed in the examined samples (521 out of 2,408 cases; 21.6%, CI-95%: 20.0-23.3%). Aktobe was the region with the highest HR-HPV prevalence, with an infection rate of 28.6% (95% CI: 3.2-31.1%), and the East Kazakhstan region was the region with the lowest indicator, with an infection rate of 25.2% (95% CI: 21.7-28.7%) (p<0.05) [29].

Discussion: 630,000 cases of cancer are registered in the world annually. 4.5% of all cancer cases are associated with HPV, which makes it a major public health problem. HPV-associated cancers account for 570,000 cases (8.6%) in women and 60,000 cases (0.8%) in men. The vast majority (83.0%) of HPV-associated cancers are CC (528,000 cases), followed by neoplasms of the head and neck (37,500 cases), anus (35,000 cases), penis (13,000 cases), vagina (12,000 cases), and vulva (8,500 cases) [30].

HPV16 is by far the most common type of all HPV-associated cancer. However, there is a wide variation in the proportion of HPV-associated cancers across regions, sex, and age groups.

Conclusion: The results of extensive multicenter studies and meta-analyses revealed patterns of HPV spread depending on age and showed high rates of HPV infection in young women and a decrease in HPV prevalence in older women. HPV prevalence also increased in low- and middle-income countries, highlighting the need for HPV vaccination programs.

References:


Актуальность: Вирус папилломы человека (ВПЧ) является наиболее распространенным вирусом, передающимся половым путем у сексуально активных мужчин и женщин. Учитывая важную и доказанную связь между развитием рака шейки матки и инфицированием ВПЧ, необходимы проведение исследований по эпидемиологии ВПЧ в мире с целью осуществления профилактических мероприятий в областях с высокими показателями ВПЧ.

Цель исследования – проанализировать эпидемиологическую ситуацию по распространенности ВПЧ в мире за последние 10 лет с учетом возрастных показателей.

Методы: проведен литературный обзор по базам данных PUBMED, MEDLINE по материалам за последние 10 лет по ключевым словам: «вирус папилломы человека (ВПЧ)», «распространенность ВПЧ», «рак шейки матки (РШМ)». В обзор включены результаты рандомизированных исследований, систематических обзоров и мета-анализов.

Результаты: Странами с самыми высокими показателями инфицирования ВПЧ являлись страны Африки (24%), Восточной Европы (21,4%) и Латинской Америки (16,1%). Наиболее распространенными типами ВПЧ во всем мире были: ВПЧ-16 (3,2%), ВПЧ-18 (1,4%), ВПЧ-52 (0,9%), ВПЧ-31 (0,8%) и ВПЧ-58 (0,7%). Распространенность ВПЧ в РК не до конца изучена, только в нескольких регионах были проведены эпидемиологические исследования по ВПЧ с высокими показателями инфицирования.

Заключение: Результаты анализа эпидемиологической ситуации по ВПЧ в мире выявили высокую распространенность ВПЧ в странах с низким и средним уровнем дохода. Высокие показатели инфицированности ВПЧ в молодых женщинах свидетельствуют о необходимости совершенствования и внедрения программ вакцинации от ВПЧ.

Ключевые слова: вирус папилломы человека (ВПЧ), распространенность ВПЧ, рак шейки матки (РШМ).

Authors' data: A.R. Satanova – surgeon, Kazakh Institute of Oncology & Radiology JSC, Abay Ave. 91, Almaaty 05000, the Republic of Kazakhstan, tel: +77013264533, e-mail: alima.satanova@mail.ru, ID ORCID: https://orcid.org/0000-0001-7863-9291; Kaidarova D.R. – PhD, Head of the Department of Oncogynecology, Almaaty Oncology Center, Almaaty, the Republic of Kazakhstan, tel: +77012221293, e-mail: r.bolatbekova@gmail.ru, ID ORCID: https://orcid.org/0000-0004-5476-9432; Bertleuov O.O. – surgeon, Kazakh Institute of Oncology & Radiology JSC, Almaaty, the Republic of Kazakhstan, tel: +77016661712, e-mail: dr.bertleuov@mail.ru, ID ORCID: https://orcid.org/0000-0002-6842-0269; Kaldybekov D.B. – surgeon, Kazakh Institute of Oncology & Radiology JSC, Almaaty, the Republic of Kazakhstan, tel: +77021020588, e-mail: dauren_bolatuly@mail.ru, ID ORCID: https://orcid.org/0000-0002-5373-7167.

Authors declare no conflict of interest.

Transparent of the study: Authors take full responsibility for the content of this manuscript.

Conflict of interest: Authors declare no conflict of interest.

Financing: This study was financed under the NTP BR11065390 (TF of the Ministry of Health of the Republic of Kazakhstan).

This study was financed under the NTP BR11065390 (TF of the Ministry of Health of the Republic of Kazakhstan).