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THE ROLE OF SOCIO-DEMOGRAPHIC FACTORS IN HPV INFECTION

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Aim. Infections caused by highly oncogenic HPV types can persist in the human body, which increases the risk of developing severe cervical lesions with their subsequent progression to invasive cervical cancer. The aim of this study was to investigate the socio-demographic characteristics of patients with precancerous diseases of the cervix and analyze the relationship between HPV infections and cervical precancerous diseases.

Materials and methods. Data on the cervix and HPV infections were collected from 402 women included in the scientific project «National Program for the Study of HPV with the Development of an Integrated Approach to Effective Diagnosis and Treatment of Precancerous Conditions» between 2024 and 2026. The study is being conducted within the framework of program-targeted funding from the Ministry of Science and Education of the Republic of Kazakhstan.

Results and discussion. The average age of women in our study with a positive HPV test result was 33.08±6.62 years. Among women infected with HPV, every third woman was not married – 31.2%, the divorce rate is 12.8%. The barrier method of contraception is used in 33.8% of sample population. Furthermore, among HPV-infected women the usage of barrier contraception is 1.2 times higher. HPV-16 and HPV-52 were the most common types in patients with both normal and abnormal cytology. Mild and severe dysplasia were more frequently observed in HPV types 16, 33, 52, and 58.

Conclusion. Socio-demographic factors such as age and marital status have a significant impact on the risk of HPV infection. Young women and unmarried women, women with full-day work hours have a higher level of infection.

Key words: human papillomavirus; oncocytology; socio-demographic factors; cervical precancerous diseases; reproductive age

INTRODUCTION

There is increasing evidence in the scientific literature about the viral origin of cervical cancer (CC) [1], in particular the role of the human papillomavirus (HPV). It has been proven that HPV can be transmitted sexually and is detected in 99.7% of tissue samples taken for CC [18]. This type of cancer ranks 4th among malignant neoplasms in women, with about 570,000 new cases of the disease and more than 311,000 deaths due to it diagnosed worldwide every year [1, 18]. Within 12-24 months after contact with HPV, in 90% of cases, this infection disappears or becomes inactive. Infections caused by highly oncogenic HPV types can persist in the human tissue, which increases the risk of developing severe cervical lesions with their subsequent progression to invasive CC [6].

Human papillomavirus is a serious public health problem, affecting both men and women in both developing and developed countries. The main route of HPV infection is transmission of the virus during sexual contact from person to person, if one of the partners has infected vaginal, perianal, cervical, vulvar or penile epithelium. In the presence of microcracks, abrasions of the epithelium, HPV penetrates the cells of the basal layer. In the cytoplasm of the cell, the viral DNA is released from proteins and passes into the nucleus, where transcription and replication of its genome begin. The rate of viral replication is directly related to the rate of DNA replication of the host cell. Each descendant cell contains one or more copies of the HPV genome. The virus, multiplying in the cells of the basal layer of the epithelium, does not cause their death, since the cells that have reached maturity are independently exfoliated from the surface. Therefore, a person is often a carrier of the virus, but has no symptoms of the disease [2, 8].

In a comparative study of the socio-demographic characteristics of 55 patients with cervical cancer, a connection was noted between late primary diagnosis of the tumor and low socio-economic status, low level of education, addictions, smoking in partners, and the absence of routine cytological examination earlier [20]. Late primary diagnosis of cervical cancer (stage IIB and higher) in patients with a

low level of education (61% and 66%) was also noted in other studies [4, 14, 16]. Failure to comply with cytological screening programs was associated with a 4-fold increase in the risk of late diagnosis of invasive cervical cancer [4]. Defects in the provision of medical care at the primary level, which prolong the time of making a correct diagnosis, play an important role: in 78.2% - the absence of examination of the cervix in speculums, in 90% of cases – incorrect interpretation of symptoms during the first visit to the doctor was the cause of the development of late stages of cervical cancer [11].

Since the role of HPV in the development of cervical cancer has become clear, a system of primary (vaccination) and secondary (screening) prevention has been developed worldwide. Extensive data support the effectiveness of HPV vaccination in early adolescence to prevent vaccine-type HPV infections, precancerous lesions, and cervical cancer in young adults. If currently available vaccines provide lifelong protection, cervical cancer rates could be reduced by 85% for those vaccinated before exposure to oncogenic HPV. Studies show that HPV vaccination reduces rates of HPV infection and HPV-related disease at each step of the carcinogenic pathway. First, vaccination before the onset of sexual activity reduces oncogenic vaccine-type HPV infections by more than 90% in vaccinated individuals; unvaccinated individuals begin to benefit from herd immunity when vaccination rates exceed 50% [23].

The aim of this study was to investigate the socio-demographic characteristics of patients with precancerous diseases of the cervix and analyze the relationship between HPV infections and cervical precancerous diseases.

Therefore, the study of the role of socio-demographic characteristics of patients infected with the human papillomavirus is of interest in order to identify socially vulnerable groups. For this purpose, we have undertaken a study of the socio-demographic characteristics of patients with precancerous diseases of the cervix. The study is being conducted within the framework of the program-targeted financing of the Ministry of Science and Education of the Republic of Kazakhstan «National Program for the Study of HPV with the Development of an Integrated Approach to Effective Diagnosis and Treatment of Precancerous Conditions» for 2024-2026.

MATERIAL AND METHODS

The study was conducted at the National Scientific Center for Motherhood and Childhood, University Medical Center Corporate Foundation (CF) in Astana, Kazakhstan.

The study included 402 women of reproductive age (18-45 years). The inclusion criteria for the participants were: absence of pregnancy at the time of the study, regular menstrual cycle, signing of informed consent to participate in the study. The exclusion criteria for the participants were: refusal to participate in the study; presence of complex concomitant chronic diseases, including hepatitis B and C, diabetes mellitus, autoimmune diseases, HIV infection and cancer; acute inflammatory processes of any localization at the time of the study; intake of probiotics and/or antibacterial therapy and/or immunosuppressive therapy within the previous 14 days; smoking; use of intrauterine devices (IUD) and hormonal contraception; any invasive procedures and surgeries within 45 days preceding the study. After signing informed consent, patients were included in the study.

All patients were tested for HPV, sexually transmitted infections using real-time polymerase chain reaction, cervical canal samples were taken for liquid cytological examination and colposcopic examination was performed. Positive HPV samples were genotyped. The study was conducted in the laboratory Medicine Department at the Republican Diagnostic Center of the KF «University Medical Center». The reagent kit «Realbest DNA HPV HCR genotype quantitative», designed for differential detection and quantitative determination of DNA of human papillomaviruses types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58 and 59 of high carcinogenic risk.

Smears for liquid cytological examination were taken using an endocervical brush; cells were collected from the surface of the vaginal part of the cervix (exocervix) and from the walls of the cervical canal (endocervix – «transformation zone» of squamous and columnar epithelium). The material was collected by scarification until «bloody dew» was obtained, so that a sample was obtained that was maximally rich in cells, which were transferred to a liquid fixation and transportation medium for analysis.

Bethesda classification categories were used to classify the obtained smear results for oncocytology: NILM – no intraepithelial lesions or malignant processes; LSIL – low-grade squamous intraepithelial lesions (mild squamous cell changes that represent a low risk of cancer development), the group covers changes characteristic of HPV infection and mild dysplasia CIN – I; HSIL – high-grade squamous intraepithelial lesions (pronounced squamous cell changes that represent a high risk of cancer development), the group covers moderate and severe dysplasia, CIN – II, CINIII and CIS [11]. Bethesda classification has separate categories: «Atypical squamous cells of undetermined significance» – ASC-US – cellular changes that are more significant than reactive, but quantitatively or qualitatively insufficient to establish a diagnosis of CIN. ASC-H – atypical squamous cells that do not exclude HSIL and occupy an intermediate position between ASC-US and HSIL.

Statistical processing of the study results was carried out using the standard Python program, version 3.11.12. To compare differences between groups, two statistical analyses were used: the Kruskal – Wallis test, which identifies any differences between three or more independent groups, and the Jonckheere – Terpstra (JT) test, specially designed to assess the presence of a monotonic trend in a variable when moving from one ordered category to another.

The relationship between the presence of different HPV types (designated as hpv*) and the degree of cytological changes in the cervix classified into NILM, ASC-US, LSIL and HSIL groups. Two methods were used to test for statistical differences: the chi-square test and the ordinal association test (CATT), correction for multiple comparisons was performed using the false discovery rate control method (FDR, Benjamini – Hochberg method). The chi-square test was used to assess the presence of a general statistical de-

pendence between the variables, that is, between the HPV type and the oncocytology categories. It does not take into account the ordering of the degrees of changes (from normal cytology to severe dysplasia), so it is appropriate when the fact of dependence is of interest, but not the direction of changes. The Cochran -Armitage Ordinary Association Test (CATT) was used. This test is specifically designed to detect a trend between a binary variable (e. g., presence/absence of an HPV type) and an ordinal category (in our case, the degree of cytological changes: NILM, ASC-US, LSIL, HSIL. ASC-H was not diagnosed in our study). Unlike the conventional χ^2 test, which simply checks for differences, CATT evaluates the presence of a monotonic trend – whether the frequency of detection of an HPV subtype increases with the severity of an oncocytological diagnosis. The values of the Z-statistics are interpreted as the direction and strength of the trend: a positive value indicates an increasing probability of the presence of HPV with increasing severity of cytological changes, a negative value – a decreasing one. The research team complied with all principles of scientific ethics, biomedical research ethics, and maintained high standards of intellectual honesty in their work. Each participant was assigned an identification number, and all paper data collected or used during this study, as well as laboratory reports, were stored in a cabinet in a locked office of the study staff, and all electronic data were stored on password-protected computers. Only key members of the study staff had access to any of these patient files. This study was approved by the Local Bioethics Committee of the UMC Corporate Foundation (protocol #2024/02-013, 10/05/2024).

RESULTS

According to the study results, 139 (35.1%) patients had a positive HPV test. The distribution by genotype frequency was as follows: genotype 16-45 (11.4%), type 52-26 (6.6%), type 33-21 (5.3%), type 59-18 (4.5%), type 18-17 (4.3%). Type 45-17 (4.3%), type 56-15 (3.8%), type 39-15 (3.8%), type 51-12 (3.0%), type 58-12 (3.0%), type 31-11 (2.8%), type 35-10 (2.5%). One patient can be infected with one or more genotypes.

The age of HPV-positive patients was 33.08±6.62 years, which is statistically significantly younger than that of uninfected women (Table 1).

The patients were distributed by nationality as follows: 90.1% (127) of the HPV-positive women were Kazakhs, 8 (5.7%) were Russians, 1 (0.7%) were Uzbeks, 2 (1.4%) were Tatars, 1 (0.7%) were Germans, 1 (0.7%) were Georgians , and 1 (0.7%) were Macedonians. 69.4% (297) of the examined women had higher education, of which 13.7% (55) were studying for a master's degree and 1.5% (6) were studying for a doctorate. 14.7% (59) had secondary specialized education, and 0.7% (3) had incomplete secondary education. Among the HPV-infected women, 70.2% (99) had higher education, of which 15.6% (22) were studying for a master's degree. Secondary vocational education was available to 12% (17) of the surveyed women (Table 2).

Consequently, the level of education in the studied patients was quite high, both in the group of HPV-infected and in the group of uninfected women, and did not have statistically significant differences. Among HPV-infected women, every third woman was not married – 31.2%, which is 1.8 times significantly higher than the rate among uninfected patients – 18.8% (P=0.0078*). Among HPV-infected women, the divorce rate was higher – 12.8% (18) (Table 3).

Of the 14 patients with severe cervical epithelial dysplasia, 13 (92.9%) were infected with HPV, including genotype 16-6 (42.9%), genotype 58-4 (28.6%), genotype 33-4 (28.6%), type 45-3 (21.4%), 31, 52 and 59 genotypes – 2 each (14.3%).

Table 1 – Age of patients infected with HPV (years)

	Statistic	HPV-negative (n=263)	HPV-positive (n=139)
Age	Mean ± SD	35.26±6.16	33.08 ± 6.62
	Median [Q1 – Q3]	34.96 [31.60 – 40.00]	33.71 [27.88 – 37.46]
	Min – Max	19.93 – 45.88	19.90 – 46.03
	Shapiro – Wilk (p)	0.0003	0.0176
	Levene's p	0.3171	
	Statistic (p)	t = 3.29	p = 0.0011

Table 2 – Educational level of the examined patients

	Education	HPV-negative (n=263)	HPV-positive (n=139)
Education	Secondary specialized	42 (16.1%)	17 (12%)
	Higher	180 (69.0%)	99 (71.2%)
	Master's degree	33 (12.6%)	22 (15.6%)
	PhD Doctoral Studies	4 (1.5%)	2 (1.4%)
	Statistic (p)	Chi-square: 3.9	p = 0.5642

Table 3 – Marital status of the surveyed women

	Marital status	HPV-negative (n=263)	HPV-positive (n=139)
Marital status	Not married	49 (18.8%)	44 (31.2%)
	Married	186 (71.3%)	78 (55.3%)
	Divorced	22 (8.4%)	18 (12.8%)
	Widow	4 (1.5%)	1 (0.7%)
	Statistic (p)	Chi-square: 11.89	p = 0.0078

Table 4 – Menstrual cycle in examined patient

Index	Criterion	HPV-negative (n=263)	HPV-positive (n=139)
Menarche	Mean ± SD	13.41 ± 1.36	13.23 ± 1.24
	Median [Q1 – Q3]	13.00 [13.00 – 14.00]	13.00 [13.00 – 14.00]
	Min – Max	10.00–18.00	10.00–17.00
	Shapiro – Wilk (p)	0.0000	0.0000
	Levene's p	0.0595	
	Statistic (p)	t = 1.35	p = 0.1767
Duration of the menstrual cycle	Mean ± SD	30.33 ± 9.81	29.22 ± 4.53
	Median [Q1 – Q3]	28.00 [28.00 – 30.00]	28.00 [28.00 – 30.00]
	Min – Max	21.00 – 100.00	20.00 – 60.00
	Shapiro – Wilk (p)	0.0000	0.0000
	Levene's p	0.1284	
	Statistic (p)	t = 1.27	p = 0.2044
Regularity of the menstrual cycle	Regular	243 (93.1%)	133 (94.3%)
	Not regular	18 (6.9%)	8 (5.7%)
	Statistic (p)	Chi-square: 0.07	p = 0.7924
	Painless	259 (99.2%)	140 (99.3%)
Painful menstruation	Painful	2 (0.8%)	1 (0.7%)
	Statistic (p)	Fisher: 0.92	p = 1.0000
Volume of menstruation	Meager	7 (2.7%)	3 (2.1%)
	Moderately	253 (96.9%)	138 (97.9%)
	Abundantly	1 (0.4%)	0 (0.0%)
	Statistic (p)	Chi-square: 0.66	p = 0.7184

Table 5 – Gynecological diseases in examined patients

Previous history	Status	HPV-negative (n=263)	HPV-positive (n=139)	P-value
Gynecological diseases	No	179 (68.6%)	94 (66.7%)	p = 0.7789
	Yes	82 (31.4%)	47 (33.3%)	
History of cervical erosion	No	138 (52.9%)	84 (59.6%)	p = 0.2363
	Yes	123 (47.1%)	57 (40.4%)	
Manipulations on the cervix	No	200 (76.6%)	112 (79.4%)	p = 0.6042
	Yes	61 (23.4%)	29 (20.6%)	

Among 14 patients with HSIL were unmarried and divorced – 8 (57.2%), married – 6 (42.9%). Abortions were noted in 3 (21.4%) patients. Gynecological diseases were detected in 4 (28.9%), among them damage to the integrity of the cervical epithelium was found in 9 (64.3%) women. Barrier contraception was used by 6 (42.9%) patients. Manipulations on the cervix were previously performed in 11 cases (78.6%), ablative methods (cryodestruction) – 2 (14.3%), incisional methods (conization, excision) – 1 (7.1%).

The average age of menarche in the examined women was 13.33 ± 1.30 years and had no statistically significant

Table 6 – Number of sexual partners in examined women depending on HPV status

Number of sexual partners	HPV-negative (n=263)	HPV-positive (n=139)	p = 0.1079
	1.57 ± 1.79	2.16 ± 5.38	

Table 7 – Reproductive status of the examined patients

	Criterion	HPV-negative (n=263)	HPV-positive (n=139)
Pregnancy	Mean ± SD	2.36 ± 1.90	1.50 ± 1.59
	Median [Q1 – Q3]	2.00 [1.00 – 4.00]	1.00 [0.00 – 2.00]
	Min – Max	0.00–8.00	0.00 – 9.00
	Statistic (p)	U = 23414.50	p = 0.0000
Childbirth	Mean ± SD	1.73 ± 1.39	1.19 ± 1.26
	Median [Q1 – Q3]	2.00 [0.00 – 3.00]	1.00 [0.00 – 2.00]
	Min – Max	0.00 – 5.00	0.00 – 5.00
	Statistic (p)	t = 3.81	p = 0.0002
Abortions	Mean ± SD	0.35 ± 0.73	0.13 ± 0.43
	Median [Q1–Q3]	0.00 [0.00 – 0.00]	0.00 [0.00 – 0.00]
	Min – Max	0.00 – 4.00	0.00 – 3.00
	Statistic (p)	U = 20828.00	p = 0.0011
Childbirth	Spontaneous vaginal	234 (89.7%)	127 (90.1%)
	C- section	27 (10.3%)	14 (9.9%)
	Statistic (p)	Chi-square : 0.0	p = 1.0000
Abortions	No	202 (77.4%)	127 (90.1%)
	Yes	59 (22.6%)	14 (9.9%)
	Statistic (p)	Chi-square: 9.06	p = 0.0026
Ectopic pregnancy	No	252 (96.6%)	139 (98.6%)
	Yes	9 (3.4%)	2 (1.4%)
	Statistic (p)	Fisher: 0.4	p = 0.3418

Table 8 – Contraception in examined patients

Methods of contraception	HPV-negative (n=263)	HPV-positive (n=139)	p	Criterion
Barrier	77 (29.5%)	59 (41.8%)	p = 0.0171	Chi-square : 5.69
Other methods	85 (32.6%)	62 (44.0%)	p = 0.7537	Fisher : 0.69

differences between infected and uninfected patients – 13.41±1.36 and 13.23±1.24 years (p=0.1767). (Table 4). There were no statistically significant differences in the main parameters of the menstrual cycle in the examined women.

Every third woman included in the study had gynecological diseases - 32%, the rate among HPV-infected women was 33.3% and did not differ from the rate among uninfected women (p=0.7789). Among sample population 20,6% of HPV-infected women had a history of manipulations on the cervix (Table 5). All manipulations on the cervix by oncocytology are presented in Figure 1.

The study used two approaches for post hoc analysis of the association between the types of cervical manipulations and oncocytology groups. Paired χ^2 tests revealed significant differences in the distribution of intervention types between the NILM vs ASC-US (p 0.0204) and NILM vs LSIL (p = 0.0098) groups, indicating a difference in the frequencies of manipulations between these groups. The Mann – Whitney test compared the order of invasiveness of manipulations between oncocytology groups and did not reveal significant differences (all p > 0.05), confirming the absence of a linear trend.

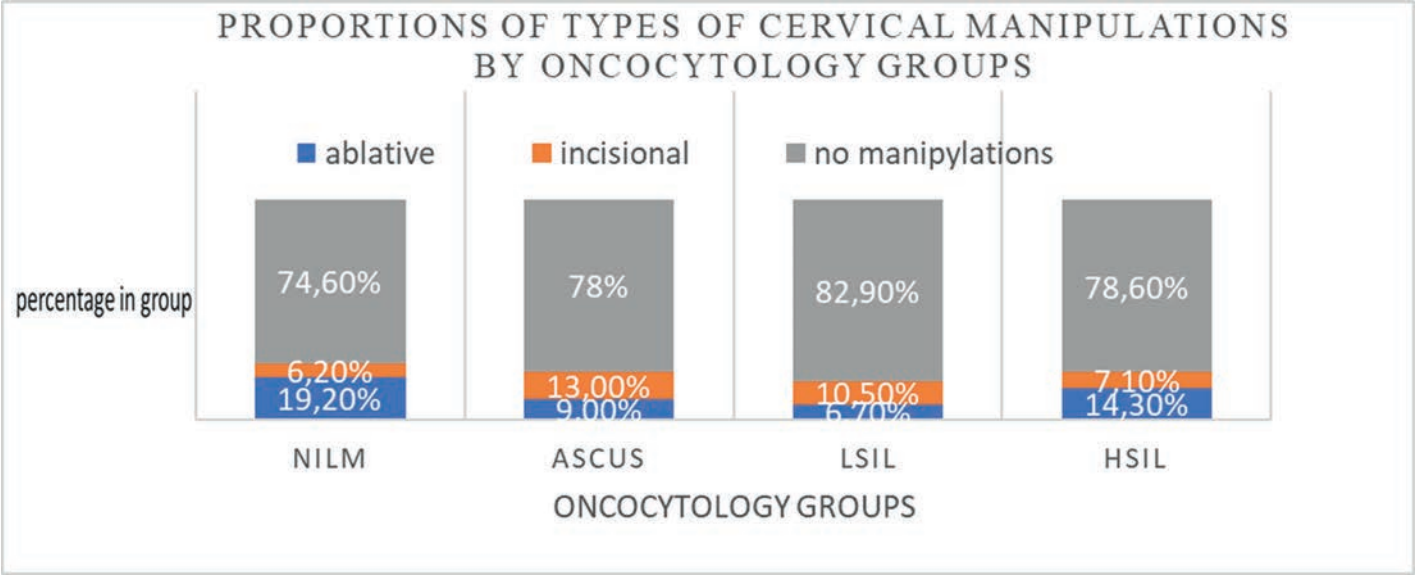

Figure 1 – Manipulations on the cervix in examined patients

Thus, the differences are nominal rather than ordinal. The absence of a directional trend between the type of cervical interventions and the degree of oncocytological changes can be explained by the composition of the sample: the study included both patients who first sought treatment, in whom the detected changes reflect the natural course of the disease, and women who had previously been treated for dysplasia. In the latter, the ablative or incisional manipulations performed could have led to a decrease in the degree of damage, which distorts the direct relationship between the intervention and the current smear result.

Among women infected with HPV, the number of sexual partners is 1.8 times significantly higher (Table 6).

Analysis of the reproductive status of the examined patients showed that the average number of pregnancies was 1.5 times lower, the number of births was 1.45 times lower in the group of HPV-infected patients, which is apparently due to the absence of marriage and a large number of divorces in this group of women. The frequency of spontaneous births and cesarean sections is the same in both groups (Table 7).

Contraception methods were used by 294 or 73.1% of women at the time of the survey. The most frequently used method of preventing unwanted pregnancy was barrier – 35.65%, while the prevalence of this method of contraception among HPV-infected women was 1.4 times significantly higher (p=0.0171), which is associated with the absence of a strong marital relationship. Hormonal methods of contraception were used by only 3 (2.1%) women (Table 8).

DISCUSSION

Although most HPV infections resolve spontaneously within two years [23], individual differences in immune responses to HPV and other exogenous factors may increase the risk of HPV acquisition, persistence, and rapid progression of cervical cancer [9]. Previous studies have shown that the presence of vaginal HPV infection influences the development of cervical dysplasia in subjects with ASC-US cytology [13, 21].

The average age of women in our study with a positive HPV test result was 33.08±6.62 years, which is statistically lower than that of uninfected patients. According to the literature, the peak prevalence of HPV occurs at the age of 17 to 25 years, then the prevalence of infection decreases and increases again at the age of 35-44 or 45-54 years [21]. In our study, the range of examined patients with HPV positivity was from 19.90-46.03 years, i.e., coincides with the literature data.

The results show that clinical and behavioral factors such as level of sexual activity (number of sexual partners, history of previous HPV infections, cervical ectopia, history of cervical manipulation or cytological abnormalities, mechanical protection during sexual intercourse) showed a consistent association with HPV infections and/or related disease in patients. Our study confirmed the significance of these factors: 44.0% of HPV-positive patients were not married but had sexual intercourse (31.2% unmarried and 12.8% divorced). The frequency of infection in these women may be due to two factors - first, unmarried women are less likely to visit a gynecologist due to psychological factors and do not undergo timely testing for sexually transmitted infections, even in the presence of clinical symptoms, do not undergo timely screening for oncocytology, HPV and do not examine the condition of the cervix. The second factor is the number of sexual partners, changing sexual partners, which plays an important role in HPV infection. These data were confirmed in the course of our study – the number of sexual partners among unmarried women was 2 times greater than among married women.

Long-term use of oral contraceptives is a risk factor for the development of both squamous cell cervical cancer and adenocarcinoma, but to a greater extent, taking these drugs increases the likelihood of developing adenocarcinomas [3, 22]. In our study, hormonal methods of contraception were used by only 3 (2.1%) women, so it is impossible to draw conclusions. The barrier method of contraception was used by 33.8%, while the prevalence of this method of contraception among HPV-infected women was 1.2 times

higher. It is possible that HPV infection occurred before the start of using barrier methods of contraception or their use was not constant.

The study included 139 women infected with HPV, and 71.2% (99) of the examined women had higher education, which did not differ from the level of education in the uninfected group. Perhaps this is a feature of Kazakhstan, where the level of education among women is generally quite high. It is impossible to exclude the influence of such a factor as living in the capital, where the competitive environment itself is quite high and educated women are concentrated in the capital. This is also a limitation of our study. An important factor in HPV infection is the lack of time in women, high stress, busyness at work and study, limited time for examinations, visits to the doctor.

It was not possible to establish any differences by ethnicity, since the contingent of those examined was very homogeneous – 90.1% of indigenous nationality.

Cervical cancer incidence and mortality vary across regions of Kazakhstan with the highest incidence in the northern regions and the lowest in the western regions of the country [1]. There are two main preventive measures to prevent cervical cancer, including vaccination against high-risk HPV types and cervical cancer screening [5, 15, 19]. HPV vaccines contain non-infectious virus-like particles that are effective in developing immunity against the virus. Currently, six vaccines against high-risk HPV types are available worldwide, including HPV-16, HPV-18, HPV-31, HPV-33, HPV-45, HPV-52, HPV-58, HPV-6, and HPV-11 [12, 26]. Since HPV vaccines currently include only 9 high-risk genotypes, they do not protect against all causes of cervical cancer. Therefore, the role of cervical cancer screening remains important, as further highlighted by the results of our study.

Studying the prevalence of high-risk HPV genotypes remains important. Previous studies on HPV genotyping in middle- and high-income countries have shown that HPV-16 and HPV-18 are the most common in patients with cervical cancer [24]. The overall prevalence of high-risk HPV genotypes does not differ significantly between populations in developed and developing countries [25]. HPV distribution among Asian countries showed that HPV-52 was the most common, while the prevalence of HPV-16 was highest in North American and European populations [7, 10, 17]. A previous study among the population of Kazakhstan over a four-year period showed that HPV-16 was the most common, followed by HPV-52 and HPV-31 [1]. Another epidemiological analysis of HPV genotypes in the population of Kazakhstan showed that HPV was present in 44% to 56% of the female population regardless of cytology results [1], and HPV-16, HPV-18, HPV-51, and HPV-33 were the most common genotypes in our population. According to our study, HPV-16 and HPV-52 were the most common types in patients with both normal and abnormal cytology. In general, HPV genotypes 16, 52, 33, and 58 were the most common among the women we examined. Mild and severe dysplasia was observed in women infected with HPV.

However, there are several limitations that need to be acknowledged: the study included women living in Astana, which may affect the prevalence of HPV genotypes. But on the other hand, Astana is a young and dynamically growing city, where a significant part of the population came from all regions of the country.

Despite the existing limitations, the study allowed us to identify the main demographic and social characteristics of women's HPV infection, establish the frequency of infection, the main HPV genotypes in precancerous diseases of the cervix. The results of the study emphasize the need to monitor the condition of the cervix for the timely detection and treatment of cervical lesions in order to prevent cervical cancer.

CONCLUSION

This study is important in identifying epidemiological data of high-risk HPV genotypes among women in Kazakhstan. It revealed that the most common types among women with cervical precancerous lesions in Kazakhstan are HPV-16 and HPV-52. This result is consistent with previous findings in other Asian countries and highlights the value of ongoing regional surveillance to inform effective vaccination and screening policies. The positive association observed between high-risk HPV prevalence and the severity of cervical precancerous lesions further supports the importance of HPV vaccination, particularly in terms of focusing on younger age groups prior to exposure to the virus.

The obtained results confirm that socio-demographic factors such as age and marital status, number of sexual partners have a significant impact on the risk of HPV infection. These findings emphasize the importance of preventive measures aimed at reducing the spread of HPV, including information on safe sexual behavior, vaccination and regular screening.

Authors' contributions:

T. M. Ukybassova, N. K. Kamzayeva, B. Zh. Imankulova – concept and design.

N. K. Kamzayeva, B. Zh. Imankulova, S. B. Makhambetva, M. S. Galym, Zh. N. Ibraeva, Zh. T. Tleuberdieva – collection and processing of material.

T. M. Ukybassova – editing.

B. Zh. Imankulova, Y. B. Baitas – text writing.

Conflict of interest:

No conflict of interest declared.

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РОЛЬ СОЦИАЛЬНО-ДЕМОГРАФИЧЕСКИХ ФАКТОРОВ В ИНФИЦИРОВАНИИ ВПЧ

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Цель. Инфекции, вызываемые высоко онкогенными типами вируса папиломы человека (ВПЧ), могут персистировать в организме человека, что увеличивает риск развития тяжелых поражений шейки матки с последующим их прогрессированием до инвазивного рака шейки матки. Целью данного исследования было изучение социально-демографических особенностей у пациенток с предраковыми заболеваниями шейки матки и анализ связи между ВПЧ-инфекциями и предраком шейки матки.

Материалы и методы. Собраны данные 402 женщин, включенных в научный проект «Национальная программа изучения ВПЧ с разработкой интегрированного подхода к эффективной диагностике и лечению предраковых состояний» на 2024 – 2026 гг. Исследование проводится в рамках программно-целевого финансирования Министерства науки и образования Республики Казахстан.

Результаты и обсуждение. Средний возраст женщин с положительным результатом теста на ВПЧ составил 33.08±6.62 г. Среди инфицированных ВПЧ каждая третья не состояла в браке (31,2%), показатель разводов составил 12.8%. Барьерный метод контрацепции использовали 33,83% участниц. Но несмотря на использование барьерного метода контрацепции пациентки были инфицированы ВПЧ. Наиболее распространенными типами у пациентов как с нормальной, так и с аномальной цитологией были ВПЧ-16 и ВПЧ-52. Дисплазия легкой и тяжелой степени наиболее часто отмечалась в типах ВПЧ-16, ВПЧ-33, ВПЧ-52, ВПЧ -58.

Выводы. Социально-демографические факторы, такие как возраст и семейное положение, оказывают значительное влияние на риск заражения ВПЧ. Молодые женщины и незамужние женщины, женщины, занятые на работе целый день, имеют более высокий уровень инфицирования.

Ключевые слова: вирус папилломы человека; онкоцитология; предраковые заболевания шейки матки; социально-демографические факторы; предраковые заболевания шейки матки; репродуктивный возраст

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АДАМ ПАПИЛЛОМАСЫ ВИРУСЫНЫҢ ИНФЕКЦИЯСЫНДАҒЫ ӘЛЕУМЕТТІК-ДЕМОГРАФИЯЛЫҚ ФАКТОРЛАРДЫҢ РӨЛІ

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Зерттеудің мақсаты. Жоғары онкогенді адам папилломасы вирусының (АПВ) түрлерінен туындаған инфекциялар адам ағзасында сақталуы мүмкін, бұл жатыр мойнының ауыр зақымдануының даму қаупін арттырады, олардың кейіннен жатыр мойны обырының инвазивтік асқынуына әкеледі.

Материалдар мен әдістер. Жатыр мойны обыры және АПВ инфекциясы туралы деректер 2024 – 2026 жылдарға арналған «Обыр алды жағдайларды тиімді диагностикалау мен емдеуге кешенді тәсілді әзірлеу арқылы АПВ зерттеу ұлттық бағдарламасы» ғылыми жобасына енгізілген 402 әйелден жиналды. Зерттеу Қазақстан Республикасы Ғылым және білім министрлігінің бағдарламалық-нысаналы қаржыландыру аясында жүргізілуде.

Нәтижелер және талқылау. АПВ сынамасының оң нәтижесі бар біздің зерттеудегі әйелдердің орташа жасы 33,08±6,62 жасты құрады. АПВ жұқтырған әйелдердің ішінде әрбір үшінші әйел некеде тұрмаған – 31,2%, ажырасу 12,8% құрады. Барьердық контрацепция әдісі 33,8%-ға белгіленді. Бірақ контрацепцияның тосқауыл әдісін қолданғанына қарамастан, науқастар АПВ жұқтырған. АПВ-16 және және АПВ-52 қалыпты және қалыпты емес цитологиясы бар науқастарда ең көп таралған түрлері болды. Жеңіл және ауыр дисплазия көбінесе АПВ-16, АПВ-33, АПВ-52, АПВ-58 түрлерінде байқалады.

Қорытындылар. Жасы және отбасылық жағдайы сияқты әлеуметтік-демографиялық факторлар АПВ жұқтыру қаупіне айтарлықтай әсер етеді. Жас әйелдерде, тұрмыс құрмаған әйелдерде және күні бойы жұмыс істейтін әйелдерде жұқтыру деңгейі жоғары.

Кілт сөздер: адам папилломавирусы; онкоцитология; әлеуметтік-демографиялық факторлар; жатыр мойнының ісік алды аурулары; репродуктивті жас