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CERVICAL CANCER: EFFECTIVENESS OF SCREENING AND POPULATION AWARENESS

Ortiqova Mubina Khursanbek qizi
Kokand University Andijan branch
Faculty of Medicine treatment direction
Email: qjsjdkfhdhudidbhssj@gmail.com

+998882326242
Scientific Supervisor: **Valijonov Shukrullo**

Abstract: The article analyzes the effectiveness of early detection (screening) of cervical cancer in Uzbekistan and the population's awareness of this issue. Screening methods such as PCR, cytological examination, HPV tests, and the results of pilot projects are highlighted. The population's level of knowledge, screening practices, and barriers are studied. Based on the research, effectiveness indicators, opportunities for increasing awareness, and future strategies are presented.

Keywords: cervical cancer, screening effectiveness, population awareness, Uzbekistan, HPV test, PCR, cytology

Introduction

Cervical cancer is one of the most common oncological diseases among women worldwide. In 2022, it ranked fourth in terms of new cases and fourth in mortality; globally, about 660,000 new cases and 350,000 deaths were recorded. About 88% of cases occur in low- and middle-income countries. In countries where screening programs have been systematically implemented, the incidence and mortality of cervical cancer have significantly decreased.

Screening methods include the Pap smear (cytological examination), HPV (human papillomavirus) molecular test, and VIA (visual inspection with acetic acid). Pap smears and regular screening can reduce mortality by up to 80%. The HPV test shows high sensitivity in detecting CIN2+ lesions (sensitivity 88–97%, specificity 73–93%).

In Uzbekistan, HPV vaccination and screening programs have expanded in recent years. From 2019 to 2021, with Gavi support, HPV vaccination was carried out among girls aged 9–14, achieving 98.6% coverage. In January 2025, pilot projects for HPV-based screening were launched. Along with this, PCR, cytology, and screening processes are being supported by innovative investments and incentive (bonus) systems. However, the correlation between the effectiveness of screening and the population's level of awareness has not been fully studied in Uzbekistan. Therefore, this article analyzes existing screening initiatives, their effectiveness, public awareness, and current shortcomings.

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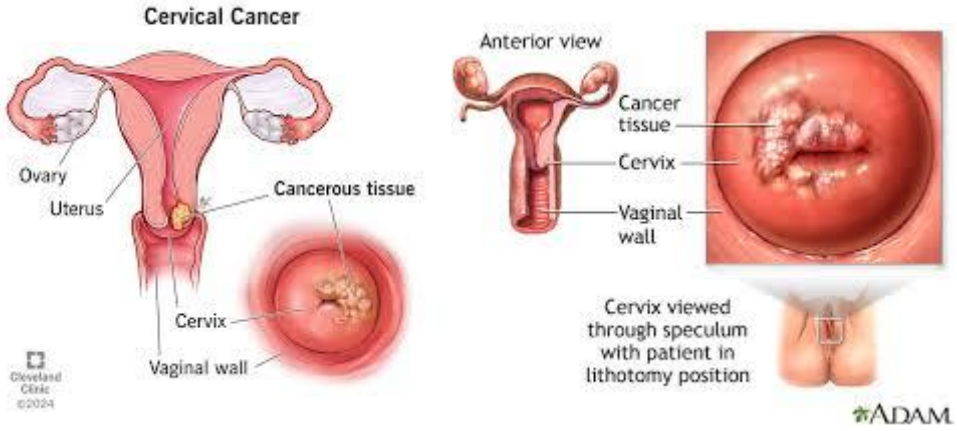

Research methodology

The research consists of two main segments:

1. Literature review and national data analysis

Data on Uzbekistan's screening programs (HPV vaccination, PCR and cytology, pilot screening projects) from 2021–2025 were collected

Global recommendations on Pap smear effectiveness, HPV test sensitivity, and screening strategies were analyzed.

2. Empirical study of population awareness

Based on the study "Human Papillomavirus Knowledge and Cervical Cancer Screening Practice among Uzbekistan Women", statistical analysis of awareness and screening practices among women in Tashkent was included. A survey of 445 women conducted in December 2020 served as the basis for analysis.

Main part

1. Current state of screening programs in Uzbekistan

1.1 HPV Vaccination

The HPV vaccination program launched in 2019 was implemented in cooperation with Gavi, WHO, and UNICEF. By 2021, 591,478 girls were vaccinated, achieving 98.6% coverage. Such high success was ensured through proper planning, involvement of class teachers, community and religious leaders, and social promotion campaigns.

1.2 PCR and Cytological Screening

In 2024, President Mirziyoyev introduced a bonus system and new regulations for early disease detection. A total of 1,700,000 women were screened, and 49,000 precancerous conditions were identified. PCR and cytology are applied at the primary care level, with recommendations for women aged 30–50 to undergo annual PCR and mammography every two years. Medical registries, electronic databases, and specialized training centers are being established.

1.3 HPV-Based Pilot Screening Projects

In Karakalpakstan, 10 districts (49,140 women) were studied: 6.7% tested HPV positive. Detection of CIN types: CIN I – 11.1%, CIN II – 15%, CIN III – 9%, carcinoma in situ – 3.7%, invasive cancer – 1%.

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In the UNFPA pilot (2021–2022) in Chirchiq and Karakalpakstan: among 6.7% HPV-positive women, 23% were referred to oncology departments, 1.2% underwent surgery, and 31% were treated with thermal ablation or radiowaves.
From 2022–2024, 28,179 women were screened:
2022 – 11 deaths reported
2023 – 1,075 precancerous cases (12.62%)
2024 – 1,130 precancerous cases (15.63%)
These results demonstrate the effectiveness of regular screening. According to the 2025 UNFPA report, Uzbekistan recorded 1,650 new cervical cancer cases and 1,000 deaths in 2020; projections estimate an increase to 2,100 cases and 1,300 deaths by 2030.

2. Screening Effectiveness

2.1 Pap Smear and HPV Test Effectiveness

Regular screening with Pap smears can reduce mortality by up to 80%. HPV testing has high sensitivity and specificity, with CIN2+ detection sensitivity of 88–97% and specificity of 73–93%.

2.2 Results in Uzbekistan

The increase in precancerous cases detected in screening programs (12.62% → 15.63% from 2023–2024) indicates growing effectiveness. Detection of CIN and cancerous pathologies in pilot projects demonstrates successful identification and treatment opportunities. The bonus system and medical registries also positively influenced efficiency by saving resources.

3. Population Awareness and Practice

3.1 Knowledge level and screening experience

The 2020 survey in Tashkent among 445 women revealed:
63.1% had undergone screening at least once
64.8% of them had been tested within the last two years

Women with lower knowledge levels (<median) were at higher risk of not undergoing screening within two years (RR = 1.57). Women with a history of STDs had a lower risk of missing screening (RR = 0.54). Although the correlation between knowledge and practice is not always direct, lack of information remains a significant barrier.

3.2 Global Barriers

International studies indicate that the main reasons for not participating in screening are economic conditions, education level, health literacy, cultural and social barriers, transport, and limited providers. Enhancing health literacy through education and multimedia tools improves effectiveness.

4. Balanced Analysis

Advantages: HPV vaccination, PCR, and pilot screening programs are yielding positive results.
Increasing detection of precancerous conditions.
High vaccination coverage. Introduction of bonus systems and electronic registries.
Shortcomings: Awareness of preventive measures among the population is insufficient. Even in Tashkent, 36.9% of women have never undergone screening. Lower screening participation among women with lower education.

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Barriers:
Cultural restrictions.
Low health literacy.
Limited transportation, especially in rural areas.
Infrastructure and diagnostic service availability.

Analysis and Results

1. Screening Effectiveness: HPV vaccination and pilot screening projects are identifying precancerous and early oncological conditions, enabling timely treatment and reducing mortality. For example, precancerous cases increased from 12.6% (2023) to 15.6% (2024).
2. Population Awareness: In Tashkent, 63.1% of women had been screened, 64.8% within two years; however, low knowledge levels negatively impacted practice.
3. Barriers: Low education, lack of information, cultural views, and insufficient infrastructure are major obstacles.
4. Trends: Screening programs are expanding, bonus systems introduced, electronic registries developed – all of which contribute to greater effectiveness.

Conclusion

In Uzbekistan, significant progress is being made in the fight against cervical cancer through screening effectiveness and population awareness. HPV vaccination, HPV and PCR-based pilot screening projects, the bonus system, and electronic registries demonstrate positive results.

However, increasing public awareness, improving education and health literacy, and overcoming cultural and logistical barriers are essential. Innovative communication, multimedia education, health literacy programs (static and interactive), and community engagement can enhance effectiveness.
Future directions: Expand HPV-based screening nationwide. Introduce remote (telemedicine) and innovative methods (mobile testing, AI-assisted VIA, automated cytology). Improve access to medical services and information, especially in rural areas.Encourage participation through new strategic communication approaches.

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