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ANALYSIS OF CERVICAL CANCER CASES AND HUMAN PAPILLOMA VIRUS PREVALENCE IN ZHAMBYL REGION IN 2021-2023

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ABSTRACT

Relevance: *There are strategies of the World Health Organization (WHO) for the prevention and screening of cervical cancer (cervical cancer), but the annual incidence of cervical cancer and mortality from this disease continue to force the world community to look for ways to improve approaches to its prevention and early detection. The possibilities of prevention and early detection of breast cancer are among the most difficult in practical oncogynecology.*

The study aimed to *evaluate the incidence of cervical cancer in the Zhambyl region for 2021-2023 and determine the spread and prevailing type of human papillomavirus in cervical cancer.*

Methods: *The study was conducted based on data from medical records of patients diagnosed with breast cancer registered with the state municipal enterprise on the right of economic management Zhambyl Regional Multidisciplinary Center of Oncology and Surgery (Zhambyl, Kazakhstan) from 2021 to 2023. Statistical data analysis was performed using the descriptive statistics program of the Statistica 8.0 computer software package (StatSoft, Russia). The data were described as the frequen-cy and proportion (%) of the total cases for categorical variables.*

Results: *In 2021, the average age of patients with cervical cancer (cervical cancer) will be 52 years, with a range from 29 to 83 years. In 2022, the average age dropped to 50 (28-73) years. In 2023, the population's average age will increase to 53.8 years (33-82 years). This indicates a possible age dynamic among patients. Diagnostic effectiveness: in 2023, 99 cases of cervical cancer were identified, of which 51% of patients tested positive for human papillomavirus (HPV). In 2023, the effectiveness of screening programs significantly increased; 23 screening cases were identified, compared with 16 cases in 2021 and 8 in 2022.*

Conclusion: *Analysis of data on the Zhambyl region for 2021-2023 revealed an increase in the average age of women with breast cancer, which requires further study. Improved screening programs and better public awareness have increased early case detection, positively affecting treatment outcomes. Against the background of the high prevalence of HPV, especially its types 16 and 18, the need for timely diagnosis and vaccination against this virus becomes especially urgent.*

Keywords: *prevention of cervical cancer, screening for cervical cancer, barriers to the prevention of cervical cancer, precancerous lesions of the cervix, modern cervical cancer prevention strategies.*

Introduction: In 1996, the World Health Organization, the European Research Organization on Genital Infections and Neoplasia, and the National Institutes of Health Consensus Conference on Cervical Cancer recognized the role of human papillomavirus (HPV) in the development of cervical cancer (cervical cancer) [1]. Based on the degree of association with invasive tumors, HPV genotypes were divided into those that pose high oncogenic risk, low oncogenic risk, and uncertain risk. High oncogenic risk (types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68) is associated with an increased risk of developing cervical cancer [2].

HPV is one of the most dangerous human carcinogens [3, 4]. However, most HPV genotypes do not cause cancer: according to IARC, only 12 of the documented 448 HPV types are currently reliably classified as carcinogenic ones (types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 59), and HPV type 68 is probably carcinogenic [5]. According to other data, several HPV types are classified as having a low risk of oncogenicity, such as 6, 11, 42, 43, and 44; others as high-risk HPV types - 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 73 and 82; the literature also describes cases when cervical cancer was caused by other types of HPV [6]. Regardless of the accepted classification, HPV type 16 is the most carcinogenic type of HPV worldwide, causing about 60% of HPV-associated cervical cancer; HPV types 18 and 45 are highly carcinogenic, and the remaining types vary in both prevalence and degree of association with cancer depending on the geographical region.

There are World Health Organization (WHO) strategies for preventing and screening cervical cancer. However, the annual incidence of cervical cancer and mortality from the disease continue to compel the global community to seek ways to improve approaches to prevention and early detection of cervical cancer [1]. Currently, the arsenal of the most effective treatments for precancerous cervical lesions includes strategies aimed at sequential treatment, identification of early molecular

markers, and determination of the influence of the vaginal microbiota on viral excretion [6-8]. One of the least explored areas for improvement of screening programs is the application of artificial intelligence to ensure quality screening in regions with a shortage of qualified specialists [9]. Another equally important issue is the shift from the principle of screening and treatment to the principle of screening, triage, and treatment in the management of patients with cervical abnormalities, including precancerous abnormalities [10, 11].

According to statistics provided by the press service of the Kazakh Research Institute of Oncology and Radiology of the Ministry of Health of the Republic of Kazakhstan, cancer care in Kazakhstan is developed within the framework of the Strategic Plan of the Ministry of Health and the Comprehensive Plan for Cancer Control for 2023-2027 a total of 218,213 cancer patients are under dynamic observation (2022 - 205,822 patients) as of the end of 2023. The growth is 5.7%. In terms of incidence, breast cancer is in first place (13.3%, 5,507 cases), colorectal cancer is second (9.5%, 3,939 cases), lung cancer is third (9.3%, 3,872 cases), stomach cancer is fourth (6.9%, 2,874 cases), and cervical cancer is fifth (4.9%, 2,035 cases) [12].

Existing methods of primary prevention influenced the dynamics of cervical cancer incidence and contributed to its downward trend. Nevertheless, the incidence of cervical cancer is increasing in many countries [13]. According to the National Cancer Registry, cervical cancer is the most common type of cancer in Kazakhstan, ranking second among neoplastic diseases in women and fifth among all malignant neoplasms in both sexes. Despite the implementation of screening programs, the incidence of cervical cancer is growing, and mortality rates from this disease remain consistently high [14-17].

The study aimed to evaluate the incidence of cervical cancer in the Zhambyl region for 2021-2023 and determine the spread and prevailing type of human papillomavirus in cervical cancer.

Study methods: The study was conducted based on medical records of patients diagnosed with cervical cancer registered in the Zhambyl Regional Multidisciplinary Center of Oncology and Surgery from 2021 to 2023.

The following materials were used for epidemiological analysis:

1. International Classification of Diseases, Tenth Edition (ICD-10), by regions;

2. Data from the official report of regional oncological dispensaries in the Republic of Kazakhstan, "Report on malignant neoplasm diseases" (registration form No. 7) for the period from 2021 to 2023;

3. Records of patients with the first diagnosis of malignant neoplasms (registration form 090/U);

4. Data of the Agency of the Republic of Kazakhstan on Statistics on the number, gender, and age structure of the population by regions and districts;

5. Form 030-6/u "Dispensary Observation Card";

6. Data from the National Cancer Registry (electronic register of cancer patients) on malignant neoplasms and cervical cancer;

7. Data from the report of the National Center for Healthy Lifestyles on the results of screening studies in the target population of the Republic of Kazakhstan for the period 2021-2023

The admission cards of 235 patients admitted to the Department of Gynecologic Oncology of the Zhambyl Regional Multidisciplinary Center of Oncology and Surgery with a diagnosis of cervical cancer of various stages were analyzed. Patients admitted on an outpatient basis for elective diagnostic and therapeutic procedures were excluded from the study. Statistical data analysis was conducted using Statistica 8.0 (StatSoft, Russia). The data were described as frequency and proportion (%) of total cases for categorical variables. The continuous variables are presented as mean ± standard deviation and were compared using the Student's t-test. The total patient statistics are presented in a general way for categorical variables.

Results:

Age of patients: In 2021, the average age of women with cervical cancer was 52 years. The 95% confidence interval ranged from 49 to 56 years, suggesting a significant variation in age. The minimum age of patients was 29 years, while the oldest age was 83 years.

In 2022, there is a slight decrease in the average age to 50. The confidence interval remained relatively narrow, covering the range of 47 to 52 years. The minimum age among patients was 28 years; the maximum was 73 years this year. A standard deviation of 11.38 years indicates a moderate dispersion of age-related values around the mean one.

Interestingly, in 2023, the average age of women with this diagnosis increased again to 53.79 years, which may indicate an age trend in the patient population. This year, the confidence interval ranged from 51.56 to 56.02 years, showing that most patients were over 50. The minimum age has increased to 33 years.

HPV and types of cancer: HPV type 16 predominated in women who tested positive for HPV. It was found in 76.9% of patients. The study highlights the importance of early diagnostics, HPV vaccination, and improvement of the efficiency of screening programs to improve cervical cancer treatment outcomes.

Cervical cancer stage in detection: In 2021, most patients were diagnosed at stage 1, while in 2023, there was an increase in the proportion of patients diagnosed at stage II (Figure 1). According to the data, the number of diagnostic cases at earlier stages increased in 2023. It may be due to the improvement of diagnostic methods.

An analysis of new cervical cancer cases by age revealed an increase in the number of new cervical cancer

cases in younger age groups in 2023 compared to 2021. The shift in the peak incidence towards younger ages confirms the need to improve and expand screening among young and middle-aged women.

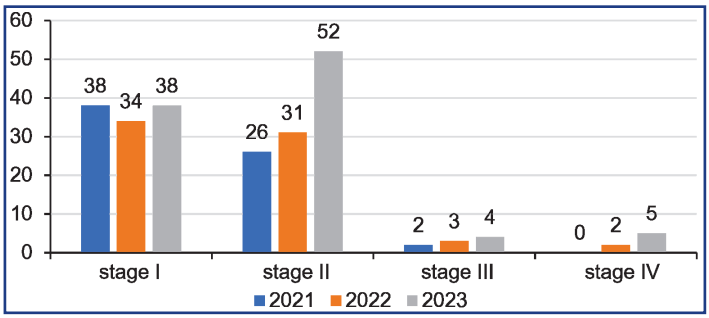

Figure 1 – Stages of cervical cancer found in 2021-2023, %

Types of cervical cancer found: Morphological analysis of the tumors shows that the most common types are adenocarcinoma and squamous cell carcinoma.

In 2023, 99 cases of cervical cancer were found, of which 51% were HPV-positive, indicating a significant prevalence of cervical cancer infection. The efficiency of the screening program has increased significantly in 2023: 23 cases were diagnosed by screening, compared to 8 in 2022 and 16 in 2021. 27.6% of patients tested negative for HPV and 21.4% did not undergo HPV screening, making it difficult to further classify them (Figure 2).

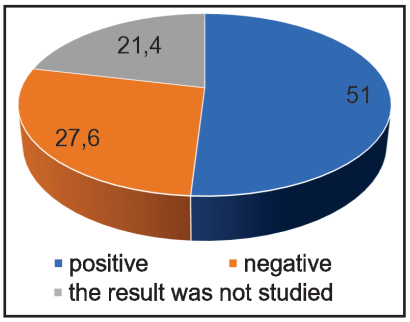

Figure 2 – HPV test results among women with cervical cancer in 2023, %

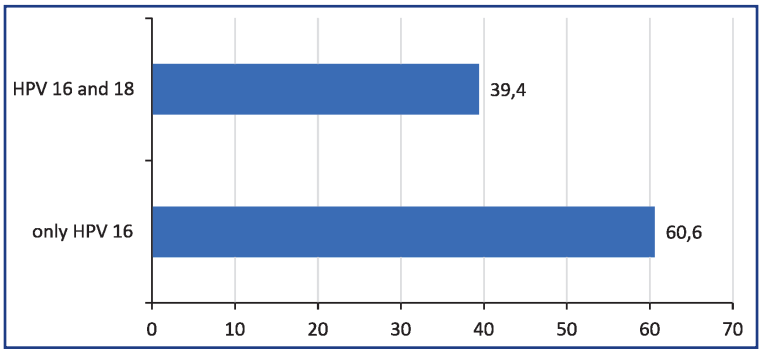

Figure 3 – Distribution of HPV types among women who tested positive for HPV, %

The remaining 23.1% of cases were diagnosed with a combination of HPV types 16 and 18, indicating the prevalence of these strains among infected women with cervical cancer (Figure 3). A 95% confidence interval was calculated for the proportion of women who tested positive for HPV [41.4% to 60.6%]. This interval confirms the reliability of estimates and indicates that more than half of the study sample has HPV infection.

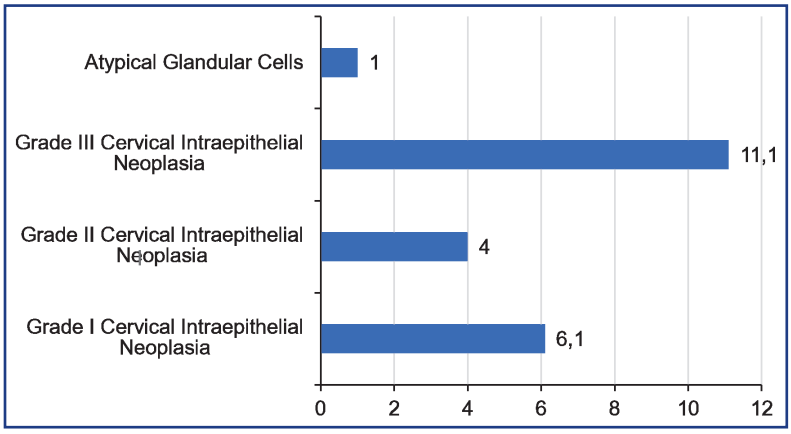

Figure 4 – Proportion of cervical cancer cases among various forms of dysplasia, %

Relationship between cervical cancer and dysplasia: 22 cases of cervical cancer (22.2%) were associated with previous diagnoses of cervical intraepithelial neoplasia (CIN) or atypical glandular cells (AGC). The distribution of these

cervical cancer cases by type of dysplasia is presented below: Grade I CIN – 6 cervical cancer cases (6.1% of the total), grade II CIN – 4 cervical cancer cases (4.0%), grade III CIN – 11 cervical cancer cases (11.1%), AGC – 1 cervical cancer case (1.0%).

The 95% CI for the proportion of cervical cancer cases associated with CIN III was [0.050; 0.172], indicating a significant level of uncertainty but confirming a higher likelihood of cervical cancer in women with CIN III. Figure 4 shows the proportion of cervical cancer cases in the presence of various forms of dysplasia.

Discussion: At the moment, the ability of countries to achieve the goals of the WHO global strategy to accelerate cervical cancer elimination is limited by their level of social and economic well-being. Researchers from different countries suggest the following to improve the efficiency of primary prevention measures:

Raising awareness of the risks associated with HPV and the role of the virus in tumorigenesis not only among women but also among men;

Inclusion of HPV vaccination for boys in national immunization plans;

Developing new HPV vaccines to extend vaccination to middle- and middle-income countries.

To increase the efficiency of secondary prevention measures (early screening for precancerous lesions of the cervix), the following is proposed:

More intensive study of the efficiency of the analysis of self-collected samples;

Search for molecular markers of carcinogenesis in self-collected samples;

Use of artificial intelligence to identify abnormalities in samples for the Pap test;

Use of artificial intelligence in doctor-led cervical biopsy to improve the accuracy of histological examinations;

Development of diagnostic and therapeutic approaches for treatment based on the analysis of the vaginal microbiome [10].

Cervical cancer is one of the main problems in the region [5, 6], and efforts should be made to remove obstacles to the elimination of this disease. Therefore, preventive methods should include vaccination, screening, and public awareness. More and more patients become ill young [7, 8]. The Pap test is an important and effective way to detect cervical cancer. It has high-quality and reliable screening, and the number of cases of this type of cancer can be reduced to 90% [9, 10]. It is recommended that the National Immunization Program include HPV vaccination so that it can be integrated with screening (with a Pap test/HPV DNA) and national cancer control programs, reducing the cost of vaccines and low awareness of effective prevention. Both print and audiovisual media can be crucial to achieve this goal.

According to domestic researchers, the HPV vaccine reduces the risk of cervical cancer and precancerous HPV-associated genital warts without negatively affecting reproductive health. This important observation underscores the safety and efficacy of the human papillomavirus vaccine in preserving the typical well-being of girls and young women. Thus, the HPV vaccine is an important immunization that not only prevents the development of dangerous diseases but also does not affect the reproductive function of a woman. It confirms the safety and efficacy of the HPV vaccination program, which is generally considered a public health measure [11].

Since 2005, preventive gynecological screening has been conducted in Kazakhstan. In 2008, the Ministry of Health of the Republic of Kazakhstan issued Order No. 607, "On Improvement of Preventive Screening of Certain Categories of the Adult Population," and in 2009 – Order No. 685, "On Approval of the Rules for Preventive Screening of the Target Population." Since 2008, the National Cervical Cancer Screening Program has been implemented using Pap tests, assessed according to the Bethesda classification [18]. Studies are conducted at five-year intervals among women aged 30 to 60 years. The program was implemented in stages: training specialists who consult women and providing colposcopy to women [19]. Since 2011, liquid cytology has been actively introduced. It has many advantages over traditional methods. This examination method allows for quick and easy sample collection and is highly sensitive to mild and severe pathologies.

It is known that the main problems in the implementation of screening programs are low coverage of the female population, low compliance with screening, low level of training of medical personnel, and high cost in countries that do not allocate national funding for cervical cancer screening. The main problems and obstacles to cervical cancer screening and proposed ways to solve them were studied in several international studies [20]. Educational activities for healthcare professionals (e.g., continuing education, training in cervical cancer diagnostics, especially screening) have effectively increased adherence and coverage. Female-targeted education campaigns on cervical cancer screening, HPV testing, and HPV vaccination should be conducted at the local, provincial, and national levels. Cervical cancer screening is undoubtedly an important step towards the reduction of the global burden of cervical cancer. However, a comprehensive approach based on the study and improvement of adherence to screening among the female population is required to achieve the ultimate goal of reduction of morbidity and mortality [21].

The results of an epidemiological study of cervical cancer morbidity and mortality in Almaty from 2005 to 2022 showed the need to improve and intensify screening among women of reproductive age and the introduction of vaccination and screening programs with HPV testing [22].

Conclusion: The data analysis results for the Zhambyl region for 2021 and 2023 emphasize the importance of continuing work in the field of early diagnostics and prevention of cancer. Improving screening programs and public awareness can reduce morbidity and improve treatment outcomes. There is a trend towards an increase in the average age of cervical cancer patients during the period under study. This fact requires further identification of possible factors affecting this age dynamics. The study demonstrates a significant HPV prevalence among women with cervical cancer, highlighting the importance of early diagnostics and timely HPV vaccination, especially against types 16 and 18.

It is necessary to perform active explanatory work among the female population, with coverage in the media and social networks, to reduce the burden of cervical cancer and increase the coverage of cervical cancer screening and HPV vaccination in order to improve prevention programs and raise awareness among the population of the Zhambyl region. It is necessary to give recommendations on physical activity for women of different age groups: lead a healthy lifestyle, avoid bad habits, practice sports, and walk in the fresh air. Promoting a healthy lifestyle should contribute to increasing women's responsibility for their health, forming a healthy lifestyle, creating a favorable social environment for maintaining health and preventing diseases, and forming a society with a strong and healthy population.

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АНДАТПА

2021-2023 жж. ЖАМБЫЛ ОБЛЫСЫ БОЙЫНША ЖАТЫР МОЙНЫ ОБЫРЫ ЖӘНЕ АДАМ ПАПИЛЛОМАВИРУСЫНЫҢ ТАРАЛУЫН ТАЛДАУ

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Өзектілігі: *Дүниежүзілік денсаулық сақтау ұйымының (ДДҰ) жатыр мойны обырының (ршм) алдын алу және скринингі бойынша стратегиялары бар, алайда ршм сырқаттанушылығы мен осы аурудан болатын өлім-жітімнің жыл сайынғы көрсеткіштері әлі де әлемдік қауымдастықты оның алдын алу және ерте анықтау тәсілдерін жетілдіру жолдарын іздеуге мәжбүр етеді. РШМ алдын алу және ерте анықтау мүмкіндіктері практикалық онкогинекологиядағы ең күрделі болып табылады.*

Зерттеудің мақсаты болып *– Жамбыл облысы бойынша 2021-2023 жылдары жатыр мойны обырында адам папилломавирусының таралуы мен басым түрін анықтаумен бірге жатыр мойны обырымен сырқаттану көрсеткіштерін бағалау табылады.*

Әдістері: *Зерттеу 2021 жылдан 2023 жылға дейін Жамбыл облыстық онкология және хирургия көпсалалы орталығы (ЖОМЦОиХ ШЖҚ МКК) шаруашылық жүргізу құқығындағы мемлекеттік коммуналдық кәсіпорнында тіркелген РШМ диагнозы қойылған пациенттердің медициналық карталарының деректері негізінде жүргізілді.. Деректер категориялық айнымалылар үшін жағдайлардың жалпы санының жиілігі мен үлесі (%) ретінде сипатталды.*

Нәтижелері: *2021 жылы Жатыр мойны обыры (ЖМО) бар науқастардың орташа жасы 29-83 жас аралығындағы 52 жасты құрайды.2022 жылы орташа жас 50 жасқа дейін төмендеді (28-73 жас). 2023 жылы халықтың орташа жасы 53,8 жасқа (33-82 жас) дейін өседі. Бұл пациенттер арасындағы жас динамикасын көрсетеді. Диагностиканың тиімділігі: 2023 жылы ЖМО-ның 99 жағдайы анықталды, оның 51%-ы адам папилломавирусына (АПВ) оң нәтиже берді.2023 жылы скринингтік бағдарламалардың тиімділігі едәуір артты, 2021 жылы 16 және 2022 жылы 8 жағдаймен салыстырғанда 23 скринингтік жағдай анықталды.*

Қорытынды: *Жамбыл облысы бойынша 2021-2023 жылдардағы деректерді талдау жатыр мойны обыры бар әйелдердің орта жасының өсуін анықтады, бұл одан әрі зерттеуді қажет етеді. Скринингтік бағдарламалардың жақсаруы және халықтың хабардарлығының артуы ерте кезеңдерде диагноз қойылған жағдайлардың көбеюіне әкелді, бұл емдеу нәтижелеріне оң әсер етеді. АПВ-ның, әсіресе оның 16 және 18 түрлерінің жоғары таралуы аясында бұл вирусқа қарсы уақтылы диагноз қою және вакцинациялау қажеттілігі әсіресе өзекті болып отыр.*

Түйінді сөздер: *жатыр мойны обырының алдын алу, жатыр мойны обырының скринингі, жатыр мойны обырының алдын алу жолындағы кедергілер, жатыр мойны обырына дейінгі зақымданулар, жатыр мойны обырының алдын алудың заманауи стратегиялары.*

АННОТАЦИЯ

АНАЛИЗ СЛУЧАЕВ РАКА ШЕЙКИ МАТКИ И РАСПРОСТРАНЁННОСТИ ВИРУСА ПАПИЛЛОМЫ ЧЕЛОВЕКА В ЖАМБЫЛСКОЙ ОБЛАСТИ В 2021-2023 гг.

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Актуальность: *Существуют стратегии Всемирной организации здравоохранения (ВОЗ) по профилактике и скринингу рака шейки матки (РШМ), однако ежегодные показатели заболеваемости РШМ и смертности от данного заболевания по-прежнему вынуждают мировое сообщество искать пути совершенствования подходов к его профилактике и раннему выявлению. Проблемы профилактики и раннего выявления РШМ являются одними из наиболее сложных в практической онкогинекологии.*

Цель исследования *– оценить показатели заболеваемости раком шейки матки в Жамбылской области за 2021-2023 гг. с определением распространения и превалирующего типа вируса папилломы человека при раке шейки матки.*

Методы: *Исследование проведено на основе данных медицинских карт пациенток с диагнозом РШМ, зарегистрированных в ГКП на ПХВ «Жамбылский областной многопрофильный центр онкологии и хирургии» с 2021 по 2023 гг. Статистический анализ данных выполняли с использованием программы «Statistica 8.0» (StatSoft, Россия). Данные были описаны как частота и доля (%) от общего числа случаев для категориальных переменных.*

Результаты: *В 2021 году средний возраст женщин с РШМ составил 52 года (диапазон: 29-83 года). В 2022 году средний возраст снизился до 50 лет (28-73 года), а в 2023 году средний возраст снова увеличился до 53,8 года (33-82 года). Это свидетельствует о возможной возрастной динамике среди пациенток с РШМ.*

В 2023 году было выявлено 99 случаев РШМ, из которых 51% пациенток имели положительный результат на вирус папилломы человека (ВПЧ). В 2023 году значительно возросла эффективность скрининговых программ: было выявлено 23 случая благодаря скринингу, в сравнении с 16 случаями в 2021 году и 8 в 2022 году.

Заключение: *Анализ данных по Жамбылской области за 2021-2023 гг. выявил рост среднего возраста женщин с РШМ, что требует дальнейшего изучения. Улучшение скрининговых программ и повышение информированности населения привели к увеличению числа случаев, диагностированных на ранних стадиях, что положительно сказывается на исходах лечения. На фоне высокой распространенности ВПЧ, особенно типов 16 и 18, необходимость в своевременной диагностике и вакцинации против этого вируса становится особенно актуальной.*

Ключевые слова: *профилактика рака шейки матки, скрининг рака шейки матки, барьеры на пути профилактики рака шейки матки, предраковые поражения шейки матки, современные стратегии профилактики рака шейки матки.*

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