

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

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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.

Introduction: Cervical cancer (CC) is one of the most common types of malignant neoplasms in women; it ranks first among cancers of the female reproductive system.

It has been established that the cause of CC is the chronic persistence of the human papillomavirus (HPV) in the body. HPV causes up to 4.5% of all new cases of cervical cancer in the world [1]. HPV was first described in 1933 by Shope and Hurst [2], but Harald Zur Hausen was the first to demonstrate the presence of the HPV genome in the tissues of cervical tumors, which gave grounds to establish a link between HPV and CC [3–5]. Since this discovery, numerous studies have found a direct link between HPV and CC. Studies on the prevalence of HPV over the past decade have shown that HPV is the most common sexually transmitted virus, and by the age of 45, more than 80% of sexually active men and women are infected with at least one type of HPV [6–7].

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

Materials and methods: A literature review was carried out using PUBMED and MEDLINE based on materials published over the past ten years. When searching for data, the following keywords were used: "Human papillomavirus (HPV)," "HPV prevalence," and

"Cervical cancer (CC)." This review is mainly based on data from randomized trials, systematic reviews, and meta-analyses of the epidemiological situation of HPV countrywide. The study includes 30 references that meet the selection criteria for keywords and publication date.

Results: The meta-analysis by L. Bruni et al. included 1,016,719 women with normal cytology. According to this meta-analysis, the global prevalence of HPV is 11.7% (95 CI, 11.6–11.7%). Regions with the highest rates: Africa (24%), Eastern Europe (21.4%), and Latin America (16.1%). The most common HPV types worldwide include HPV16 (3.2%), HPV18 (1.4%), HPV52 (0.9%), HPV31 (0.8%), and HPV 58 (0.7%) [8].

De Sanjosé et al., between 1995 and 2005, HPV infection was 10.4% among 157,879 women with normal cervical cytology (95% CI 10.2–10.7) [9].

HPV prevalence analysis across regions: Africa 22.1% (20.9–23.4), Central America 20.4% (19.3–21.4), North America 11.3% (10.6–12.1), Europe 8.1% (7.8–8.4), and Asia 8.0% (7.5–8.4) [8, 9]. Despite the high prevalence of HPV in young women, the second peak in the countries of America and Europe was observed in women aged 45 and older [10].

According to a meta-analysis, about 291 million women worldwide are infected with HPV, while 32% are

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, 2.0% in North America, 0.9% in Latin America, and 0.2% in Asia [20 -22].

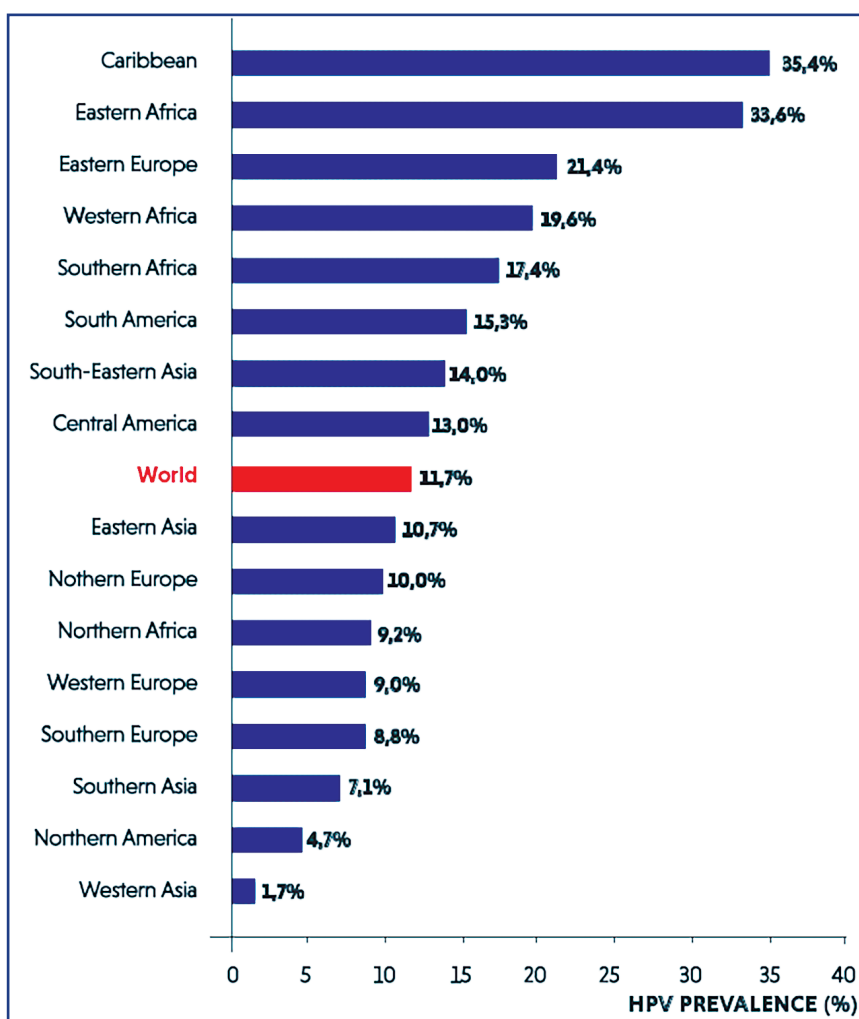


Figure 1 – HPV prevalence among women with normal cytology of the cervix worldwide (data as of June 30, 2015) [8]

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].

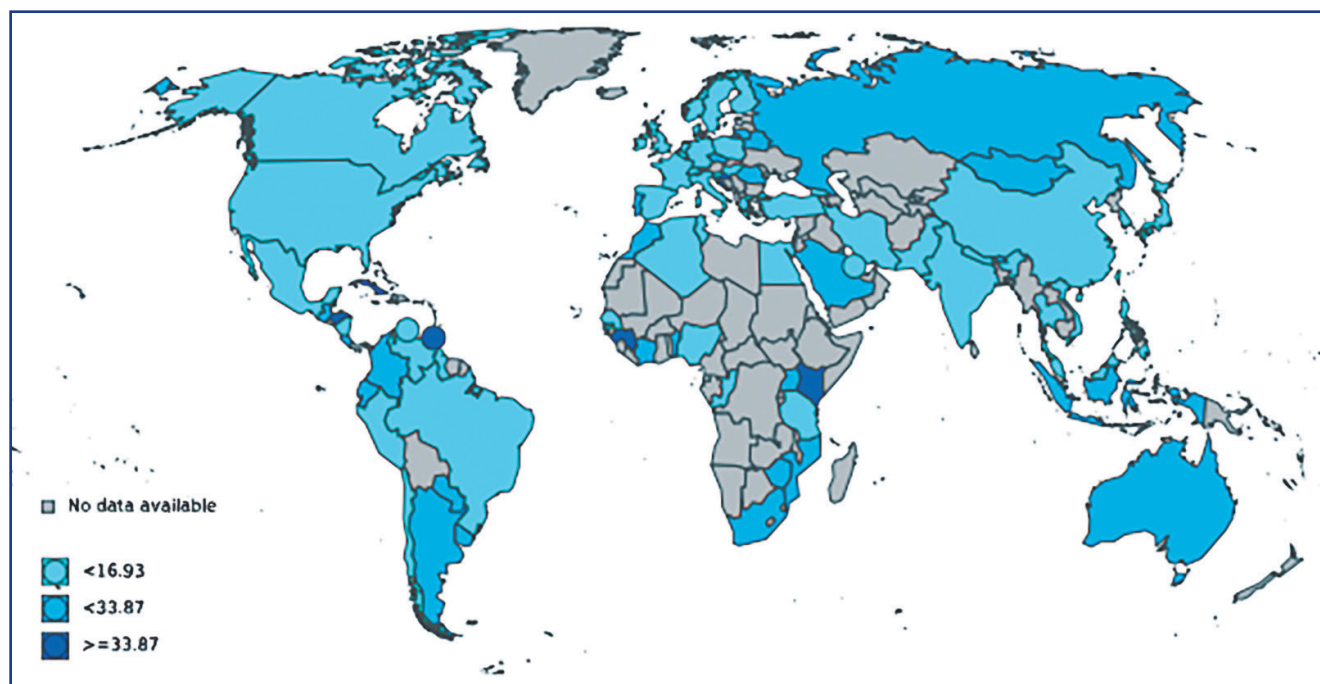


Figure 2 – Prevalence of HPV among women with average cytology results across geographic regions [16]

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: 23.2-31.1%), 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 associat-

ed 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.

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ТҮЖЫРЫМ

ЖАТЫР МОЙНЫ ҚАТЕРЛІ ІСІГІН ТУДЫРАТЫН АДАМ ПАПИЛЛОМАВИРУСЫНЫҢ ӘЛЕМДЕ ТАРАЛУЫ: ӘДЕБИЕТТЕРГЕ ШОЛУ

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Өзектілігі: Адам папилломавирусы жыныстық қарым-қатынаста белсенді ерлер мен әйелдер арасында жыныстық жолмен берілетін ең көп таралған вирустың бірі. Жатыр мойны қатерлі ісігінің дамуы мен АІПВ инфекциясының арасындағы тікелей және дәлелденген байланысты ескере отырып, АІПВ-ның деңгейі жоғары аудандарда алдын-алу шараларын жүргізу үшін әлемдегі АІПВ эпидемиологиясы бойынша эпидемиологиялық зерттеулер жүргізу қажет.

Зерттеу мақсаты: жас көрсеткіштерін ескере отырып, соңғы 10 жыл ішінде әлемде АПВ-ның таралуы бойынша эпидемиологиялық жағдайды талдау.

Әдістері: PUBMED, MEDLINE деректер базасы бойынша соңғы 10 жылдағы материалдар бойынша түйінді сөздермен әдеби шолу жүргізілді: адам папиллома вирусы, таралуы, жатыр мойны қатерлі ісігі. Әдеби шолуда рандомизацияланған зерттеулердің нәтижелері, жүйелі шолулар және мета-талдаулар бар.

Нәтижелері: АПВ-мен инфицирленген ең жоғары елдердің көрсеткіші Африка (24%), Шығыс Еуропа (21,4%) және Латын Америкасы (16,1%) елдерінде болды. Бүкіл әлемде АПВ-ның ең көп таралған түрлері: АПВ-16 (3,2%), АПВ-18 (1,4%), АПВ-52 (0,9%), АПВ-31 (0,8%) және АПВ-58 (0,7%). ҚР-да АПВ-ның таралуы толық зерттелген жоқ, тек бірнеше өңірде эпидемиологиялық зерттеулер жүргізілді, олар ҚР-да АПВ-ның басым типтері 16 және 18 жоғары қауіпті АПВ типтері болып табылатынын көрсетеді.

Қорытынды: Әлемдегі АПВ эпидемиологиялық жағдайын талдау нәтижелері барысында кірісі төмен және орташа елдерде АПВ-ның кең таралуын анықтады. Жас әйелдерде АПВ инфекциясының кең таралу деңгейі АПВ вакцинациялау бағдарламаларын жетілдіру және енгізу қажеттілігін көрсетеді.

Түйінді сөздер: адам папиллома вирусы (АПВ), АПВ таралуы, жатыр мойны қатерлі ісігі (ЖМКІ).

АННОТАЦИЯ

РАСПРОСТРАНЕННОСТЬ В МИРЕ ВИРУСА ПАПИЛЛОМЫ ЧЕЛОВЕКА, ВЫЗЫВАЮЩЕГО РАК ШЕЙКИ МАТКИ: ОБЗОР ЛИТЕРАТУРЫ

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Актуальность: Вирус папилломы человека (ВПЧ) является наиболее распространенным вирусом, передающимся половым путем у сексуально активных мужчин и женщин. Учитывая прямую и доказанную связь между развитием рака шейки матки и инфицированностью ВПЧ, необходимо 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, которые показали, что преобладающими типами ВПЧ в РК являются типы ВПЧ высокого риска 16 и 18.

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 у молодых женщин свидетельствуют о необходимости совершенствования и внедрения программ вакцинации от ВПЧ.

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

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