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Factors Affecting Cervical Cancer Screening in Primary Care Physician Practices in Ukraine

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Abstract

Purpose

Cervical cancer remains a major cause of cancer-related deaths among women in Ukraine. Screening efforts are limited by systemic challenges and the ongoing conflict. This study assessed cervical cancer screening practices, barriers, and facilitators among primary care physicians in Ukraine.

Methods

We conducted a national cross-sectional survey of internal medicine and family medicine physicians in April-May 2023. The survey gathered data on clinical practices, access to screening tools, use of screening tests, and perceived barriers. Results were analyzed using descriptive statistics and adjusted population estimates.

Results

Among 292 respondents, most primary care physicians referred patients to gynecologists for cervical cancer screening rather than performing screening themselves. Direct use of screening tests was low: 19.5% used Papanicolaou (Pap) tests, 20.2% used Pap and human papillomavirus (HPV) co-testing, 5.8% used HPV testing, and 4.1% offered self-collection HPV tests. Only 13% of practices had Pap tests available. Key barriers included limited training on the benefits of screening and counseling patients (43.8%), lack of equipment or supplies (34.2%), and absence of reimbursement for procedures (27.7%). Patient-related barriers included low awareness of screening (41.8%), financial constraints (36.0%), and fear of treatment (35.3%). Physicians familiar with national guidelines and with access to screening tools were more likely to implement screening practices.

Conclusion

Gaps in training, resources, and systemic support constrain cervical cancer screening in Ukraine's primary care settings. Improving physician education, access to diagnostic tools, and adherence to national guidelines may help to enhance screening uptake and reduce cervical cancer burden.

Context Summary

Key Objective: What factors influence cervical cancer screening practices among primary care physicians (PCPs) in Ukraine, and what barriers and facilitators do they face?

Knowledge Generated: Among 292 surveyed Ukrainian PCPs, 92.1% rely on referrals to gynecologists rather than performing screening themselves, while fewer than 21% use Pap or HPV/Pap co-testing directly. Familiarity with Ministry of Health guidelines is associated with higher screening rates (e.g., Pap test use: 21.7% vs. 11.5% among physicians unaware of the guidelines). Key barriers include insufficient training, limited availability of screening equipment, and patient-level factors such as low awareness of screening and fear of treatment.

Relevance: Cervical cancer remains a major public health burden in Ukraine, with over 3,000 new cases annually. The findings identify actionable gaps - particularly in PCP training, resource availability, and guideline dissemination - that, if addressed, could support progress toward WHO cervical cancer elimination targets.

INTRODUCTION

Cervical cancer ranks as the fourth most common cancer affecting women globally [1]. In 2022, there were an estimated 662,301 new cases and 348,874 deaths from cervical cancer worldwide, with the highest incidence and mortality rates (>90%) found in low- and middle-income countries (LMICs)[2]. The age-standardized incidence rate for cervical cancer in 2022 was 14.1, while the mortality rate was 7.1 per 100,000 people[2] globally. In Ukraine, an estimated 3,004 new cases of cervical cancer are diagnosed annually (14.4 per 100,000 women)[3,4], and 1,106 women die of cervical cancer, representing 5.5% of the 54,625 new cancer cases and 5.9% of all cancer-related deaths. Cervical cancer ranks fifth in incidence and ninth in mortality [5]. Cervical cancer screening has strong evidence supporting prevention and early diagnosis to reduce mortality[6,7]. Ukraine lacked population-based Comprehensive Cancer Screening programs or guidelines before 2017 [8]. In 2017, the healthcare system in Ukraine underwent significant reforms, focusing on primary care, disease screening, and prevention[8]. This led to the establishment of the National Health Service of Ukraine (NHSU). The Ministry of Health (MOH) issued a public guideline on June 18, 2024, addressing key aspects of an effective cervical cancer screening program and introducing a national standard for cervical cancer screening. Updated guidelines for implementing screening were published on August 5, 2024. These policies highlight the importance of evidence-based practices, such as routine Papanicolaou (Pap) testing, HPV/Pap co-testing, treatment of women screened positive, and HPV vaccination, in reducing the disease burden. These reforms aim to create standardized protocols for early detection, prevention, and treatment, enhancing women's health in Ukraine[9].

Almost all (99%) cases of cervical cancer are caused by human papillomavirus (HPV) infection, making HPV vaccination a critical primary prevention strategy[10]. In Ukraine, the HPV vaccination program has faced several challenges, resulting in low vaccination coverage and limited access for the population [11]. The HPV vaccine is not included in the national immunization program, and patients must pay for it out of pocket [12,13]. This financial barrier has reduced vaccine uptake. Furthermore, the HPV vaccination program in Ukraine has primarily focused on teenage females, as cervical cancer mainly affects the female population [14]. The Cervical Cancer Elimination Initiative has established national targets, known as the 90-70-90 targets, for countries to eliminate cervical cancer by 2030. These targets require that 90% of girls receive the complete HPV vaccine before turning 15 years old, 70% of women undergo high-performance screenings at ages 35 and 45, and 90% of women with precancerous lesions or invasive cancer receive prompt treatment [15]. The Ukrainian healthcare system faces numerous challenges in primary care due to limited resources and outdated infrastructure, making it difficult to provide high-quality care [16,17].

Previous research has identified several barriers that hinder the effective implementation of cervical cancer screening and HPV vaccination in low- and middle-income countries (LMICs). These barriers include limited access to healthcare services, such as screening facilities equipped for pelvic exams, Pap tests, and a shortage of trained healthcare providers to treat pre-cancer/cancer [18]. Other factors include insufficient awareness and knowledge about cervical cancer and the benefits of screening and vaccination, cultural beliefs and stigmas surrounding reproductive health issues, and cost constraints[19]. Our study aimed to identify the factors that influence cervical cancer screening and the perceived barriers and facilitators that primary care physicians (PCPs) in Ukraine face. The results of our research may be beneficial for improving cervical cancer screening in Ukraine and creating national screening programs.

METHODS

Survey Design and Distribution, Data Collection Tool Design, and Allocation

We designed a survey for Ukrainian primary care providers to evaluate factors associated with cervical cancer screening. The survey questions were created to capture the experiences, attitudes, and practices related to cervical cancer screening and were adapted from the National Cancer Institute's Survey of Colorectal Screening Practices for primary care physicians

(PCPs) [20,21]. The questionnaire was modified to fit the Ukrainian healthcare context. Formal survey validation was beyond the scope and primary aim of this study; however, the survey was adapted from a previously used instrument through discussions with oncology specialists and primary care physicians in Ukraine. Additionally, the survey examined barriers to cancer screening and early diagnosis based on constructs from the Consolidated Framework for Implementation Science (CFIR), the Barriers to Effective Screening Tool, and factors identified in other studies that influence cancer screening and early diagnosis [22–28].

The questions addressed the following topics: 1) characteristics of clinical practice; 2) beliefs, knowledge, experience, and practices related to cancer screening; 3) frequency of use of specific cervical cancer screening methods; 4) potential barriers to and facilitators of cervical cancer screening in Ukraine; 5) availability of the HPV vaccine. All participants were asked to define cervical cancer screening through a multiple-choice question that included a “correct” definition of “screening” among the answer options to evaluate their initial knowledge and understanding of screening terminology (select Refer to the Survey Instrument in Supplement 1 for more details). Since respondents could choose multiple options, the totals will not add up to 100% for some of the questions

Survey questions were translated into Ukrainian and refined with the assistance of a team of Ukrainian physicians, including a family medicine physician, a surgical oncologist, medical oncologists, and gynecologists.

The final electronic survey was distributed to a convenience sample of primary care physicians (PCPs) in Ukraine through the Facebook page of the Academy of Family Medicine of Ukraine, the Global Medical Knowledge Alliance, and a physician-only Facebook group that included over 35,000 members. No financial incentives were offered for participation. The survey was conducted in April and May 2023, and the National Cancer Institute Institutional Review Board in Kyiv, Ukraine, approved the study. In accordance with the journal’s guidelines, we will provide our data for independent analysis by a selected team by the Editorial Team for the purposes of additional data analysis or for the reproducibility of this study in other centers if such is requested.

Ethics considerations

The study protocol was approved by the Institutional Review Board of the Ukrainian National Cancer Institute. Written informed consent was not required, given the low-risk nature of the study. Participants were provided with information sheets about the study, including the plan to publish the results in aggregate form prior to taking the online survey. Participation was voluntary, and the confidentiality of all respondents was strictly maintained throughout the research process.

Data analysis and data interpretation

To enable population-level inferences, we utilized publicly available data from the national primary care physician demographics collected by the National Health Service of Ukraine (NHSU). This information is accessible online and includes the marginal distribution of age, gender, specialty, and geographical practice location of primary care physicians in Ukraine. Notably, at the time of the analysis, there were 20,820 primary care physicians (PCPs) in Ukraine, of whom 82,20% were female and 17,80% were male.

Out of the 409 collected surveys, 117 were excluded because they lacked demographic data. After excluding physicians from other specialties, only primary care physicians (PCPs) were considered, resulting in a total of 292 out of 409 surveys included in our analysis.

In addition to reporting the summary responses from the sample, we also assumed that the conditional distribution for each question response could be appropriately modeled using a binary logistic model if the response had two levels, or a

multinomial logistic model if it had more. We utilized the fitted models to estimate the expected population-level responses by standardizing the results according to the known population marginal distributions of the covariates.

To estimate associations between the use of cervical cancer screening tests and responses to survey questions, we fit logistic models for screening test usage, conditional on physician age, gender, specialty, geographical region, and the response to the relevant survey question. Using the fitted model, we then estimated the expected probability of using each cervical cancer screening test based on each level of response to the survey question by directly standardizing to the known population marginal distributions of the covariates. We employed this approach to compute associations between the use of screening tests - specifically, the Pap test and the Pap/HPV co-testing - and the reported use of various educational materials, availability of cervical cancer screening tests, and beliefs about the effectiveness of cervical cancer screening, adjusted for physician age, gender, specialty, and geographical region.

Confidence intervals (CIs) were constructed by taking percentiles of the sampling distribution, estimated by bootstrapping with 1000 iterations. We performed statistical analysis using R version 4.2.2.

RESULTS

Participant demographics and clinical practice characteristics compared to primary care physicians (PCPs) overall in Ukraine

Out of the 409 surveys collected, 292 were included in the analysis, comprising 250 (85.6%) family medicine physicians and 42 (14.4%) internal medicine physicians. The majority of respondents were women (92.5%, 270), while men represented 7.5% (22). The age distribution revealed that the largest group of primary care physicians (PCPs) was aged 31–40 years (42.1%), followed by those aged 20–30 years (27.7%) and 41–50 years (21.6%) (Table 1).

Survey respondents represented 24 of 25 administrative districts of Ukraine, with the exception of Russian-occupied Crimea. The highest representation came from the western regions, accounting for 44.2% of respondents. (Fig. 1).

At the time of data analysis, based on data from the National Health Service of Ukraine (NHSU), there were 20,820 primary care physicians (PCPs) in Ukraine, including 16,994 Family medicine doctors and 3,826 Internal medicine doctors, of whom 82,20% were female and 17,80% were male. The data from the National Health Service of Ukraine (NHSU) also excluded physicians from Russian-occupied Crimea [29].

The demographics of the surveyed primary care physicians (PCPs) closely align with national trends. In the dataset from the National Health Service of Ukraine (NHSU), 82% of primary care physicians (PCPs) specialize in family medicine, compared to 85.6% in our study.

Cervical Cancer Screening Modalities and Perceptions of Effectiveness

A significant percentage of surveyed primary care physicians (PCPs) (92.1%) reported referring patients to gynecologists for cervical cancer screening. However, fewer primary care physicians (PCPs) reported directly using specific screening tests: 20.2% utilized the HPV/Pap co-testing, 19.5% conducted Pap tests, 5.8% performed HPV tests, and only 4.1% provided self-collection HPV tests. A small percentage of primary care physicians (PCPs) (4.5%) did not use any screening modality.

In terms of resource availability, 45.9% of primary care physicians (PCPs) reported having access to gynecologists at their clinics. However, access to specific screening tools was limited: 13.0% reported the availability of Pap tests, 13.4% had access to HPV/Pap co-testing, 5.1% could offer self-collection HPV tests, and 4.5% had HPV tests available.

Primary care physicians' (PCPs') perceptions of the effectiveness of screening modalities varied. Most respondents, 84.9%, believed the HPV/Pap co-testing was very effective in reducing cervical cancer mortality. In comparison, 54.8% believed in the effectiveness of Pap tests, 45.2% supported HPV tests, and only 16.1% viewed self-HPV testing as very effective (Table 2).

Table 2

Factors affecting cervical cancer screening with population estimates.

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates, % with 95% confidence intervals
Screening modality used		
Gynecology referral	269 (92.1%)	86.4% (71.3, 95.0)
HIV/Pap co-testing	59 (20.2%)	19.7% (12.8, 31.2)
Pap test	57 (19.5%)	18.5% (12.1, 29.3)
Primary HPV screening	12 (4.1%)	6.2% (1.8, 24.0)
Self-collection HPV test	17 (5.8%)	4.5% (2.8, 20.2)
Do not screen at all	13 (4.5%)	6.6% (2.8, 23.8)
Screening test availability		
I refer to another clinic for screening	133 (45.5%)	49.6% (39.5, 60.1)
Gynecologist available	134 (45.9%)	43.8% (33.7, 54.6)
Pap test	38 (13.0%)	15.1% (8.9, 25.0)
HPV/Pap cotest	39 (13.4%)	11.8% (8.4, 23.1)
Self-collection HPV test	15 (5.1%)	6.9% (2.5, 24.3)
HPV test	13 (4.5%)	3.6% (1.9, 16.0)
No screening modality is available	23 (7.9%)	6.2% (3.6, 10.5)
Vaccination against HPV		
I vaccinate against HPV	199 (68.2%)	63.4% (51.9, 74.8)
Patients pay themselves for vaccination	146 (50.0%)	42.1% (26.4, 52.5)
Vaccine is available at my medical facility	71 (24.3%)	26.4% (16.0, 35.7)
Vaccination cost is compensated by the government at my clinic	37 (12.7%)	18.4% (7.7, 46.9)
Reported belief in cervical cancer screening tool effectiveness in decreasing cervical cancer mortality		
Pap test		
Very effective	160 (54.8%)	46.4% (9.0, 54.3)
Somewhat effective	119 (40.8%)	48.9% (36.4, 57.6)
Not effective	1 (0.3%)	0.2% (0.1, 56.2)
I do not know	12 (4.1%)	4.5% (2.2, 14.9)
Pap/HPV co-testing		

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates, % with 95% confidence intervals
Screening modality used		
Very effective	248 (84.9%)	80.6% (63.0, 87.8)
Somewhat effective	30 (10.3%)	14.5% (7.5, 31.2)
Not effective		
I do not know	14 (4.8%)	4.2% (1.8, 11.0)
Primary HPV screening		
Very effective	132 (45.2%)	37.5% (26.4, 49.8)
Somewhat effective	143 (49.0%)	43.8% (33.4, 57.4)
Not effective	5 (1.7%)	14.4% (1.1, 18.6)
B b I do not know	12 (4.1%)	4.2% (1.8, 11.0)
Primary HPV test with self-collection		
Very effective	47 (16.1%)	11.5% (7.4, 31.1)
Somewhat effective	177 (60.6%)	66.0% (9.0, 72.7)
Not effective	26 (8.9%)	10.0% (4.5, 71.6)
I do not know	42 (14.4%)	12.4% (5.2, 22.7)
Among female physicians, report of history of cervical cancer screening		
Yes, via Pap test	112 (38.4%)	39.9% (29.6, 50.3)
Yes, via HPV/Pap co-testing	111 (38.0%)	26.9% (23.2, 30.4)
Yes, via primary HPV screening	15 (5.1%)	4.0% (2.2, 16.2)
Yes, via self-collection HPV test	7 (2.4%)	6.0% (0.5, 7.3)
No, I do not undergo screening	51 (17.5%)	21.7% (12.2, 30.8)
Screening is NOT indicated to me	23 (7.9%)	14.2% (10.4, 30.6)
What educational resources related to cervical cancer screening do you use, and/or what education related to cervical cancer screening have you participated in?		
Ministry of Health Order 504	187 (64.0%)	64.0% (54.8, 72.5)
Use of EU guidelines for cervical cancer screening	92 (31.5%)	31.2% (21.3, 41.7)
Attendance of educational seminars on cervical cancer screening	77 (26.4%)	23.2% (17.0, 33.1)
Practice / advice from my colleagues (my manager)	72 (24.7%)	27.9% (19.9, 38.4)

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates, % with 95% confidence intervals
Screening modality used		
Institutional patient pathways (specific for Ukraine)	71 (24.3%)	22.0% (15.8, 31.3)
Cervical cancer screening training during residency training	60 (20.5%)	15.3% (12.0, 20.4)
Attendance of educational seminars regarding screening benefits	45 (15.4%)	18.7% (10.9, 31.4)
Use of US guidelines for cervical cancer screening	41 (14.0%)	12.5% (9.1, 17.5)
Attendance of educational seminars on screening procedures	28 (9.6%)	13.8% (6.5, 29.4)
I do not use any educational recourse for cervical cancer screening	12 (4.1%)	4.0% (2.0, 12.0)
What motivates you to screen patients for Cervical cancer?		
Patient's family history	171 (58.6%)	54.9% (44.1, 66.3)
Ministry of Health (MOH) recommendations	164 (56.2%)	55.6% (44.2, 65.9)
Availability of other specialists for screening	96 (32.9%)	40.0% (30.9, 51.6)
Institutional patient pathways (specific for Ukraine)	55 (18.8%)	18.8% (12.8, 28.7)
Patient request for screening	43 (14.7%)	16.5% (9.2, 30.7)
The practice of cancer screening in other similar medical institutions	52 (17.8%)	15.5% (11.5, 22.1)
Recent education or training in cancer screening and pre-cancer management	37 (12.7%)	5.5% (3.2, 10.0)
I do NOT refer patients for screening	20 (6.8%)	5.5% (3.2, 10.0)
Why don't you screen for cervical cancer in asymptomatic, average-risk patients using Pap test?		
Patient's family history	171 (58.6%)	54.9% (44.1, 66.3)
Insufficient experience in conducting a gynecological examination	111 (38.0%)	39.3% (28.4, 50.8)

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates, % with 95% confidence intervals
Screening modality used		
This is not part of my clinical duties	69 (23.6%)	25.0% (17.2, 36.8)
Absent Pap test kits	63 (21.6%)	19.1% (12.5, 29.2)
Lack of mirrors and other equipment for gynecological examination	59 (20.2%)	14.0% (10.8, 21.6)
Patients are reluctant to undergo a gynecological examination for the purpose of screening	56 (19.2%)	24.3% (13.1, 34.6)
Lack of time in my practice	49 (16.8%)	16.7% (10.5, 28.8)
Insufficient experience or equipment to treat cervical lesions	49 (16.8%)	12.7% (9.3, 17.2)
The cost of a Pap smear and/or gynecological nation is not reimbursed by the National Health Service of Ukraine at the primary level	44 (15.1%)	14.7% (8.4, 28.1)
Insufficient equipment for colposcopy and visualization of cervical lesions	40 (13.7%)	9.3% (7.0, 13.8)
Absence of such a requirement from the management of the institution	38 (13.0%)	10.0% (7.1, 17.8)
Recent education or training in cancer screening	37 (12.7%)	5.5% (3.2, 10.0)
Patients cannot afford a Pap smear and/or gynecological examination	27 (9.2%)	6.7% (4.3, 16.2)
Lack of material motivation	14 (4.8%)	7.7% (2.5, 27.2)
Absence of quality criteria from NSZU	12 (4.1%)	5.1% (2.3, 10.1)
Insufficient experience of pathologists to interpret the Pap test	11 (3.8%)	10.3% (3.3, 13.2)
Insufficient number of gynecologists or other medical professionals to treat cervical lesions	7 (2.4%)	1.7% (0.9, 10.0)
Don't know how to explain the risks and	5 (1.7%)	3.9% (0.7, 13.8)

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates, % with 95% confidence intervals
Screening modality used		
benefits of Pap smear screening to patients		
Absence of cervical cancer screening recommendations	4 (1.4%)	12.7% (0.3, 14.5)
Why don't you refer asymptomatic, average-risk patients for cervical cancer screening with HPV test?		
Insufficient experience in conducting a gynecological examination	105 (36.0%)	34.2% (25.2, 43.0)
Lack of HPV testing kits	76 (26.0%)	22.3% (14.7, 31.1)
This is not part of my clinical duties	72 (24.7%)	22.8% (16.8, 31.8)
I refer patients for cervical cancer screening using HPV test among asymptomatic patients at average risk of cancer	55 (18.8%)	22.1% (13.0, 33.4)
The cost of HPV testing is not reimbursed by the National Health Service of Ukraine at the. primary level	59 (20.2%)	14.7% (10.9, 23.8)
Patients are reluctant to be screened	31 (10.6%)	12.2% (6.3, 27.4)
Lack of time in my practice	34 (11.6%)	13.1% (6.8, 25.8)
Patients cannot afford the cost of HPV testing	51 (17.5%	11.1% (8.3, 21.0)
I do not know how to explain to patients the. risks and benefits of cervical cancer screening based on the HPV test	9 (3.1%)	19.6% (3.9, 21.3)
Absence of cervical cancer screening recommendations	5 (1.7%)	13.2% (0.6, 15.3)
Absence of such a requirement from the management of the institution	34 (11.6%)	8.5% (5.5, 12.7)
Absence of quality criteria from NSZU	11 (3.8%)	3.8% (1.7, 10.9)
There are not enough gynecologists or the equipment needed to treat cervical lesions	16 (5.5%)	4.3% (2.5, 20.6)

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates, % with 95% confidence intervals
Screening modality used		
Lack of material motivation	16 (5.5%)	10.0% (2.8, 23.4)

Perceived healthcare and patient-related barriers to cervical cancer screening

When asked about barriers to cervical cancer screening in healthcare, 43.8% of primary care physicians (PCPs) identified insufficient training on educating patients about screening as a significant obstacle. Likewise, 41.4% pointed out that they received insufficient training in conducting screening procedures. Additionally, 34.2% of primary care physicians (PCPs) mentioned the lack of equipment or supplies for screening. Other notable healthcare-related barriers included the absence of reimbursement for screening procedures by the National Health Service of Ukraine (NHSU) at 27.7% and insufficient communication between primary care physicians (PCPs) and gynecologists or oncologists at 19.2%.

Regarding patient-related barriers, 41.8% of primary care physicians (PCPs) noted a lack of awareness about cancer symptoms and screening recommendations, which aligns with a population estimate of 37.5%. Financial constraints were also significant, with 36.0% indicating insufficient funds for diagnostic procedures and 31.2% expressing concerns about costs if cancer is detected. Fear of cancer treatment, including surgery and chemotherapy, or its side effects, was another prominent barrier, reported by 35.3% of respondents (Table 3).

Table 3
Perceived reported barriers affecting cervical cancer screening with population estimates.

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates % with 95% confidence intervals
Please choose the three main patient-related barriers to cervical cancer screening in Ukraine		
Ignorance of cancer symptoms and screening recommendations	122 (41.8%)	37.5% (29.0, 48.4)
Fear of cancer treatment, including surgery and chemotherapy, or its side effects	103 (35.3%)	29.5% (23.0, 37.7)
Lack of money needed for diagnosis	105 (36.0%)	33.7% (25.2, 44.9)
Distrust of the medical system	69 (23.6%)	19.2% (15.2, 25.2)
Patients are embarrassed to be screened by existing methods	49 (16.8%)	14.0% (10.1, 24.5)
Fear of pain due to procedures related to cancer diagnosis	45 (15.4%)	21.4% (11.8, 34.0)
Work or family responsibilities	33 (11.3%)	10.0% (7.0, 14.5)
Residence far from medical institutions	32 (11.0%)	12.8% (6.7, 20.7)
Lack of money that will be needed if cancer is detected	91 (31.2%)	30.3% (22.5, 39.2)
Fear that other people will find out	12 (4.1%)	6.1% (2.4, 23.4)
Fear of being rejected by family, friends or employer	8 (2.7%)	2.0% (1.2, 6.5)
Lack of support from family or friends	3 (1.0%)	7.4% (0.0, 8.6)
Please choose the three main barriers to cervical cancer screening in Ukraine related to the healthcare system		
Inadequate education/training of primary care physicians about the benefits of cancer screening and how to counsel patients about cancer screening	128 (43.8%)	39.5% (30.8, 50.0)
Inadequate training of primary care practitioners to perform procedures related to cancer screening	121 (41.4%)	42.4% (33.7, 55.2)
Lack of national guidelines for cervical cancer screening	39 (13.4%)	11.6% (8.2, 23.5)
Insufficient equipment/tests needed for cancer screening and diagnosis	100 (34.2%)	27.5% (20.6, 37.7)

Factor	Sample responses from surveyed PCP's, N (%)	Population estimates % with 95% confidence intervals
Please choose the three main patient-related barriers to cervical cancer screening in Ukraine		
No reimbursement from the National Health Service (NHSU) for screening procedures	81 (27.7%)	24.6% (18.2, 34.5)
Insufficient communication with gynecologists and oncologists	56 (19.2%)	20.4% (13.1, 31.7)
Lack of material motivation	40 (13.7%)	15.6% (9.4, 25.2)
Primary care physicians do not recommend screening for their patients	33 (11.3%)	12.7% (7.1, 23.7)
Insufficient number of specialists (for example, gynecologists) to carry out the cervical cancer screening examination	24 (8.2%)	10.6% (4.8, 25.0)
Absence of quality criteria from NSZU	17 (5.8%)	5.6% (3.1, 21.0)
Absence of such a requirement from the management of the institution	18 (6.2%)	8.1% (3.3, 24.9)
Insufficient training of specialists (endoscopists, surgeons) for screening	15 (5.1%)	4.4% (2.5, 20.3)

Physician adherence to screening guidelines: population estimates and confidence intervals. Population-based assessment of medical professionals' adherence to screening standards

Table 4 presents population estimates along with their 95% confidence intervals, emphasizing the differences in the likelihood of primary care physicians (PCPs) using the most common cervical cancer screening methods, such as Pap tests, Pap/HPV co-testing, and referrals to gynecologists. The estimates are adjusted for important demographic factors, including age, gender, primary care physician (PCP) specialty, and geographic region.

Physicians who were familiar with the Ministry of Health (MOH) recommendations were more likely to utilize screening methods compared to those who were unaware of the guidelines. Specifically, familiarity with Ministry of Health (MOH) guidelines is associated with a higher likelihood of gynecology referrals (88.6% vs. 79.0%), Pap tests (21.7% vs. 11.5%), and Pap/HPV co-testing (22.8% vs. 12.9%).

When screening methods such as Pap tests, Pap/HPV co-testing, or gynecology referrals were not easily accessible in clinical practice, their reported usage was lower. For example, the usage of Pap tests was reported at 14.8% when unavailable, compared to 53.7% when available. Similarly, Pap/HPV co-testing was used by 15.4% of respondents in the absence of availability, compared to 53.0% when these tests were accessible. Additionally, gynecology referrals were reported at 83.7% compared to 90.4% when referral systems were in place. (Table 4)

Table 4
Population estimates and 95% confidence intervals for the probability of screening with Pap test, Pap/HPV co-testing or gynecology referral based on responding in the affirmative or negative to questions about awareness and use of listed screening recommendations

Question	Pap test			Pap/HPV co-testing			Gynecology referral		
	Yes	No	Probability difference	Yes	No	Probability difference	Yes	No	Probability difference
Are you using any educational resources?	19.1% (12.5, 29.7)	0.0% (0.0, 0.0)	19.1% (12.5, 29.4)	20.3% (13.1, 31.7)	0.0% (0.0, 0.0)	20.3% (13.1, 30.8)	85.9% (71.9, 94.8)	100.0% (92.8, 100.0)	-14.1% (-24.3, -5.2)
Are you familiar with the MOH cervical cancer screening recommendations?	21.7% (13.8, 32.8)	11.5% (5.6, 22.4)	10.2% (1.9, 18.7)	22.8% (14.6, 33.8)	12.9% (6.6, 26.2)	9.9% (0.9, 18.0)	88.6% (73.4, 97.0)	79.0% (65.9, 92.8)	9.6% (-0.8, 18.1)
Is a screening modality or test available at the medical facility where you work?	53.7% (29.5, 68.0)	14.8% (8.2, 25.6)	38.9% (17.1, 50.3)	53.0% (29.4, 69.6)	15.4% (8.7, 28.0)	37.6% (16.6, 51.4)	90.4% (74.3, 97.1)	83.7% (69.8, 94.3)	6.7% (-2.2, 15.5)
Do you provide HPV vaccination to your patients?	22.4% (14.3, 36.1)	10.6% (4.2, 23.2)	11.8% (2.7, 21.0)	22.2% (13.9, 34.6)	13.5% (6.8, 27.0)	8.7% (-1.2, 18.1)	84.7% (70.5, 94.5)	88.6% (73.5, 97.3)	-3.9% (-12.4, 3.6)
Do you know how to take a Pap smear?	23.0% (10.2, 38.4)	17.8% (11.2, 28.8)	5.2% (7.2, 17.2)						
Do you believe that this screening test modality is highly or somewhat effective?	18.8% (12.3, 29.4)	7.8% (0.0, 30.8)	11.0% (-9.6, 26.0)	20.3% (13.1, 31.6)	0.0% (0.0, 0.0)	20.3% (13.1, 30.7)			

DISCUSSION

Summary of Main Results

The primary objective of this study was to assess cervical cancer screening practices among primary care physicians (PCPs) in Ukraine. We found that most primary care physicians (PCPs) (92.1%) rely on referrals to gynecologists rather than directly performing screening. Only a minority reported using Pap tests (19.5%), HPV/Pap co-testing (20.2%), or HPV testing (5.8%) in their own practice, and access to these methods in clinical settings was similarly limited. Approximately one-third of respondents reported using European Union guidelines for cervical cancer screening, with a population-level estimate of 31.2%. These indicate that following guidelines is crucial in promoting effective screening practices[9,10,15] and reducing cervical cancer morbidity and mortality. Primary care physicians' (PCPs) perceptions of effectiveness varied across modalities, with the highest confidence in HPV/Pap co-testing.

In[30] our previous study on the factors influencing colorectal cancer (CRC) screening in Ukraine, we identified challenges akin to those seen in cervical cancer screening, including limited access to screening options - only 4.5% of primary care physicians (PCPs) had flexible sigmoidoscopy (FS) available, and 2.4% offered Fecal Immunochemical Test (FIT) tests in their practices. In the current study concerning cervical cancer screening, we noted that access to specific screening methods remains limited, with just 13% of primary care physicians (PCPs) having Pap tests and 13.4% having Pap/HPV co-testing available in their practices.

Physician perceptions play a crucial role in shaping screening practices. A significant majority (84.9%) viewed the HPV/Pap co-testing as highly effective in reducing cervical cancer mortality, compared to 54.8% for Pap tests and 45.2% for primary HPV screening. This favorable view of evidence-based practices aligns with global recommendations [2,31]. It emphasizes the critical role of structural and knowledge-based factors in supporting cervical cancer screening [7,10,19]. However, the low perception of effectiveness for self-collecting HPV test (16.1%) indicates both a knowledge gap and systemic issues in implementing innovative screening methods.

Results in the Context of Published Literature

The challenges identified in our study reflect findings from low- and middle-income countries (LMICs), where systemic barriers - such as limited provider training, lack of equipment, and patient-related factors - hinder cervical cancer screening uptake [19,32]. Similar challenges have been documented in global low- and middle-income countries (LMIC) settings, where reliance on specialist referrals is common due to gaps in resources and infrastructure. However, our study differs in that it examines a healthcare system with diverse resources and practices across various regions.

Compared to other studies, ours provides more granular, region-specific data on how guideline familiarity and test availability correlate with screening behaviors - factors not routinely examined in broader international analyses. Differences between our results and some European data may reflect variability in resource distribution, training systems, and the recent introduction of national screening guidelines in Ukraine, and the availability of screening tools influences provider behavior [33].

Strengths and Weaknesses

A key strength of this study is its nationwide scope, capturing primary care physician (PCP) perspectives from nearly all administrative regions of Ukraine. The study provides detailed, population-adjusted estimates based on national primary care physicians (PCP) demographic distributions, strengthening the reliability of findings. Another strength is the use of validated survey constructs adapted from established cancer screening research tools. However, several limitations should be noted. The study focused specifically on primary care physicians, given their key role in delivering cervical cancer screening. However, inclusion of other specialties that play an active role in cervical cancer screening in Ukraine, such as gynecologists, in future studies, would provide a more comprehensive understanding of screening practices and inform broader implementation strategies. The relatively low number of participants should be considered when interpreting the findings. This study used a convenience sampling approach, and we sought to reach as many primary care physicians (PCPs) as possible through professional networks and social media platforms; however, this may have excluded physicians not active online and affected representativeness. No formal sample size calculation was performed prior to survey distribution, as participation depended on physicians' availability and willingness to respond, which may introduce selection bias and limit generalizability. Additionally, self-reported data introduce the potential for recall and social desirability bias. Finally, collapsing "not effective" and "do not know" responses may have obscured nuances in physician perceptions.

The study did not specifically assess the impact of the ongoing conflict in Ukraine, including healthcare system disruption, population displacement, and resource constraints, which may influence screening practices and access to care[34].

Implications for Practice and Future Research

This study provides foundational knowledge on cervical cancer screening practices in Ukrainian primary care and fills a critical gap in understanding how early detection services are delivered in a rapidly reforming healthcare system. The results highlight opportunities to strengthen screening by improving primary care physicians' (PCPs') training, increasing access to Pap and HPV testing, and supporting the implementation of updated national guidelines. These findings can work toward building a more accessible, standardized, and effective screening system aligned with WHO's elimination goals. Future research should evaluate implementation strategies to expand screening capacity in primary care, assess the impact of new national guidelines over time, and investigate approaches to increase patient awareness and uptake of cervical cancer screening.

CONCLUSION

The findings underscore the importance of systemic reforms to improve cervical cancer prevention in Ukraine. Developing comprehensive training programs is essential for equipping primary care physicians (PCPs) with the skills needed to perform and interpret cervical cancer screenings. This should include a focus on new methods, such as self-collection HPV tests, and their potential for increasing screening access in underserved areas [9,14,19]. Ensuring the availability of diagnostic tools, including Pap tests, HPV/Pap co-testing, and self-collection HPV kits, at primary care facilities is crucial. Launching patient-centered initiatives is key to raising awareness about cervical cancer prevention, reducing stigma, and promoting HPV vaccination. Exploring innovative solutions, such as telemedicine and mobile health units, will help overcome challenges in resource-limited settings. Digital platforms could also facilitate the distribution of guidelines and educational resources to primary care physicians (PCPs) [35,36].

Our results align with global findings that underscore the necessity of clear policies, adequate resource allocation, and physician training to improve cervical cancer prevention strategies in low- and middle-income countries (LMICs). The availability of screening resources, awareness of national recommendations, and confidence in the effectiveness of screening methods are crucial factors that need to be addressed to reduce cervical cancer morbidity and mortality, particularly in resource-limited settings like Ukraine [19,23,35].

Declarations

Note:

The abstract *"Cervical Cancer Screening in Ukraine: A Survey of Primary Care Providers' Attitudes and Practices"* was submitted to the Annual Global Meeting in Gynecologic Oncology 2025 (Cape Town, South Africa).

Ethics approval and consent to participate

This study was approved by the Ethics Committee of the National Cancer Institute, Kyiv, Ukraine (Excerpt from Protocol No. 203/9, dated 18 January 2022; unanimous approval, 11 votes in favor). All methods were carried out in accordance with relevant guidelines and regulations, including current Ukrainian legislation, the Law of Ukraine "On Medicines," the principles of ICH Good Clinical Practice (GCP), and Order of the Ministry of Health of Ukraine No. 690 dated 23 September 2009. The study surveyed primary care physicians only; it included no patients or human tissue samples. All participating physicians were fully informed of the study's aims and methods, and we maintained confidentiality of responses throughout.

Consent for publication

Not applicable. The manuscript contains no data or images relating to any identifiable individual person.

Availability of data and materials

The datasets generated and analyzed during the current study are available from the corresponding author on request.

Competing interests

The authors declare no competing interests.

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Table 1

Table 1 is available in the Supplementary Files section.

Figures

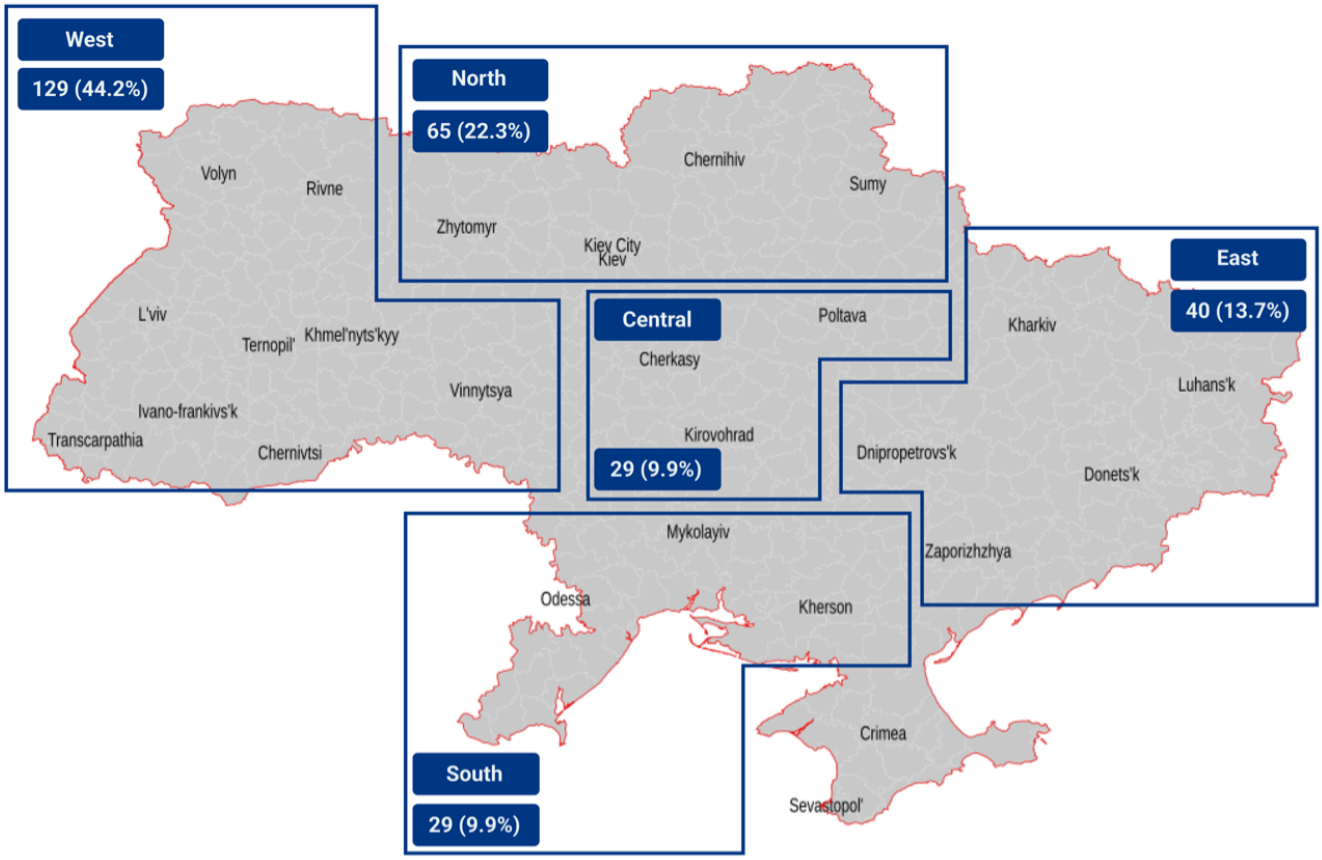


Figure 1

Geographic distribution of survey respondents across Ukraine's administrative districts (excluding Crimea)

Supplementary Files

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- SupplementaryMaterial.docx
- Table1.docx