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Cervical cancer screening using the self-sampling method among Kazakhstani women: A pilot validation study

Kuralay Amirbekova [1], Yerbolat Iztleuov [2], Gulnara Sakhipova [3], Gulzhanat Aimagambetova [4]

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Corresponding author:
Gulzhanat Aimagambetova,
E-mail:
gulzhanat.aimagambetova@nu.edu.kz

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[1] Undergraduate Student, School of Medicine, Nazarbayev University, Astana, Kazakhstan
[2] Head of the Department of Radiology, Marat Ospanov West-Kazakhstan Medical University, Aktobe, Kazakhstan
[3] Associate Professor, Department of General Medicine, Marat Ospanov West-Kazakhstan Medical University, Aktobe, Kazakhstan
[4] Assistant Professor School of Medicine, Nazarbayev University, Astana, Kazakhstan

Abstract

Background. With the high rates of cervical cancer incidence and mortality in Kazakhstan and limited coverage of the national cytological cervical screening program, the alternative methods of screening need to be tested and implemented. This is a pilot study that aims to validate acceptance of the cervical self-sampling device for human papillomavirus (HPV) detection among Kazakhstani women and investigate their perceptions of the comfort, potential advantages, and barriers of the approach.

Methods. Two questionnaires and a self-sampling HPV test BGI Sentis was distributed among women attending outpatient gynecological facilities in Astana in January 2025 - June 2025. Ordinal logistic regression and non-parametric tests are used to find the relationships between sociodemographic and medical characteristics and attitudes of women.

Results. A total of 34 women were included in the final analysis. 61.8% of participants perceived the self-sampling test as easy to take, 82.4% as unpainful, and 58.9% as not unpleasant. Only 44.1% of respondents are sure they took the sample correctly. For their subsequent cervical cancer examination, 38.2% of respondents would choose the self-sampling method, 58.8% - a gynecologist-taken sample, 3% - a GP-taken sample.

Conclusions. Women in Kazakhstan accept HPV self-sampling devices as an efficient and comfortable way to increase coverage of cervical cancer screening. Despite their positive experience with the self-sampling device, participants prefer sampling done by a healthcare professional over self-sampling across the board, with no difference in age, marital status, number of children, or other factors. There could be social, cultural, and economic factors affecting women's preference for sampling by a doctor that need to be further investigated.

Keywords: cervical cancer, precancerous diseases of the cervix, self-collection of material.

1. Introduction

Cervical cancer is an abnormal growth of cells of the cervix, a lower part of the uterus that connects to the vagina (birth canal) [1]. In 2020, there were 604,000 new cases and 340,000 deaths detected worldwide due to cervical cancer. Cervical cancer was estimated to be the 4th most common cancer in women (6.5% of all new cancer cases) and the 8th most common cancer overall (3.1% of all new cancer cases) [2]. About 85% of cervical cancer deaths worldwide occur in developing countries, with the death rate 18 times greater in low- and middle-income countries compared with wealthier nations [3].

In Kazakhstan, in 2018, the crude incidence rate of cervical cancer was estimated to be 19.5, while the crude mortality rate was 6.4 per 100,000 women. Age-standardized incidence rate (ASIR) was 18.3 per 100,000 women [4]. In Kazakhstan, cervical cancer ranks second among cancers that affect women [5]. According to Igissinov, et.al. (2021), the ASIR of cervical cancer in Kazakhstan is at its highest at the ages of 45 to 64, with the average age of cervical cancer patients being 50.7 [4].

Human papillomavirus (HPV), a sexually transmitted infection, is the cause of cervical cancer in 99.7% of cases [6]. HPV is a double-stranded DNA virus belonging to the Papillomaviridae family of more than 200 types of viruses that affect skin basal epithelial cells or inner lining of tissues [7]. Other than cervical cancer, HPV can cause anal, oropharyngeal, penile, vaginal, and vulvar cancer [1]. Based on their correlation with cancer risk, HPVs can be classified as high-risk and low-risk. Low-risk HPV types, types 6, 11, 42, 43, and 44, can cause warts on or around the genitals, anus, mouth, or throat but don't cause cancer. High-risk HPV types, types 16, 18, 31, 33, 34, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68, and 70, can cause several types of cancer [1,8]. HPV-16 and -18, specifically, account for over 50% and 10% of cervical cancer cases, respectively, and are considered the prevailing cause of cervical cancer [6].

As HPV is a sexually transmitted infection, the risk factors of cervical cancer include sexual activity factors, such as the age of first sexual contact, having several partners, and parity, and other health factors, such as smoking, long-term use of oral contraceptives, and co-infection with chlamydia, genital herpes, and human immunodeficiency virus infection (HIV) [6]. The majority sexually active people in the world will have come in contact with HPV at least once in their lifetime without experiencing any pathologies [7]. Worldwide, the prevalence of HPV 16/18 is equal to 3.9% in women with normal cytology, 25.8% with low-grade lesions, 51.9% with high-grade lesions, and 69.4% with cervical cancer. A large proportion of cervical cancer cases are caused by high-risk HPV types, which is proven by histology results in women with invasive cervical cancer that indicate the presence of HPV-16 and HPV-18 in 55.2% and 14.2% of cases, respectively [9]. The increased risk of HPV infection coincides with the highest metaplastic activity, which occurs at puberty and first pregnancy and drops after menopause. Sexually active young women aged 18-30 are the most exposed to HPV infection; then, there is a sharp decline in prevalence to the virus. Nonetheless,

women over 35 are significantly more likely to get cervical cancer, indicating that HPV infection starts earlier and eventually develops into cancer later in life [8].

There is no available data from the HPV Information Centre on the HPV burden in the general population of Kazakhstan yet. In Asia, the estimated prevalence of cervical HPV-16/18 infection at any one moment is 3.4% of women in the general population [5]. According to some limited studies, between 43.8% and 55.8% of the population of Kazakhstan is HPV positive. Still, the state of the epidemiology of HPV-related cancers in Kazakhstan is not well understood due to a lack of available data. Researchers can only infer the widespread nature of HPV from the high incidence and mortality rates of cervical cancer due to the absence of reliable data and HPV screening and low public awareness of the problem [10].

Cervical cancer can be prevented using primary and secondary prevention methods. Primary prevention involves the elimination of risk factors to prevent disease occurrence. In the case of cervical cancer, primary prevention includes HPV vaccination and sexual health education [11]. The first vaccine against HPV, Gardasil (Merck&Co, Pennsylvania), was licensed and approved by the US Food and Drug Administration in 2006. It protects against four HPV strains: 6, 11, 16, and 18 [6]. Additionally to Gardasil, three other HPV vaccines are in use: Gardasil-9, Cervarix, and Cecolin. Since the vaccine was first approved, more than 100 WHO member countries implemented it successfully [12].

Secondary prevention entails early diagnosis and treatment of the disease. Secondary methods for cervical cancer prevention include cervical cancer screening and HPV DNA tests [11]. The techniques for screening preinvasive disease include conventional cervical cytology, or Papanicolaou test (Pap-smear), liquid-based cytology, histological methods such as visual inspection using 3%-5% acetic acid (VIA) and Lugol's iodine (VILI), and HPV DNA testing [11,13]. Cervical cytology is the globally recommended cervical cancer screening method that has been shown to reduce the occurrence of invasive cervical cancer by up to 80% [11]. Pap-smear detects abnormal cell changes and precancers in the transformation zone of the cervix that can be treated before they turn into cancer [1]. The WHO suggests that women in general and women living with HIV should begin routine cervical cancer screening at ages 30 and 25, respectively. Where HPV DNA tests are unavailable, WHO suggests a screening interval of 3 years using VIA or cytology as primary tests [8].

Despite its immense contribution to cancer prevention, the Pap-smear test has limitations, namely low sensitivity and coverage. The sensitivity and specificity of Pap-smear in detecting cervical premalignant and malignant lesions are equal to 47.19% and 64.79%, respectively [14]. Inadequate samples constitute about 8% of cytology specimens received. There have been reports of false-negative rates as high as 20–30% [8]. Low sensitivity can be solved by co-testing - the approach of using cervical cytology together with HPV testing. A combination of the high sensitivity of HPV DNA testing and the high specificity of cytology can lengthen the screening interval for women who tested negative by both methods. The FDA authorized such a combined test in 2003 for primary screening use in low-risk women 30 years of age and older [11].

In 2020, the WHO officially launched the Global Strategy to Accelerate the Elimination of Cervical Cancer. By 2030, the Global Strategy aims "to vaccinate 90% of eligible girls against HPV, to screen 70% of eligible women at least twice in their lifetimes, and to effectively treat 90% of those with a positive screening test or a cervical lesion, including palliative care when needed" [13].

In Kazakhstan, women are screened for cervical cancer using the cervical cancer cytology, Papanicolaou test (Pap-test). The national cervical cancer screening program is covered by the Government and is available free of charge for all women aged 30-70 every 4 years in any gynecologic outpatient department. HPV testing is offered only on a self-pay basis and in big cities [15]. The use of only Pap-test as a screening method makes the cervical cancer prevention program in Kazakhstan less efficient than most developed countries, which employ co-testing [4]. Still, the introduction of a screening program in Kazakhstan has shown substantial results: in 2007, the percentage of women with an advanced stage upon diagnosis, or the neglect rate, was 26.7%. Since the

state cervical screening program was implemented in 2008, the neglect rate has fallen by half [4].

Overall, 4,460,320 women were screened for cervical cancer in Kazakhstan as of 2018. The coverage of cervical cancer screening was 45.9% in 2016 [16]. The present coverage does not meet the goals set by the WHO and the Ministry of Health of the Republic of Kazakhstan, which is to reach at least 70% of the population at risk [17]. According to Issa, et.al. (2021), the low screening coverage can be explained by low awareness about cervical cancer and the free screening program and the fact that participants regarded themselves either healthy or too young to attend screening. With these factors, other potential reasons for low screening coverage include a lack of practical resources such as sufficient medical facilities nearby or time to go to the screening, emotional barriers such as fear of the results, discomfort during the procedure, and distrust towards medical institutions [18].

Self-sampling devices for Human Papillomavirus (HPV) detection are used as a potential way to increase cervical cancer screening coverage. Patients use brushes or other devices to collect samples from the cervix by themselves. A possible benefit of self-sampling is the potential for reaching those at risk of developing cervical cancer who are unable to see a doctor for screening. The participation rates of self-sampled HPV tests are higher than in physician-collected tests [19]). According to Chao, et.al. (2018), for the detection of CIN2 (cervical intraepithelial neoplasia) or severe diagnosis, HPV self-sampled testing can attain diagnostic test accuracy comparable to that of clinician-sampled tests. In terms of ease of use, privacy, and physical and mental comfort (such as less pain, anxiety, and shame), self-sampled specimens are deemed acceptable [20]). Overall, self-sampling devices are considered an accurate, comfortable, and convenient method for HPV detection and cervical cancer prevention on a larger scale.

Aim: to validate acceptance of the cervical self-sampling device for HPV detection among Kazakhstani women and investigate their perceptions of the comfort, potential advantages, and barriers of the approach.

Hypothesis: Kazakhstani women accept self-sampling devices for HPV detection as an efficient and comfortable way to increase participation and coverage of cervical cancer screening, as compared to traditional methods administered by healthcare professionals.

2. Materials and Methods

Study design and participants

This is a cross-sectional study, which was conducted in the period of January 2025 – June 2025 in the outpatient gynecological facilities of Astana, Kazakhstan. A total of 34 women participated in the study, answered the demographic and topic-related questionnaires fully, and were included in the analysis.

Inclusion criteria

The study participants were selected from the general population based on age, health, and literacy. Women above 18 years were surveyed on the grounds of their ability to give informed consent. The study participants had to have an intact cervix with no prior surgeries done on the cervix, including a total hysterectomy. Participants had to be able to read, write, comprehend, and respond to survey questions. Women younger than 18, with no intact cervix, or those who cannot read, write, comprehend, and give valid answers in Russian, Kazakh, or English were excluded from participating in the study. Those who could not use the test due to menstruation or physiological concerns, or withdrawn consent after learning about the method of taking the sample, were also excluded from the study.

Study instruments

The primary instrument in the study were (1) BGI Sentis self-collection kit for HPV (Figure 1). The BGI HPV test combines self-sampling technology and genotyping assay to detect 14 high-risk HPV types, 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68, and 2 low-risk types - 6, 11. Study participants are presented with the BGI DNA sample storage card and a brush for sample collection and asked to take a sample themselves. Before taking a sample, participants get thorough written and verbal instructions on the use of the test.

Figure 1 - BGI Sentis self-sampling card for HPV contents: a) Sampling brush; b) DNA sample storage card

Two questionnaires were used in the study. The first survey collected data on the demographic and clinical characteristics of women. Sociodemographic data recorded were age, ethnicity, marital status, number of pregnancies, births, living children, and abortions. Clinical metrics such as height, body mass, age of menarche, menstrual function, age of start of sexual activity, gynecological disorders and surgeries endured, smoking status, contraceptive use, and oncological diseases in participants or their close relatives were also recorded. There was a section with questions regarding gynecologic screening tests - Pap-smear and vaginal microbiome test. The second questionnaire was adapted from De Pauw, et.al. (2021) [21] and adapted to investigate the acceptance of the self-sampling device among women in Kazakhstan. The questionnaire was modified to fit the context of Kazakhstan. All questions were translated into Kazakh and Russian languages (the official languages of the country) by independent trilingual translators. The survey was divided into two parts for women to answer: before and after using the self-sampling device. The first part focuses on the awareness of women on the topics of HPV and cervical cancer, preliminary preferences in methods of taking the test, and the potential benefits of self-sampling devices. Questions after taking the test evaluate the instructions attached to the test and the comfort and ease of use of the self-sampling test. Both parts included Likert scale questions and Yes/No, Agree/Disagree questions. Additionally, information about the participant's experience with the Pap-test is also requested.

Variables

Independent variables

In this research, the independent variables included sociodemographic characteristics such as age, BMI, education level, marital status, and number of living children. Age was categorized into two groups: 19-32 and 32-66 years. Ethnicity was categorized into 2 groups: Kazakh and other ethnicities. Education level was categorized as middle (high school), middle-specialized (college), and higher. Additionally, BMI (underweight, normal weight, overweight, obese), age of menarche (12≥, 13-15, 15<), number of abortions (none, 1, more than 1), and the use of contraceptives (yes, no) are all independent variables.

Outcome variable

The outcome variable was the preference of women for sampling methods for their next cervical cancer examination. Women chose between self-taken, a general practitioner-taken, and a gynecologist-taken sample. For the sake of statistical analysis, the options of

a GP and a gynecologist taking a cervical sample were combined as "health provider-taken samples".

Statistical analysis

Statistical analysis was performed on Statistical Package for the Social Sciences (SPSS) software. All continuous variables were tested for normality of data distribution, revealing non-normal distribution for age, BMI, and age of menarche. The variables were described as median and interquartile range and non-parametric tests, Mann-Whitney U and Kruskal-Wallis tests, with a significance value of <0.05 were used to analyze the relationships between continuous and categorical variables. Pearson Chi-square test and Fisher's exact test with a significance value of <0.05 were used to analyze the relationships between nominal variables.

Ethical considerations

The study was approved by the Institutional Research Ethics Committee of Nazarbayev University (NU IREC) on 21 October 2022 (IREC Number: 621/03102022). Before inclusion in the study, all potential participants were informed about the aims, methods, risks, and benefits of the study. Written consent was obtained from participants after an explanation of the study's voluntary and anonymous nature.

3. Results

A total of 34 women aged 19 to 66 years agreed to participate in the study. Table 1 represents the socioeconomic characteristics of the participants. The median age of participants was 28.5 (21.25-41) years, with 19 participants aged 19-32 (55.9%) and 15 participants older than 32 (44.1%). Most participants were of Kazakh descent (94.1%). 67.6% of participants had a higher education. The majority of participants are married (52.9%) and have children: 41.2% have 1 to 3 children, and 20.6% have more than 4 children.

Table 1 - The socioeconomic characteristics of the participants (N = 34)

Variables	BGI sentis, N = 34 (%)
Age, Median	28.5 (21.25-41)
19-32	55.9 %
32<	44.1%
Ethnicity	
Kazakh	32 (94.1)
Other	2 (5.9)
Education	
Middle (high school)	7 (20.6)
Middle-specialized (college)	4 (11.8)
Higher	23 (67.6)
Marital status	
Married	18 (52.9)
Single	16 (47.1)

Table 2 depicts the health characteristics, especially related to gynecological examinations, of the participants. The median BMI of the women is 22.81 (19.54-27.11), which is within the normal range, with 11.8% within the underweight, 20.6% within the normal, 47.1% within the overweight, and 20.6% within the obese range.

The median age of menarche is 13 (13-14.75). Most participants have normal menstrual function (67.6%) and don't suffer from gynecological disorders (70.6%). The most common gynecological illnesses among the participants are uterine fibroids (11.8%) and ovarian cysts (11.8%). The majority of the respondents have not undergone any reproductive system surgeries (73.5%) and never had abortions (61.8%). 20.6% of respondents have never had sexual experience, while 11.8% had their first experience at the age of 18 or younger, 44.1% at 19-22 years, and 23.5% older than 22 years. Among the sexually active participants, 14 don't use any contraception (41.2% of all), 8 use IUDs (23.5%), and 5 use barrier contraception methods (14.7%). Most participants have not taken a Pap smear (79.4%). The majority of participants don't smoke (91.2%), have no oncological disorders (100%), and have no relatives who have oncological disorders (94.1%).

Table 2 - The health characteristics of the participants

Variables	Total N = 34 (%)
BMI, Median 22.81 (19.54-27.11)	
Underweight (18.5>)	4 (11.8%)
Normal weight (18.5-24.9)	7 (20.6%)
Overweight (25.0-29.9)	16 (47.1%)
Obese (30.0≤)	7 (20.6%)
Menarche age, Median 13 (13-14.75)	
12≥	4 (11.8%)
13-15	28 (82.3%)
15<	2 (5.9%)
Menstrual function	
Normal	23 (67.6%)
Abnormal	11 (32.3%)
Age of start of sexual activity	
Never	7 (20.6%)
18≥	4 (11.8%)
19-22	15 (44.1%)
22<	8 (23.5%)
Gynecological illnesses	
None	24 (70.6%)
Uterine fibroids	4 (11.8%)
Ovarian cyst	4 (11.8%)
Other	3 (8.8%)
Gynecological surgeries	
None	25 (73.5%)
C-section	3 (8.8%)
Other	6 (17.6%)
Abortions	
None	21 (61.8%)
1	9 (26.5%)
1<	4 (11.8%)

Pap-smear	
Performed	7 (20.6%)
None	27 (79.4%)

Figure 2 illustrates the participants' opinions regarding the BGI self-sampling HPV test before using it. The overwhelming majority believed that the self-sampling test is a good way to increase coverage of cervical cancer screening among women who do not go to a general practitioner or gynecologist for a Pap-smear (76.5%). 67.6% of the women believed that the self-taken sample is worse than that taken by a doctor. Most women claim that the self-sampling approach is suitable for women who have not undergone cervical cancer screening before (58.8%). When it comes to the possible preference of self-sample over going to the doctor's office, women were conflicted - 38.3% believe that most women will choose self-sampling over the sampling by a health professional, 35.3% disagree, and 26.5% are not sure.

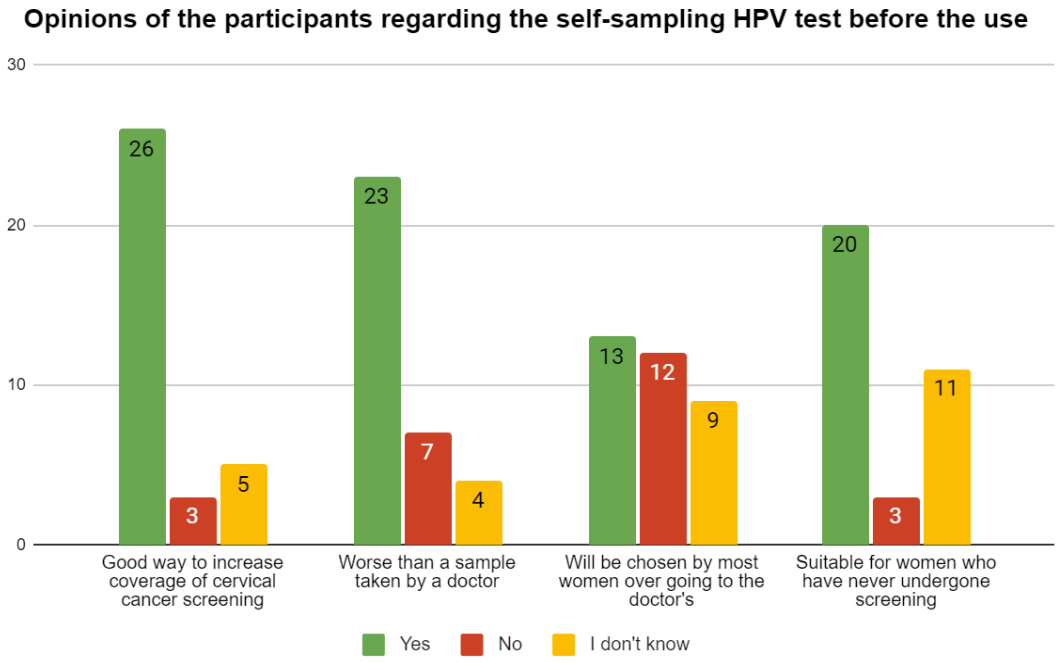

Figure 2 - Opinions of the participants regarding the self-sampling HPV test before the use (N=34). Yes (green bar); No (red bar); I don't know (yellow bar)

Figure 3 shows the participants' perceptions of their experiences with the BGI self-sampling HPV test after using it. The majority, 61.8%, perceived the test to be easy to take. 82.4% of the women disagreed with the statement that the test is painful, and 58.9% disagreed that it is unpleasant. 44.1% of respondents are sure they took the sample correctly, 29.4% partially agree, and 20.6% are not sure. Most women would recommend the procedure to their family and friends (64.7%). Finally, 41.2% of respondents are sure that self-sampling is an easier approach to cervical cancer screening than going to the doctor's office, while 29.4% of them fully disagree.

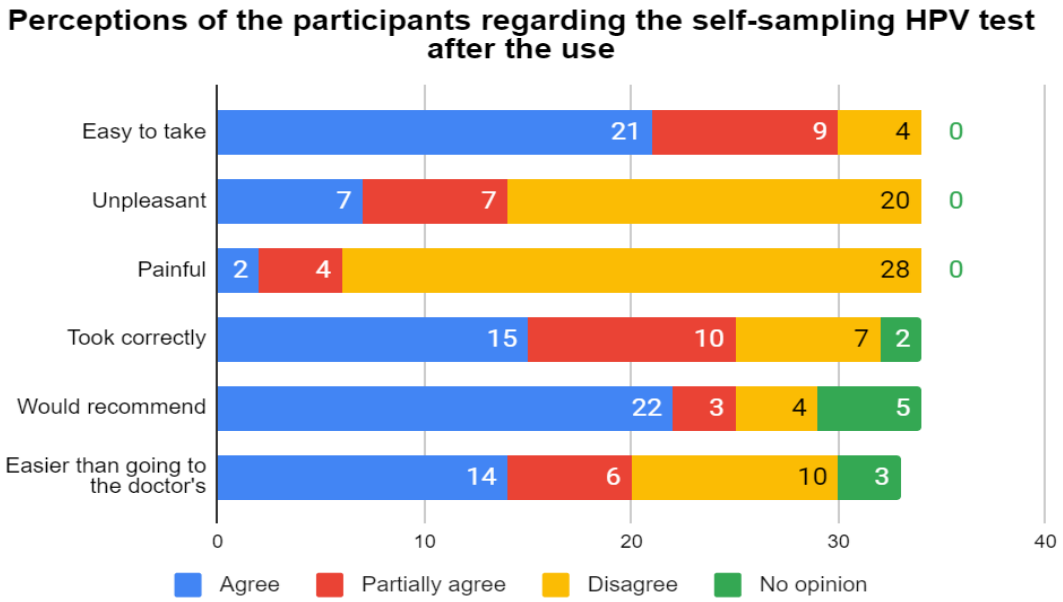

Figure 3 - Perceptions of the participants regarding the self-sampling HPV test after the use (N=34). Agree (blue bar); Partially agree (red bar); Disagree (yellow bar), No opinion (green bar)

In terms of the preferences in the sampling methods for their following cervical cancer examination, 38.2% of respondents would choose the self-sampling method; 58.8% would prefer a gynecologist to take a sample, while 3% would prefer a GP to take a sample for their subsequent cervical cancer examination.

4. Discussion

Cervical cancer remains the 2nd most common cancer in women in Kazakhstan (Bruni, et.al., 2023b) with the crude rate of incidence of CC of 19.5 and the crude mortality rate of 6.4 per 100,000 women in 2018 [4]. With the coverage of cervical cancer screening being as low as 45.9% in 2016 [16], the healthcare system of Kazakhstan needs to further reinforce the cervical cancer screening program. Determining the factors associated with acceptance of self-sampling HPV tests as a viable cervical cancer screening method would allow the technology to be implemented taking into account specific socioeconomic, cultural, and medical characteristics of the target audience. Up to now, there has been no research done on the perceptions of women on self-screening HPV tests, not only in Kazakhstan but in Central Asia overall. Thus, there is a need to validate the acceptance of the cervical self-sampling device for HPV detection among Kazakhstani women and investigate their perceptions of the comfort, potential advantages, and barriers of the approach.

Overall, the present study shows that most women in Kazakhstan believe that the self-sampling approach is a sufficient way to increase cervical cancer screening coverage, especially for women who have never undergone a Pap-test. After taking the test, most participants perceived it as not causing pain or discomfort and as easy to administer. They would recommend using the method for their friends and family. Still, there is a barrier for women to fully embrace the self-sampling approach. Some of the participants view the sample taken by themselves to be worse and less trustworthy than that taken by a medical professional.

Despite the positive feedback on the self-sampling device, most women still choose to have their sample taken by a gynecologist.

The results could be explained by the fact that the concept of self-sampling is new and unfamiliar in Kazakhstan for women of all ages, education levels, marital statuses, and any number of children. The lack of confidence in women in the sample quality could be due to the absence of similar methods of sampling in the country. Interestingly, the only factor that has a significant correlation with the preference for a sampling method is the use of contraceptives: those who use contraception were more likely to prefer a self-sampling device over a sample taken by a medical professional. The reason for this could be that women who use contraception are more likely to know about their health and HPV screening methods and be comfortable with administering tests on themselves.

The present research also sheds light on the awareness of women in Kazakhstan of cervical cancer, HPV, and HPV testing. Figure 5 shows that only half of the respondents know that HPV causes cervical cancer, which shows low levels of cervical cancer awareness among Kazakhstani women. This ignorance could be another reason for distrust towards the self-sampling device and preference for sampling done by a doctor. According to Issa, et.al. (2021) [17], low screening coverage in Kazakhstan can be attributed to low awareness about cervical cancer and the free screening program [18]. Similar reasons could affect the mixed reaction of women towards the self-sampling device. Future research could focus on health awareness, contraceptive use, and other factors and their role in the decision-making process of women who undergo or avoid screening.

There were some differences between the present study results and previous research conducted in other countries of the world. The study that built the framework of the present study, De Pauw, et.al. (2021), assesses attitudes and experiences associated with self-sampling among women enrolled in VALHUDES, a Belgian research comparing the clinical accuracy of HPV self-sampling tests and clinician-taken sample tests [21]. As the study is conducted in a high-income European country, Belgium, the results indicate higher acceptance, more apparent preference for the self-sampling method over a sample taken by a doctor, and more evident awareness of HPV and cervical cancer, compared to the present results. These observations can be explained by the fact that co-testing and alternative methods of cervical cancer screening were introduced sooner and in higher magnitude in high-income countries than in low- and middle-income countries. Furthermore, the increased awareness of HPV and cervical cancer in European countries may be attributed to the higher quality of health-related education and media coverage.

Results obtained in Kazakhstan, a middle-income country, could be compared to the results of other low- and middle-income countries (LMIC). The literature review of 50 articles from 26 countries performed by Kamath Mulki & Withers (2021) investigated the feasibility and acceptability of the self-sampling method in LMIC (countries of sub-Saharan Africa, Latin America/Caribbean, East Asia/Pacific, South Asia, Middle East/North Africa) [22]. According to the researchers, the HPV self-sampling method is an effective way to increase cervical cancer coverage in LMICs. Overall, participants reported that the HPV self-sampling method was easy to administer (75–97%, 18 studies), painless (60–90%, nine studies), and preferred over clinician-taken sampling (57–100%, 14 studies). The most crucial perceived benefits of self-sampling were the convenience of screening in the home environment, less shame and embarrassment, and less travel. However, some reviewed studies show that women had issues with the quality of self-sampling, privacy issues in sampling from home, and the need for assistance from health professionals with self-sampling.

Similarly, in the research from China, Zhao, et.al. (2019), among 1375 women, 86.55% perceived the self-sampling as convenient, 78.40% as not uncomfortable, 83.27% would choose self-sampling for cervical cancer screening again, and 85.82% were wary of inaccurate sampling [23]. In research by Qu, et.al. (2023), 27% of 862 surveyed Chinese women from the Jiangsu province favored clinician-sampling, 33% favored self-sampling, and 40% had no apparent preference [24]. Women with sufficient knowledge about HPV and prior positive

experience with HPV self-sampling were more accepting of self-sampling, compared to those who weren't aware of or exposed to it before. This further proves that awareness about HPV, cervical cancer, and the self-sampling approach produces higher acceptance for the self-sampling device. As China has a comparable economic state and some social and cultural characteristics to Kazakhstan, the results indicate the same experiences, attitudes, and worries in women in both countries. Both women in China and Kazakhstan, despite their positive experiences with the self-sampling device, worry about the accuracy of their sample and favor clinician-taken samples almost as much as samples taken by themselves.

The current study doesn't investigate the reasons for preference for a health professional-taken sampling, but they could be close to those obtained by Kamath Mulki & Withers (2021), Zhao, et.al. (2019), and Qu, et.al. (2023) [23,24]. Overall, the economic, social, and cultural context of the self-sampling approach among women in Kazakhstan needs to be further investigated in future research.

Study strengths and limitations

The present research is the first study to examine the attitudes of Kazakhstani women on cervical self-sampling, their comfort when using the device, and perceived advantages and disadvantages of the test compared to a professional-taken test. There are many strengths of the study. Firstly, the research inspects an innovative and unexplored approach to cervical cancer screening in Kazakhstan. As Kazakhstan has a crude incidence rate of cervical cancer of 19.5 and a crude mortality rate of 6.4 per 100,000 women [4], the study provides indispensable and relevant insight into the acceptability of the self-sampling approach among women. Considering the high risk and low coverage of cervical cancer screening in the country, the researchers raise an important issue that affects all women. The study evaluates the acceptance of the self-sampling approach based on various factors, including experience after taking the sample, perception of effectiveness for increasing cervical cancer screening coverage, preference over going to the doctor's office, and others. The research reveals important implications for further investigation on social, cultural, and economic factors affecting women's distrust of the self-sampling method.

Nevertheless, there are some limitations to the study. Firstly, the sample size was too low (N=34). Due to the low respondent count, statistical analysis results have shown an insignificant relationship between socioeconomic and medical characteristics and women's choice of sampling methods. For more comprehensive results, more participants need to be surveyed. The study was conducted in one outpatient facility in Astana, which makes the results less suitable to make general conclusions about all women in Kazakhstan. Further studies could be conducted in outpatient facilities in different cities and towns of Kazakhstan. Additionally, the study doesn't explore the reasons for choosing the self-sampling method, which could be explored next time.

Possible clinical implications. The results of the study could be used to successfully implement the self-sampling device in cervical cancer screening programs. Kazakhstan comes closer to implementing co-testing for cervical cancer screening. Therefore, the present research could be used as a testament to the need to raise reproductive health-related awareness among local women before introducing the self-sampling approach to broader audiences. The research also opens the opportunity to study the social, cultural, and economic factors, which are specific to Kazakhstan, that prevent successful implementation of cervical self-sampling methods.

5. Conclusion

The present study assesses the acceptance of the self-sampling HPV test among Kazakhstani women. Women in Kazakhstan accept self-sampling devices for Human Papillomavirus detection as an efficient and comfortable way to increase participation and coverage of cervical cancer screening. Despite their positive experience with the self-sampling device, participants prefer sampling done by a healthcare professional over

self-sampling across the board, with no difference in age, marital status, number of children, and other factors. There could be social, cultural, and economic factors affecting women's preference for sampling by a doctor that need to be further investigated.

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Conflict of interest: The authors declare no conflict of interest.

References

1. Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., Bray, F. (2021). Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*, *71*(3), 209-249. https://doi.org/10.3322/caac.21660

2. Zhang, S., Xu, H., Zhang, L., Qiao, Y. (2020). Cervical cancer: Epidemiology, risk factors and screening. *Chinese Journal of Cancer Research*, *32*(6), 720. https://doi.org/10.21147/j.issn.1000-9604.2020.06.05

3. Igissinov, N., Igissinova, G., Telmanova, Z., Bilyalova, Z., Kulmirzayeva, D., Kozhakhmetova, Z., Kuandykov, Y. (2021). New trends of cervical cancer incidence in Kazakhstan. *Asian Pacific journal of cancer prevention: APJCP*, *22*(4), 1295 https://doi.org/10.31557/APJCP.2021.22.4.1295

4. Papillomavirus, H. (2023). Related Cancers, Fact Sheet. *Saudi Arabia*.

5. Johnson, C. A., James, D., Marzan, A., Armaos, M. (2019, April). Cervical cancer: an overview of pathophysiology and management. In *Seminars in oncology nursing* (Vol. 35, No. 2, pp. 166-174). WB Saunders. https://doi.org/10.1016/j.soncn.2019.02.003

6. 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*, 552028. https://doi.org/10.3389/fpubh.2020.552028

7. Kusakabe, M., Taguchi, A., Sone, K., Mori, M., Osuga, Y. (2023). Carcinogenesis and management of human papillomavirus-associated cervical cancer. *International Journal of Clinical Oncology*, *28*(8), 965-974. https://doi.org/10.1007/s10147-023-02337-7

8. Bruni, L., Albero, G., Serrano, B., Mena, M., Gómez, D., Muñoz, J. (2022). *Human papillomavirus and related diseases in the world. Summary Report. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre); 2023*.

9. Aimagambetova, G., & Azizan, A. (2018). Epidemiology of HPV infection and HPV-related cancers in Kazakhstan: a review. *Asian Pacific journal of cancer prevention: APJCP*, *19*(5), 1175. https://doi.org/10.22034/APJCP.2018.19.5.1175

10. Aggarwal, P. (2014). Cervical cancer: can it be prevented? *World journal of clinical oncology*, *5*(4), 775. https://doi.org/10.5306/wjco.v5.i4.775

11. Akhatova, A., Azizan, A., Atageldiyeva, K., Ashimkhanova, A., Marat, A., Iztleuov, Y., Suleimenova, A., Shamkeeva, S., Aimagambetova, G. (2022, November 11). Prophylactic Human Papillomavirus Vaccination: From the Origin to the Current State. Vaccines (Basel), 10(11):1912. https://doi.org/10.3390/vaccines10111912

12. World Health Organization. (2021). WHO recommends DNA testing as a first-choice screening method for cervical cancer prevention. *Geneva: WHO. Available online at: https://www.who. int/news/item/2021-dna-testing-for-cervical-cancer (Accessed August 11, 2024)*. https://doi.org/10.1200/jgo.18.65600

13. Najib, F. S., Hashemi, M., Shiravani, Z., Poordast, T., Sharifi, S., Askary, E. (2020). Diagnostic accuracy of cervical pap smear and colposcopy in detecting premalignant and malignant lesions of cervix. *Indian journal of surgical oncology*, *11*(3), 453-458. https://doi.org/10.1007/s13193-020-01118-2

14. 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

15. Kaidarova, D., Zhylkaidarova, A., Dushimova, Z., Bolatbekova, R. (2018). Screening for cervical cancer in Kazakhstan. https://doi.org/10.1200/jgo.18.65600

16. Issa, T., Babi, A., Azizan, A., Alibekova, R., Khan, S.A., Issanov, A., Chan, C.K., Aimagambetova, G. (2021, January-December). Factors associated with cervical cancer screening behaviour of women attending gynaecological clinics in Kazakhstan: A cross-sectional study. Womens Health (Lond), 17:17455065211004135. https://doi.org/10.1177/17455065211004135

17. Chorley, A. J., Marlow, L. A., Forster, A. S., Haddrell, J. B., Waller, J. (2017). Experiences of cervical screening and barriers to participation in the context of an organised programme: a systematic review and thematic synthesis. *Psycho-oncology*, *26*(2), 161-172. https://doi.org/10.1002/pon.4126

18. Chao, Y. S., Clark, M., Ford, C. (2018). HPV self-sampling for primary cervical cancer screening: a review of diagnostic test accuracy and clinical evidence.

19. Nishimura, H., Yeh, P. T., Oguntade, H., Kennedy, C. E., Narasimhan, M. (2021). HPV self-sampling for cervical cancer screening: a systematic review of values and preferences. *BMJ global health*, *6*(5). https://doi.org/10.1136/bmjgh-2020-003743

20. De Pauw, H., Donders, G., Weyers, S., De Sutter, P., Doyen, J., Tjalma, W. A., Arbyn, M. (2021). Cervical cancer screening using HPV tests on self-samples: attitudes and preferences of women participating in the VALHUDES study. *Archives of Public Health*, *79*(1), 155. https://doi.org/10.1186/s13690-021-00667-4

21. Kamath Mulki, A., Withers, M. (2021). Human Papilloma Virus self-sampling performance in low-and middle-income countries. *BMC women's health*, *21*(1), 12. https://doi.org/10.1186/s12905-020-01158-4

22. Zhao, Y., Liao, Q., Mi, X., Li, M. Z., Zhao, C., Cui, S. H., Wei, L. H. (2019). Survey of the acceptance status of HPV self-sampling screening in female population for cervical cancer. *Zhonghua fu chan ke za zhi*, *54*(5), 312-317. https://doi.org/10.3760/cma.j.issn.0529-567x.2019.05.005

23. Qu, S. X., Ni, Y. H., Qin, J. F., Chen, X. Y., Wu, W. L., Zhang, W. C. (2023). Experience and acceptability for HPV self-sampling among women in Jiangsu province, China: a cross-sectional survey. *Journal of Obstetrics and Gynaecology*, *43*(1), 2204942. https://doi.org/10.1080/01443615.2023.2204942

Қазақстандағы әйелдер арасында жатыр мойны обырын өздігінен жинау арқылы скрининг: Пилоттық валидациялық зерттеу

Амирбекова К. [1], Изтлеуов Е. [2], Сахипова Г. [3], Аймагамбетова Г. [4]

[1] Студент, Медицина мектебі, Назарбаев Университеті, Астана, Қазақстан

[2] Радиология кафедрасының меңгерушісі, Марат Оспанов атындағы Батыс Қазақстан медицина университеті, Ақтөбе, Қазақстан

[3] Жалпы медицина кафедрасының ассистенті, Марат Оспанов атындағы Батыс Қазақстан медицина университеті, Ақтөбе, Қазақстан

[4] Хирургия кафедрасының ассистенті, Медицина мектебі, Назарбаев Университеті, Астана, Қазақстан

Түйіндеме

Кіріспе. Қазақстанда жатыр мойны обырының аурушаңдығы мен өлім-жітім деңгейінің жоғары болуына, сондай-ақ жатыр мойны цитологиясының ұлттық скринингтік бағдарламасының шектеулі қамтылуына байланысты скринингтің баламалы әдістерін сынақтан өткізу және енгізу қажет.

Зерттеудің мақсаты. Бұл пилоттық зерттеу қазақстандық әйелдер арасында адам папилломасы вирусына (АПВ) жатыр мойны жағындыларын сынау үшін өздігінен сынама алу құрылғысының қолайлылығын растауға және олардың осы тәсілдің ыңғайлылығы, ықтимал артықшылықтары мен шектеулері туралы түсініктерін зерттеуге бағытталған.

Әдістері. 2025 жылдың қаңтары мен 2025 жылдың аусым аралығында Астанадағы амбулаторлық гинекологиялық емханаларға келген әйелдерге екі сауалнама және BGI Sentis сынағы берілді. Әлеуметтік-демографиялық және медициналық сипаттамалар арасындағы байланыстарды, сондай-ақ әйелдердің емдеуге деген көзқарасын анықтау үшін реттік логистикалық регрессия және параметрлік емес тесттер қолданылды.

Нәтижесі. Соңғы талдауға 34 әйел қатысты. Қатысушылардың 61,8%-ы жағындыны өздігінен жинауды жеңіл, 82,4%-ы ауыртпалықсыз, 58,9%-ы жағымды деп тапты. Респонденттердің тек 44,1%-ы жағындыны дұрыс жинағандарына сенімді. Жатыр мойны обырының кейінгі скринингі үшін респонденттердің 38,2%-ы жағындыны өздігінен жинауды, 58,8%-ы оны жинау үшін гинекологты және 3%-ы оны жинау үшін дәрігерді таңдайды.

Қорытынды. Қазақстандық әйелдер HPV тестілеуге арналған өзін-өзі жинау құрылғыларын жатыр мойны обырын скринингтік қамтуды арттырудың тиімді және ыңғайлы әдісі деп санайды. Өзін-өзі жинау құрылғыларының оң тәжірибесіне қарамастан, қатысушылар жасына, отбасылық жағдайына, балалар санына немесе басқа факторларға қарамастан, жағындыларды дәрігердің жинағанын қалайды. Әйелдердің жағындыларды дәрігерден алуды қалайтынына қосымша зерттеуді қажет ететін әлеуметтік, мәдени және экономикалық факторлар әсер етуі мүмкін.

Түйін сөздер: жатыр мойны обыры, жатыр мойнының ісік алды зақымдануы, өздігінен сынама алу.

Скрининг рака шейки матки методом самостоятельного забора образцов среди женщин в Казахстане: Пилотное валидационное исследование

Амирбекова К. [1], Изтлеуов Е. [2], Сахипова Г. [3], Аймагамбетова Г. [4]

[1] Студент программы бакалавриата, Школа Медицины, Назарбаев Университет, Астана, Казахстан

[2] Заведующий кафедры радиологии, Западно-Казахстанский медицинский университет имени Марата Оспанова, Актобе, Казахстан

[3] Ассистент кафедры общей медицины, Западно-Казахстанский медицинский университет имени Марата Оспанова, Актобе, Казахстан

[4] Ассистент кафедры хирургии, Школа Медицины, Назарбаев Университет, Астана, Казахстан

Резюме

Актуальность. В связи с высокими показателями заболеваемости раком шейки матки и смертности от него в Казахстане, а также ограниченным охватом населения национальной программой цитологического скрининга шейки матки, необходимо апробировать и внедрить альтернативные методы скрининга.

Цель. Данное пилотное исследование направлено на обоснование приемлемости устройства для самостоятельного взятия мазка с шейки матки для выявления вируса папилломы человека (ВПЧ) среди

казахстанских женщин и изучение их восприятия удобства, потенциальных преимуществ и ограничений данного подхода.

Методы. Женщинам, посещавшим амбулаторные гинекологические учреждения Астаны в период с января 2025 года по июнь 2025 года, были розданы две анкеты и тест на ВПЧ BGI Sentis. Для выявления взаимосвязей между социально-демографическими и медицинскими характеристиками, а также отношением женщин к лечению используются порядковая логистическая регрессия и непараметрические тесты.

Результаты. В окончательный анализ были включены 34 женщины. 61,8% участниц посчитали самостоятельный забор мазка простым, 82,4% – безболезненным, а 58,9% – не неприятным. Только 44,1% респондентов уверены, что взяли мазок правильно. Для последующего обследования на рак шейки матки 38,2% респонденток выбрали бы самостоятельный забор мазка, 58,8% – забор гинекологом, 3% – забор терапевтом.

Выводы. Женщины в Казахстане считают устройства для самостоятельного забора мазка на ВПЧ эффективным и удобным способом увеличения охвата скринингом рака шейки матки. Несмотря на положительный опыт использования устройства для самостоятельного забора мазка, участницы предпочитают забор мазка врачом, независимо от возраста, семейного положения, количества детей или других факторов. На предпочтение женщинами забора мазка врачом могут влиять социальные, культурные и экономические факторы, требующие дальнейшего изучения.

Ключевые слова: рак шейки матки, предраковые заболевания шейки матки, самостоятельный забор материала.