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The Role of Colposcopy in Detecting Precancerous Cervical Lesions in Women of Reproductive Age in Kazakhstan

Nazira Kamzayeva [1], Nazira Kadroldinova [2*], Sanimkul Makhambetova [3], Makhabbat Galym [4], Talshyn Ukybassova [5]

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[1] Obstetrician-gynecologist, «University Medical Center» Corporate Fund, Astana, Kazakhstan. E-mail: nazira.kamzaeva@umc.org.kz
[2] Obstetrics-gynecologist resident-physician, Department of Surgery, Nazarbayev University School of Medicine, Astana, Kazakhstan. E-mail: nazira.kadroldinova@nu.edu.kz
[3] Obstetrician-gynecologist, «University Medical Center» Corporate Fund, Astana, Kazakhstan. E-mail: sanimkul.makhambetova@umc.org.kz
[4] Obstetrician-gynecologist, «University Medical Center» Corporate Fund, Astana, Kazakhstan. E-mail: mahabbat_g@mail.ru
[5] Professor, «University Medical Center» Corporate Fund, Astana, Kazakhstan. E-mail: talshynu@yandex.ru

*** Corresponding author:** nazira.kadroldinova@nu.edu.kz

Abstract

Introduction. This study aims to investigate the distribution of high-risk HPV genotypes in different cervical pathology and identify the diagnostic agreement between colposcopy and cervical biopsy in Kazakhstan.
Methods. This is a cross-sectional cohort study that was conducted in a tertiary care hospital in Astana, Kazakhstan from November 2024 to March 2026. Women of reproductive age aged 18–45 years underwent HPV testing, a video-colposcopy and colposcopy-guided cervical biopsy.
Results. The study included 483 participants who were not previously vaccinated from HPV. Colposcopy was done for 285 women. 48.5% of participants had normal colposcopic impression, 40.1% had abnormal grade I impression, and 10.6% had abnormal grade II impression. Among these 285 patients, cervical biopsy results were available for 127 participants and the distribution of biopsy results varied significantly among three colposcopic impressions. The agreement percentage between colposcopic impressions and biopsy results is 37.5%, unweighted Cohen's $\kappa = 0.083$ (bootstrap CI -0.097-0.269) indicating weak and the quadratic-weighted $\kappa = 0.342$ (bootstrap CI [0.178, 0.477]) indicating a moderate degree of agreement.
Conclusion. Although discordance was present between colposcopy and cervical pathology, our results demonstrated that colposcopy has potential to increased diagnostic value in detection of high grade cervical changes.

Key words: cervical precancerous lesions, colposcopy, human papillomavirus, cervical biopsy, cervical cancer.

1. Introduction

Cervical cancer is a global healthcare burden that ranked to be the fourth most prevalent cancer among women worldwide [1]. An estimated incidence of cervical cancer exceeds 600,000 while number of deaths attributable for cervical cancer is almost 350,000 [2]. In Kazakhstan, estimated incidence of cervical cancer in age-standardized group was 19 per 100,000 women in 2022 and listed as a second most common cancer among this population [3-6].

The persistence of human papillomavirus (HPV) is a main factor of development of cervical cancer and precancerous lesions. HPV is a non-enveloped sexually transmitted virus with circular and double-stranded DNA [7]. The are more than 200 types of HPV with several types linked to different dysplastic lesions [7,8]. There are 12 high carcinogenic HPV strains that are more probable to cause cancer than other strains. This 12 types are identified by the International Agency for Research on Cancer (IARC) and include HPV 16/18/31/33/35/39/45/51/52 /56 /58, and 59 [9]. There are also group 2 or probably carcinogenic HPV strains reported by IARC and include HPV-68 (group 2A), HPV-26, HPV-30, HPV-34, HPV-53, HPV-66, HPV-67, HPV-69, HPV-70, HPV-73, HPV-82, HPV-85, and HPV-97 (group 2B) [10]. Almost 70% of cervical cancer worldwide related with HPV-16 and HPV-18.

However, previous studies show that the distribution of high-risk HPV genotypes vary among different cervical precancerous lesions [7-11]. In addition, population-related factors like migration and sexual behaviour and disease-related factors like precancerour lesion type and diagnostic methods are the main factors that gave this variability [10,11]. Therefore, the investigation of regional variations fof HPV prevalence and distribution are important for genotype-specific prevention of cervical cancer and prediction of vaccine efficacy [10,11].

Primary prevention of cervical cancer include vaccination against HPV. However, there are high-risk HPV strains that not targeted by currently available vaccines while being responsible for up to 7% of cervical cancer incidence worldwide [10]. These strains include HPV-35/ HPV-39/ HPV-51/ HPV-56/ HPV-59 [10].

Secondary prevention of cervical cancer includes screening programs. In some regions, including Kazakhstan, cervical cytology alone is considered as a secondary prevention [5,6]. World Health Organization (WHO) emphasized the importance of HPV DNA testing in low- and middle-income countries due to its higher sensitivity than cervical cytology [13].

In addition to cervical cytology and HPV DNA testing, colposcopy is an important next step in detection of cervical lesions [14]. Colposcopy is also included in the primary medical check up of cervical cancer in most of the countries, Kazakhstan [4,15-17]. However, the diagnostic value of colposcopy varies depending on population [18,19] and by now, there is a scarcity of research on diagnostic value of this methods in our region [6,20]. This study aims to investigate the distribution of high-risk HPV genotypes in different cervical precancerous lesions and identify the diagnostic agreement between colposcopy and cervical biopsy in identification of cervical lesions among unvaccinated women in Kazakhstan.

2. Materials and Methods

Study design

This is a cross-sectional cohort study conducted in the tertiary care hospital in Astana, Kazakhstan from November 2024 to March 2026. The study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [21].

Eligible population

Women of reproductive age aged 18–45 years, who were not pregnant at the time of the study, and with a regular menstrual cycle are enrolled to the study. Exlcusion criteria was the presence of chronic diseases, acute inflammatory processes, smoking history, intrauterine device in situ, history of HPV vaccination, use of probiotics and/or antibiotic therapy and/or immunosuppressive therapy within the previous 14 days and any surgeries within 45 days preceding the study.

The study instrument and Data collection

Polymerase chain reaction (PCR) was used for determination of high-risk HPV genotypes. The set of reagents “Realbest DNA HPV HCR genotype quantitative” is used, intended for the differential detection and quantitative determination of DNA of human papillomaviruses 16,18,31,33,35,39,45,51,52,56,58, and 59 types of highly carcinogenic risk.

The colposcopy was performed using MK-200 digital videocolposcope (Scaner, MEDVisor EVA, Russian Federation) with interchangeable magnifications from 3,3x to 22x. A patient was appropriately positioned on a gynecological chair, uterine cervix is visualized per vaginal speculum. Visual inspection of vagina and cervix was performed with naked eyes before colposcopic examination. Then videocolposcopy was performed with 3% percent acetic acid, which was applied to the vaginal part of the uterine cervix with a cotton swab and allowed to soak for 1 minute; visual examination was performed with colposcope. As the next step 5% iodine solution was applied to the vaginal part of the uterine cervix to highlight the dysplastic areas (if any) [23]. The colposcopy results were recorded accorign to 2011 IFCPC colposcopic terminology of the cervix [24].

Histopathological outcomes were graded according to the WHO terminology: normal, cervical intraepithelial neoplasia grade 1 (CIN1), cervical intraepithelial neo-plasia grade 2 (CIN2), cervical intraepithelial neoplasia grade 3 (CIN3) and carcinoma in situ [25].

Data analysis

Statistical analyses, as well as the visualization of results, were conducted using Python version: 3.11.12 (NumPy: 2.0.2, Pandas: 2.2.2, Statsmodels: 0.14.4, SciPy: 1.15.3, Scikit-learn: 1.6.1, Matplotlib: 3.10.0, Seaborn: 0.13.2).

Ethical Consideration

This study was conducted following the Declaration of Helsinki and its subsequent modifications and approved by the Local Bioethics Committee of "UMC" Corporate Fund (Minutes No. 2024/02-013 of 10 May 2024). All participants provided written informed consent. The research team complies with all principles of scientific ethics and biomedical research ethics, and maintains high standards of intellectual integrity when implementing the program.

3. Results

Socio-demographic data of the patients

The study included 483 participants who were not previously vaccinated from HPV. 256 participants had no HPV infection, while HPV was positive in 173 women. The socio-demographic data of the patients with and without HPV infection is presented in Table-1. The mean age of all participants were 34.5 ± 6.4 years with slightly older group of patients in HPV negative group (35.25 ± 6.18 years). There was no difference between groups in ethnicity, education level, BMI, number of sexual partners, hormonal contraception, and STI status. However, marital status, number of pregnancies and deliveries, number of abortions and use of any type of contraception, including barier were statistically higher among HPV negative women. The most significant difference was shown in barrier contraception use (70.8% in HPV negative group vs. 59.0% in HPV positive group, p = 0.0232).

Table 1 - Socio-demographic data of the patients

Variable	Statistics	HPV negative (n=310)	HPV positive (n=173)
Age	Mean ± SD	35.25 ± 6.18	33.17 ± 6.60
	Median [Q1–Q3]	34.96 [31.60–40.00]	33.86 [27.92–37.48]
	Min–Max	19.93–45.88	19.90–46.03
	Statistic (p)	t = 3.13	p = 0.0019
Ethnicity	Kazakh	285 (91.8%)	156 (89.9%)
	Russian	14 (4.7%)	10 (5.8%)
	Others	11 (3.5%)	7 (4,3%)
	Statistic (p)	Chi-square: 11.09	p = 0.4354
Education	Incomplete secondary	2 (0.8%)	1 (0.7%)
	Secondary professional	51 (16.3%)	21 (12.2%)
	Bachelor	215 (69.3%)	121 (70.5%)
	Masters	39 (12.5%)	26 (15.1%)
	PhD	3 (1.2%)	4 (1.4%)
	Statistic (p)	Chi-square: 1.58	p = 0.8130
Marital status	Single	58 (18.7%)	53 (30.9%)
	Married	222 (71.6%)	96 (55.4%)
	Divorced	27 (8.6%)	23 (12.9%)

	Widow	3 (1.2%)	1 (0.7%)
	Statistic (p)	Chi-square: 11.39	p = 0.0098
BMI	Mean ± SD	23.85 ± 4.62	23.36 ± 4.56
	Median [Q1–Q3]	23.14 [20.57–26.35]	22.31 [20.26–25.56]
	Min–Max	15.78–43.26	14.88–42.80
	Statistic (p)	t = 1.03	p = 0.3037
Number of sexual partners	Mean ± SD	1.57 ± 1.79	2.18 ± 5.42
	Median [Q1–Q3]	1.00 [1.00–1.00]	1.00 [1.00–2.00]
	Min–Max	0.00–20.00	0.00–60.00
	Statistic (p)	t = -1.65	p = 0.0991
Number of pregnancies	Mean ± SD	2.38 ± 1.91	1.51 ± 1.60
	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 = 22720.00	p = 0.0000
Number of deliveries	Mean ± SD	1.74 ± 1.39	1.20 ± 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
Number of abortions	Mean ± SD	0.36 ± 0.74	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 = 20258.00	p = 0.0011
Barrier contraception	0	219 (70.8%)	102 (59.0%)
	1	91 (29.2%)	71 (41.0%)
	Statistic (p)	Chi-square: 5.16	p = 0.0232
Hormonal contraception	0	300 (96.9%)	169 (97.8%)
	1	10 (3.1%)	4 (2.2%)
	Statistic (p)	Fisher: 0.69	p = 0.7536
Any type of contraception	0	210 (67.7%)	98 (56.8%)
	1	100 (32.3%)	75 (43.2%)
	Statistic (p)	Chi-square: 4.16	p = 0.0414
STI status	STI negative	64 (20.6%)	44 (25.2%)
	STI positive	246 (79.4%)	129 (74.8%)
	Statistic (p)	Chi-square: 0.84	p = 0.3604

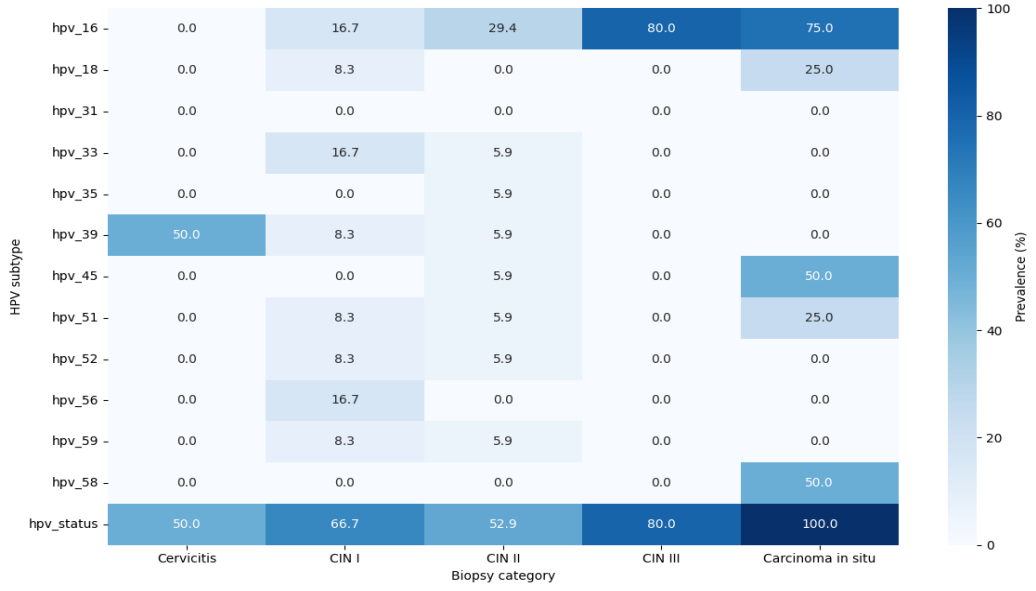


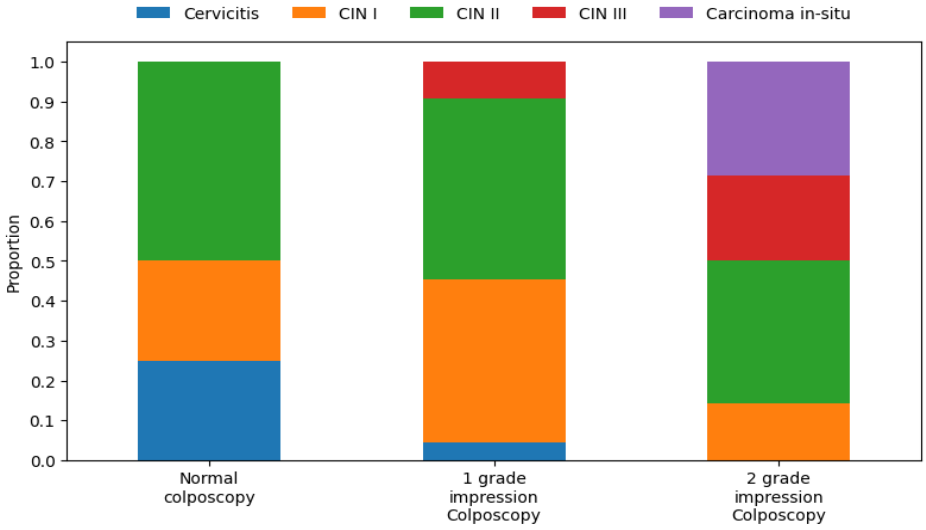
Figure 1 - Prevalence of HPV genotypes among cervical biopsy groups

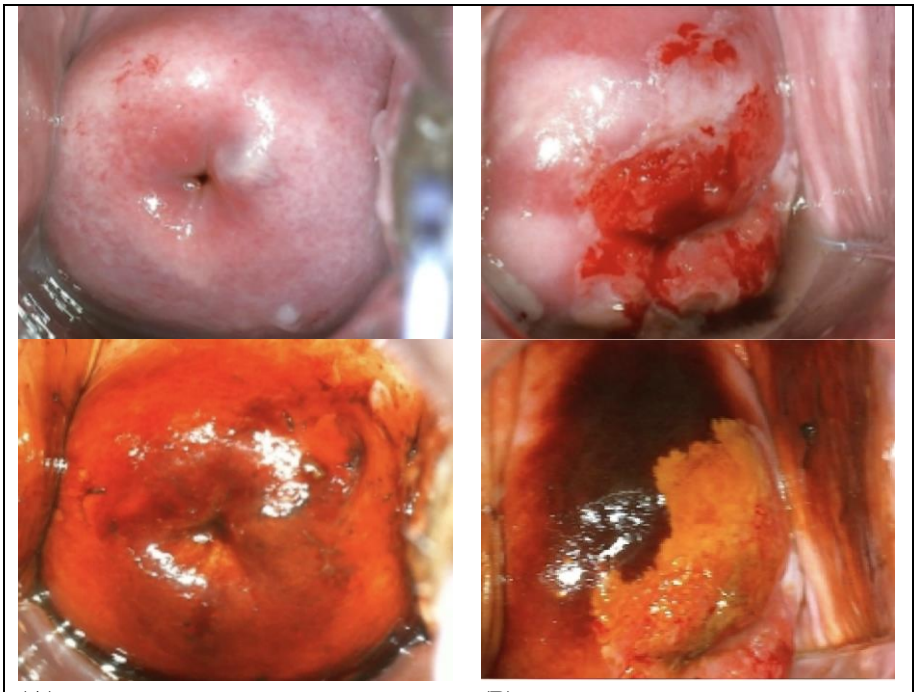
Distribution of HPV genotypes among cervical biopsy groups

Colposcopy was performed to 285 women. 48.5% of participant had normal colposcopic impression, 40.1% had abnormal grade I impression, and 10.6% had abnormal grade II impression. Among these 285 patients, cervical biopsy was performed to 127 patients. Among 12 high-risk genotypes of HPV, HPV-16 was the most prevalent genotype and had a positive correlation with biopsy results (from 16.7% in CIN I to 75.0% in carcinima in situ). In the heatmap presented in Figure 1, it is shown that HPV-18, HPV-33, HPV-35, HPV-39, HPV-45, HPV-51, HPV56, and HPV-58 were the next prevalent HPV genotypes among different biopsy groups.

Agreement between colposcopy and cervical pathology

Pathohistological analysis showed that cervicitis was present in 15 cases, CIN I in 55 cases, CIN II in 33 cases, CIN III in 14 cases, and carcinoma in situ in 10 women. The distribution of cervical histopathology results among three colposcopic impression groups is presented in Figure 2. The distribution of biopsy results varied among three colposcopic impressions.



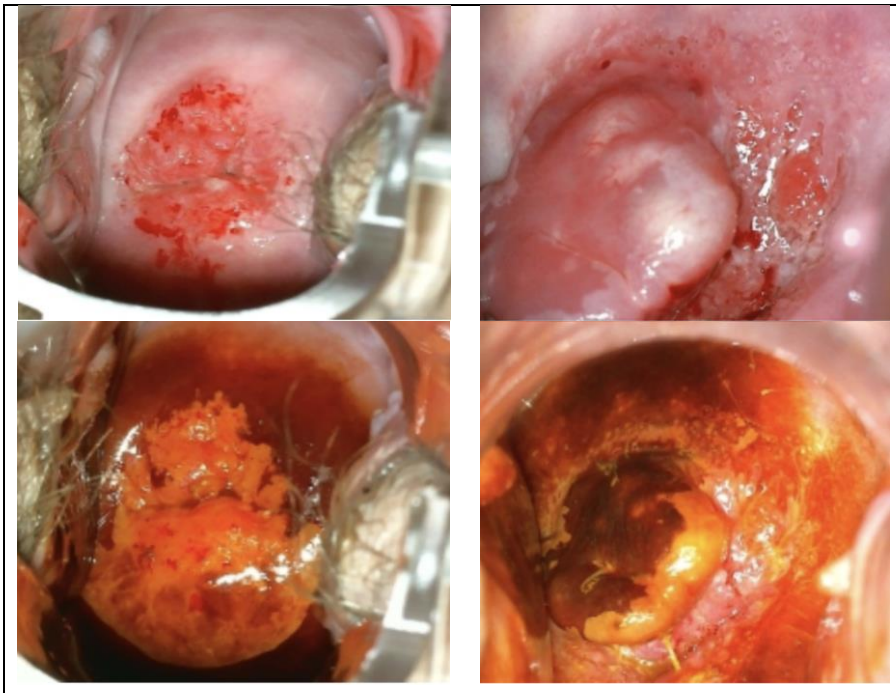


(A) (B)

Colposcopic images 1.
(A) Normal cervical colposcopy with the biopsy showing CIN II, HPV-59.

(B) Grade 2 impression colposcopy with thick acetowhite epithelium after acetic acid application which did not take up Lugol's iodine staining, the biopsy showing cervicitis with no atypia, HPV-16, Gardnerella vaginalis+, CMV+.
CIN – cervical intraepithelial neoplasia; HPV - human papillomavirus; CMV – cytomegalovirus.

The agreement percentage between colposcopic impressions and biopsy results is 37.5%. Unweighted Cohen's κ is 0.083 (bootstrap CI -0.097-0.269) indicating weak or virtually insignificant agreement. The quadratic-weighted κ is 0.342 (bootstrap CI [0.178, 0.477]) indicating a moderate degree of agreement across scales. According to figure 2, for normal colposcopy, there were biopsies of grades CIN I and CIN II; for colposcopy grade 1, there were many biopsies of CIN I, CIN II and with some cervicitis and carcinoma in situ; for colposcopy grade 2, CIN II–III and carcinoma in situ were also common. This means that most of the discrepancies are in adjacent categories (e.g., colposcopy grade 1 vs. biopsy CIN II), which explains the discrepancy between the unweighted kappa (low) and quadratic-weighted kappa (moderate).



A) (B)

Colposcopic images 2.
(A) Normal cervical colposcopy, zone of transformation type 3, biopsy showing CIN II, HPV negative.
(B) Grade 2 impression colposcopy with thick acetowhite epithelium in 11-12 o'clock after acetic acid application, biopsy showing cervicitis with no atypia, HPV-45.

CIN – cervical intraepithelial neoplasia; HPV - human papillomavirus.

4. Discussion

Cervical cancer rate remains high in low- and middle-income countries which represents the existing healthcare problems [2,26,27]. The root cause of this issue can be inadequte prevention and follow-up programs in that regions [26,27]. Therefore, in our study we addressed the secondary prevention of cervical cancer, including HPV testing and colposcopy among non-vacinnated women in Kazakhstan.

According to our results, marital status, parity and gravidity was negatively correlated with HPV status and this reflects the general trend worldwide [28-30]. The use of barrier contraception is also shown as a protective factor against HPV infection [28-30]. High-risk HPV

genotypes distribution was comparable with the previously reported epidemiological studies. HPV-16 is identified the leading cause of increasing grade of cervical precancerous lesions in both European and Asian population, including Kazakhstan [5,31,32]. However, the high prevalence of HPV-52 and HPV-33 in cervical precancerous lesions is present in Kazakhstani population showing the regional specificity of HPV genotype distribution [5,6,33].

A three-step diagnostic approach is a well-established strategy of cervical cancer, including screening, visual inspection, and histological confirmation [34,35]. Colposcopy is an integral component of this three-step diagnostic approach. However, the diagnostic accuracy of colposcopy differs between various studies and hospitals [14,36]. This can be explained by several clinical and anamnestic factors of the patients. These factors include menopause status, the type of transformation zone, and the status of HPV [37,38]. Previous studies reported that the diagnostic accuracy of colposcopy decreased to 56.02% in postmenopausal patients that is a decrease by 30-40% from premenopausal patients [36]. The challenge of accurate colposcopic examination in postmenopausal patients is primarily explained by changes in hormonal status. These changes lead to migration of tranformation zone to endocervix and thus decrease the visualization [36,39]. In our study, we included only premenopausal women and the influence of menopausal factor was excluded.

Colposcopic changes are also influenced by the presence of high-risk HPV. While some studies reporte that diagnostic accuracy is influenced differently by different genotypes of HPV, some clinical studies showed that HPV-16 and HPV-18 increase the agreement between colposcopy and cervical pathology [36]. This findings are explained by the pathological viral mechanism that causes visual cervical changes. However, our study results showed that despite positive viral status and colposcopic visual changes, cervical pathology may not show any atypical changes. This lead to further research questions, including investigation of viral load on diagnostic accuracy of colposcopy [40].

Although discordance was present between colposcopy and cervical pathology, our results demonstrated that high grade cervical lesions was visualized as either grade 1 or grade 2 colposcopic impression. This shows the importance of colposcopy as a guiding tool for cervical biopsy and for establishment of futher management. Our study confirms that diagnostic agreement between colposcopy and cervical pathology might vary depending on patients' factors. However, detailed visual inpection still remains an essential component of cervical cancer diagnosis in Kazakhstan.

Strengths and limitations

This study also investigates the agreement between colposcopy and cervical biopsy in this region for the first time. The current study uses standardized diagnostic procedures and internationally recognized diagnostic classifications from a single center. This shows the reliability of our results that can be further compared with future studies.

The main limitation of this study includes the number of participants that might decrease the statistical power for colposcopy and biopsy agreement. In addition, this study includes participants only from a single center that affect generalizability of the study. Finally, exclusion of vaccinated participants limits the investigation vaccine effect on diagnostic value of colposcopy. Therefore, future research should include higher number of patients from multi-centers, including vaccinated women.

5. Conclusion

Cervical cancer pose an important physical and mental health burden for women worldwide. Our study focused on secondary prevention of cervical cancer. The distribution of high risk HPV genotypes was comparable with the previous findings in our region. Although discordance was present between colposcopy and cervical pathology, our results demonstrated that colposcopy has increased diagnostic value in detection of high grade cervical changes. This proves the importance of colposcopy as a guiding tool for cervical biopsy as a final diagnosis and for establishment of further management. Further multi-center studies are necessary to validate these findings.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and was approved by the Local Bioethics Committee of "UMC" Corporate Fund (Minutes No. 2024/02-013 of 10 May 2024).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data can be shared up on request.

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Author contributions: Conceptualization – TM, NK; methodology – TM, NK, NK; validation – NK, NK; formal analysis – NK, MS; investigation – TM, NK, NK, SM, MG; resources - TM, NK, SM, MG; data curation – TM, NK ; writing—original draft preparation – NK, NK; writing—review and editing – TM, NK, NK; visualization – NK, SM; supervision – TM, NK. All authors have read and agreed to the published version of the manuscript.

References

1. Luo, Q., Zhang, H., Zeng, X., Han, N., Ma, Z., Luo, H., & Chongqing Cancer Multi-Omics Big Data Application Engineering Research Center. (2024). HPV specificity and multiple infections and association with cervical cytology in Chongqing, China: A cross-sectional study. *BMC Infectious Diseases, 24*, Article 804. https://doi.org/10.1186/s12879-024-09693-3

2. Liu, Y., & Ai, H. (2024). Comprehensive insights into human papillomavirus and cervical cancer: Pathophysiology, screening, and vaccination strategies. *Biochimica et Biophysica Acta (BBA) - Reviews on Cancer, 1879*(1), Article 189122. https://doi.org/10.1016/j.bbcan.2024.189122

3. Kamzayeva, N., Bapayeva, G., Terzic, M., Primbetov, B., Imankulova, B., Kim, Y., Sultanova, A., Kongrtay, K., Kadroldinova, N., & Ukybassova, T. (2025). Enhancing cervical cancer screening: New diagnostic methodologies, triage, and risk stratification in prevention and treatment. *Life, 15*(3), Article 367. https://doi.org/10.3390/life15030367

4. Aimagambetova, G., Chan, C. K., Ukybassova, T., Imankulova, B., Balykov, A., Kongrtay, K., & Azizan, A. (2021). Cervical cancer screening and prevention in Kazakhstan and Central Asia. *Journal of Medical Screening, 28*(1), 48–50. https://doi.org/10.1177/0969141320902482

5. Kadroldinova, N., Ukybassova, T., Primbetov, B., Imankulova, B., Makhambetova, S., & Galym, M. (2025). Distribution of high-risk human papillomavirus genotypes and their association with cervical cytology in Kazakhstani women. *Bulletin of Surgery of Kazakhstan*, (2), 67–72. https://doi.org/10.35805/BSK2025II007

6. Ukybassova, T., Aimagambetova, G., Kongrtay, K., Kassymbek, K., Terzic, M., Makhambetova, S., Galym, M., & Kamzayeva, N. (2025). Correlation of HPV status with colposcopy and cervical biopsy results among non-vaccinated women: Findings from a tertiary care hospital in Kazakhstan. *Vaccines, 13*(11), Article 1151. https://doi.org/10.3390/vaccines13111151

7. Rizzo, A., Moschese, D., Salari, F., Giacomelli, A., Morelli, L., Cossu, M. V., Fusetti, C., Petri, F., Casalini, G., Poloni, A., Lazzarin, S., Gori, A., Antinori, S., Gismondo, M. R., Lombardi, A., & Rizzardini, G. (2024). High prevalence of high-risk HPV genotypes in individuals attending an infectious diseases clinic from 2018 to 2022 in Milan, Italy. *Journal of Medical Virology, 96*(1), Article e29370. https://doi.org/10.1002/jmv.29370

8. Zhou, Y. X., Ma, X. H., Wang, T. T., Qu, X. L., & Zhang, X. Q. (2024). Analysis of age-specified and genotype distribution of HPV multiple infections in the Chinese population. *Scientific Reports, 14*(1), Article 2678. https://doi.org/10.1038/s41598-024-53271-1

9. Gholamzad, A., Khakpour, N., Hashemi, M., & Gholamzad, M. (2024). Prevalence of high and low risk HPV genotypes among vaccinated and non-vaccinated people in Tehran. *Virology Journal, 21*(1), Article 9. https://doi.org/10.1186/s12985-023-02270-1

10. Seyoum, A., Seyoum, B., & Gure, T. (2024). High rate of non-vaccine targeted high-risk HPV genotypes circulate among women in Eastern Ethiopia. *Scientific Rep., 14*, Article 958. https://doi.org/10.1038/s41598-024-51594-7

11. Aslanimehr, M., Nemati, S., Sadeghi, H., Samiee-Rad, F., Ghafari, S., & Naserpour-Farivar, T. (2025). High-risk HPV genotypes in women with abnormal cytology: A 12-year retrospective study. *Infectious Agents and Cancer, 20*, Article 34. https://doi.org/10.1186/s13027-025-00664-0

12. Perkins, R. B., Wentzensen, N., Guido, R. S., & Schiffman, M. (2023). Cervical cancer screening: A review. *JAMA, 330*(6), 547–558. https://doi.org/10.1001/jama.2023.13174

13. World Health Organization. (2021). *WHO guideline for screening and treatment of cervical pre-cancer lesions for cervical cancer prevention*. World Health Organization. https://www.who.int/publications/i/item/9789240030824

14. Ren, H., Jia, M., Zhao, S., Li, H., & Fan, S. (2022). Factors correlated with the accuracy of colposcopy-directed biopsy: A systematic review and meta-analysis. *Journal of Investigative Surgery, 35*(2), 284–292. https://doi.org/10.1080/08941939.2020.1850944

15. Imankulova, B., Babi, A., Issa, T., Zhumakanova, Z., Knaub, L., Yerzhankyzy, A., & Aimagambetova, G. (2023). Prevalence of precancerous cervical lesions among nonvaccinated Kazakhstani women: The national tertiary care hospital screening data (2018). *Healthcare, 11*(2), Article 235. https://doi.org/10.3390/healthcare11020235

16. Current Care Guidelines. (2019). *Cytological changes in the cervix, vagina and vulva*. Working Group Set Up by the Finnish Medical Society Duodecim and the Finnish Cardiac Society.

17. Kühn, W., & Gieseking, F. (2015). *Die aktuellen Empfehlungen der AG-CPC zur Kolposkopie 2015*. AG-CPC. https://www.ag-cpc.de/wp-content/uploads/2018/07/Gieseking-Empf-AG-CPC.pdf

18. Yang, Y., Li, F., Saha, M. N., Abdi, J., Reece, D., Chen, G. A., & Chang, H. (2020). Therapeutic potential of targeting IRE1α-XBP1 pathway in multiple myeloma with proteasome inhibitors. *Cancers, 12*(6), Article 1683. https://doi.org/10.3390/cancers12061683

19. Qin, D., Bai, A., Xue, P., et al. (2023). Colposcopic accuracy in diagnosing squamous intraepithelial lesions: A systematic review and meta-analysis of the International Federation of Cervical Pathology and Colposcopy 2011 terminology. *BMC Cancer, 23*, Article 187. https://doi.org/10.1186/s12885-023-10648-1

20. Balmagambetova, S., Tinelli, A., Urazayev, O., Koyshybaev, A., Ismagulova, E., Sakiyeva, K., et al. (2020). Colposcopy accuracy in diagnosing cervical precancerous lesions in western Kazakhstan. *Gynecologic Oncology Reports, 34*, Article 100661. https://doi.org/10.1016/j.gore.2020.100661

21. von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., Vandenbroucke, J. P., & STROBE Initiative. (2007). Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *BMJ, 335*(7624), 806–808. https://doi.org/10.1136/bmj.39335.541782.AD

22. Cooper, D. B., & Dunton, C. J. (2025). *Colposcopy*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK564514/

23. International Federation of Cervical Pathology and Colposcopy. (2011). *2011 IFCPC colposcopic terminology of the cervix (Annex 3)*. IFCPC. https://www.ifcpc.org

24. Ronco, G., Dillner, J., Elfström, K. M., Tunesi, S., Snijders, P. J., Arbyn, M., Kitchener, H., Segnan, N., Gilham, C., & Giorgi-Rossi, P. (2014). Efficacy of HPV-based screening for cervical cancer in Europe: Follow-up of four randomised controlled trials. *The Lancet, 383*(9916), 524–532. https://doi.org/10.1016/S0140-6736(13)62218-7

25. Arbyn, M., Weiderpass, E., Bruni, L., de Sanjosé, S., Saraiya, M., Ferlay, J., & Bray, F. (2020). Estimates of incidence and mortality of cervical cancer in 2018: A worldwide analysis. *The Lancet Global Health, 8*(2), e191–e203. https://doi.org/10.1016/S2214-109X(19)30482-6

26. Scioscia, M., Noventa, M., Palomba, S., & Laganà, A. S. (2021). Effect of the COVID-19 pandemic on oncology screenings: It is time to change course. *BJOG: An International Journal of Obstetrics & Gynaecology, 128*(13), 2213–2214. https://doi.org/10.1111/1471-0528.16857

27. Bruni, L., Albero, G., Serrano, B., et al. (2023). *ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre): Human papillomavirus and related diseases report*. ICO/IARC. https://hpvcentre.net

28. Tekalegn, Y., Sahiledengle, B., Woldeyohannes, D., Atlaw, D., Degno, S., Desta, F., Bekele, K., Aseffa, T., Gezahegn, H., & Kene, C. (2022). High parity is associated with increased risk of cervical cancer: Systematic review and meta-analysis of case-control studies. *Women's Health, 18*. https://doi.org/10.1177/17455065221075904

29. Kombe Kombe, A. J., Li, B., Zahid, A., Mengist, H. M., Bounda, G. A., Zhou, Y., & Jin, T. (2021). Epidemiology and burden of human papillomavirus and related diseases, molecular pathogenesis, and vaccine evaluation. *Frontiers in Public Health, 8*, Article 552028. https://doi.org/10.3389/fpubh.2020.552028

30. Guan, P., Howell-Jones, R., Li, N., Bruni, L., de Sanjosé, S., Franceschi, S., & Clifford, G. M. (2012). Human papillomavirus types in 115,789 HPV-positive women: A meta-analysis from cervical infection to cancer. *International Journal of Cancer, 131*(10), 2349–2359. https://doi.org/10.1002/ijc.27485

31. Auvray, C., Douvier, S., Caritey, O., Bour, J. B., & Manoha, C. (2023). Relative distribution of HPV genotypes in histological cervical samples and associated grade lesion in a women population over the last 16 years in Burgundy, France. *Frontiers in Medicine, 10*, Article 122440. https://doi.org/10.3389/fmed2023.122440

32. Kongrtay, K., Kadrodinova, N., Sultankulova, F., Batpanova, A., Kim, Y., Zhumasheva, D., Shanazarov, N., & Kamzayeva, N. (2023). Prevalence of high-grade HPV types among women in Astana, Kazakhstan (2018–2022). *Journal of Cancer Metastasis and Treatment, 9*, Article 32. https://doi.org/10.20517/2394-4722.2023.54

33. Jung, L., Klamminger, G. G., Nigdelis, M. P., & Eltze, E. (2025). Impact of HPV testing based on the 2020 update of the German cervical cancer screening program—Data from a retrospective monocentric study. *Cancers, 17*(12), Article 2024. https://doi.org/10.3390/cancers17122024

34. Yao, Q., Wang, J., Elfström, K. M., Strander, B., Dillner, J., & Sundström, K. (2024). Evaluation of primary HPV-based cervical screening among older women: Long-term follow-up of a randomized healthcare policy trial in Sweden. *PLoS Medicine, 21*(12), Article e1004505. https://doi.org/10.1371/journal.pmed.1004505

35. Chu, Y., Chen, Q., Liu, R., Zhou, X., Bao, M., Wang, H., & Lin, Y. (2024). Analysis of factors affecting the accuracy of colposcopic diagnosis of cervical lesions: A retrospective cohort study. *Frontiers in Medicine, 11*, Article 1462079. https://doi.org/10.3389/fmed.2024.1462079

36. Jach, R., Mazurec, M., Trzeszcz, M., et al. (2020). COLPOSCOPY 2020—Colposcopy protocols: A summary of the Clinical Experts Consensus Guidelines of the Polish Society of Colposcopy and Cervical Pathophysiology and the Polish Society of Gynaecologists and Obstetricians. *Ginekologia Polska, 91*(6), 362–371. https://doi.org/10.5603/GP.2020.0075

37. Qi, S., Tang, X., Ye, N., et al. (2025). Epidemiological characteristics of human papillomavirus in Guangzhou, China—A retrospective analysis of 76,898 cases. *BMC Public Health, 25*, Article 2061. https://doi.org/10.1186/s12889-025-23264-4

38. Benini, V., Ruffolo, A. F., Casiraghi, A., Degliuomini, R. S., Frigerio, M., Braga, A., et al. (2022). New innovations for the treatment of vulvovaginal atrophy: An up-to-date review. *Medicina, 58*(6), Article 770. https://doi.org/10.3390/medicina58060770

39. Baumann, A., Henriques, J., Selmani, Z., Meurisse, A., Lepiller, Q., Vernerey, D., et al. (2021). HPV16 load is a potential biomarker to predict risk of high-grade cervical lesions in high-risk HPV-infected women: A large longitudinal French hospital-based cohort study. *Cancers, 13*(16), Article 4149. https://doi.org/10.3390/cancers13164149

Қазақстандағы репродуктивті жастағы әйелдерде жатыр мойнының обыры алды патологиясын анықтаудағы кольпоскопияның рөлі

Қамзаева Н. [1], Кадролдинова Н. [2], Махамбетова С. [3], Ғалым М. [4], Үкібасова Т. [5]

[1] Акушер-гинеколог дәрігер, «University Medical Center» Корпоративтік қоры, Астана, Қазақстан.
E-mail: nazira.kamzaeva@umc.org.kz
[2] Акушер-гинеколог дәрігер-резидент, Хирургия кафедрасы, Назарбаев Университеті Медицина мектебі, Астана, Қазақстан.
E-mail: nazira.kadroldinova@nu.edu.kz
[3] Акушер-гинеколог дәрігер, «University Medical Center» Корпоративтік қоры, Астана, Қазақстан.
E-mail: sanimkul.makhambetova@umc.org.kz
[4] Акушер-гинеколог дәрігер, «University Medical Center» Корпоративтік қоры, Астана, Қазақстан. E-mail: mahabbat_g@mail.ru
[5] Профессор, «University Medical Center» Корпоративтік қоры, Астана, Қазақстан. E-mail: talshynu@yandex.ru

Түйіндеме

Кіріспе. Бұл зерттеудің мақсаты - Қазақстандағы жатыр мойнының обыры алды патологиясындағы жоғары қауіпті адам папилломавирусы (АПВ) генотиптерінің таралуын зерттеу және кольпоскопия мен жатыр мойны биопсиясы арасындағы диагностикалық сәйкестікті анықтау.

Әдістер. Бұл зерттеу - 2024 жылдың қарашасынан 2026 жылдың наурызына дейін Астана қаласындағы үшінші деңгейлі ауруханада жүргізілген көлденең когорттық зерттеу. 18-45 жастағы әйелдер АПВ тестілеуінен, бейне-кольпоскопиядан және кольпоскопия жетекшілігімен жатыр мойны биопсиясынан өтті.

Нәтижелер. Зерттеуге бұрын АПВ-дан вакцинацияланбаған 483 қатысушы қатысты. 285 әйелге кольпоскопия жасалды. Қатысушылардың 48,5%-ында кольпоскопиялық әсер қалыпты, 40,1%-ында I дәрежелі ауытқулар, ал 10,6%-ында II дәрежелі ауытқулар болды. Осы 285 пациенттің ішінде 127 қатысушы жатыр мойны биопсиясынан өтті және биопсия нәтижелерінің таралуы үш кольпоскопиялық әсер арасында айтарлықтай өзгерді. Кольпоскопиялық әсерлер мен биопсия нәтижелері арасындағы сәйкестік пайызы 37,5% құрайды, өлшенбеген Коэн к = 0,083 (bootstrap CI -0,097-0,269) әлсіздікті, ал квадраттық өлшенген к = 0,342 (bootstrap CI [0,178, 0,477]) орташа сәйкестік дәрежесін көрсетеді.

Қорытынды. Кольпоскопия мен жатыр мойны патологиясы арасында сәйкессіздік болғанымен, біздің нәтижелеріміз кольпоскопияның жатыр мойнының жоғары дәрежелі өзгерістерін анықтауда диагностикалық құндылығын арттыру мүмкіндігі бар екенін көрсетті.

Түйін сөздер: жатыр мойнының обыры алды патологиясы, кольпоскопия, адам папилломавирусы, жатыр мойнының биопсиясы, жатыр мойны обыры.

Роль кольпоскопии в выявлении предраковых поражений шейки матки у женщин репродуктивного возраста в Казахстане

Камзаева Н. [1], Кадролдинова Н. [2], Махамбетова С. [3], Галым М. [4], Укыбасова Т. [5]

[1] Врач акушер-гинеколог, Корпоративный фонд «University Medical Center», Астана, Казахстан. E-mail: nazira.kamzaeva@umc.org.kz
[2] Врач-резидент акушер-гинеколог, Кафедра хирургии, Школа медицины Назарбаев Университета, Астана, Казахстан. E-mail: nazira.kadroldinova@nu.edu.kz
[3] Врач акушер-гинеколог, Корпоративный фонд «University Medical Center», Астана, Казахстан. E-mail: sanimkul.makhambetova@umc.org.kz
[4] Врач акушер-гинеколог, Корпоративный фонд «University Medical Center», Астана, Казахстан. E-mail: mahabbat_g@mail.ru
[5] Профессор, Корпоративный фонд «University Medical Center», Астана, Казахстан. E-mail: talshynu@yandex.ru

Резюме

Введение. Целью данного исследования было изучить распределения генотипов вируса паппиломы человека (ВПЧ) высокого риска при предраковых патологиях шейки матки среди женщин Казахстане и определение степени соответствия результатов кольпоскопии и биопсии шейки матки.

Методы. Это поперечное когортное исследование, проведенное в многопрофильной больнице в Астане, Казахстан, с ноября 2024 года по март 2026 года. Женщины репродуктивного возраста 18–45 лет прошли тестирование на ВПЧ, видеокольпоскопию и биопсию шейки матки под контролем кольпоскопии.

Результаты. В исследование были включены 483 участницы, ранее не вакцинированные против ВПЧ. Кольпоскопия была проведена 285 женщинам. У 48,5% участниц кольпоскопическое заключение было нормальным, у 40,1% – аномальным I степени, и у 10,6% – аномальным II степени. Среди этих 285 пациенток биопсия была произведена 127 участницам, и распределение результатов биопсии значительно различалось между тремя кольпоскопическими заключениями. Процент совпадения между кольпоскопическими заключениями и результатами биопсии составляет 37,5%, невзвешенный коэффициент Каппа Коэна = 0,083 (bootstrap CI - 0.097-0.269), что указывает на слабое совпадение, и квадратично-взвешенный коэффициент Каппа = 0,342 (bootstrap CI [0.178, 0.477]), что указывает на умеренную степень совпадения.

Заключение. Хотя между кольпоскопией и патологией шейки матки наблюдалось расхождение, наши результаты показали, что кольпоскопия потенциально может повысить диагностическую ценность при выявлении изменений шейки матки высокой степени.

Ключевые слова: предраковые поражения шейки матки, кольпоскопия, вирус папилломы человека, биопсия шейки матки, рак шейки матки.