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Patient Perspectives on HPV DNA Self-Sampling: Acceptability, Barriers, and Willingness for Cervical Cancer Screening

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ABSTRACT

Cervical cancer remains a major public health problem, especially in low- and middle-income countries where screening coverage is limited. HPV DNA self-sampling has emerged as a potential strategy to improve participation; however, patient acceptance is essential for its successful implementation. This study aimed to evaluate patient perspectives on HPV DNA self-sampling, including acceptability, perceived barriers, cost considerations, and willingness for future screening. A cross-sectional study was conducted among 48 women with abnormal Pap smear results at a tertiary referral hospital. Participants completed a structured questionnaire assessing concerns, ease of use, preferred sampling method, screening barriers, acceptable cost, and willingness for routine testing. Most participants (60.4%) reported no concerns, while 39.6% expressed apprehension, mainly related to fear of pain (20.8%) and uncertainty regarding sample adequacy (14.6%). All participants (100%) found the method easy to use, although 60.4% preferred clinician-based sampling. Major barriers included fear of cancer diagnosis (87.5%) and financial concerns. More than half (54.1%) considered a cost below IDR 300,000 acceptable, and 95.8% were willing to undergo routine screening. HPV DNA self-sampling is highly acceptable and feasible, with strong potential to improve screening uptake.

Keywords: HPV DNA self-sampling; Cervical cancer screening; Patient perspective; Acceptability; Screening barriers.

INTRODUCTION

Cervical cancer remains a significant global health challenge, particularly in low- and middle-income countries, where it is a leading cause of cancer-related morbidity and mortality among women (Smith et al., 2021; Canfell et al., 2020). According to global estimates, cervical cancer accounts for over 600,000 new cases and more than 340,000 deaths annually, with the majority occurring in regions with limited access to screening and preventive services (Sung et al., 2021). Persistent infection with high-risk types of human papillomavirus (HPV), particularly HPV 16 and 18, is recognized as the primary etiological factor in the development of cervical cancer (Walboomers et al., 1999).

Effective screening programs, including cytology-based screening and HPV DNA testing, have been shown to significantly reduce the incidence and mortality of cervical cancer (Arbyn et al., 2018). However, despite the availability of these screening methods, participation rates remain suboptimal, especially in developing countries (Burger et al., 2020). Multiple barriers contribute to this low uptake, including limited access to healthcare facilities, socioeconomic constraints, lack of awareness, and psychological factors such as embarrassment, fear, and discomfort associated with pelvic examinations (Chorley et al., 2017).

HPV DNA testing has emerged as a highly sensitive method for detecting high-risk HPV infection and is increasingly recommended as a primary screening tool (Ronco et al., 2014). In recent years, HPV DNA self-sampling has been introduced as an alternative approach that allows women to collect their own vaginal samples outside of clinical settings. This method

offers several advantages, including increased privacy, convenience, and potential to reach under-screened populations (Nelson et al., 2017).

A growing body of evidence suggests that HPV self-sampling demonstrates comparable diagnostic accuracy to clinician-collected samples, particularly when PCR-based assays are used (Arbyn et al., 2020). Moreover, self-sampling has been associated with increased participation in cervical cancer screening programs, especially among women who are reluctant to undergo clinician-based procedures (Yeh et al., 2019a).

The urgency of this research is underscored by the high burden of cervical cancer in Indonesia, where screening coverage remains low. Without acceptable and affordable screening alternatives, many women will continue to be diagnosed at advanced stages. Understanding the perspectives of women with abnormal results is critical for designing patient-centered interventions that can increase follow-up and reduce loss to follow-up in screening programs (Koliopoulos et al., 2017).

The novelty of this study lies in its specific focus on women with abnormal Pap smear results—a population that has been largely overlooked in previous self-sampling research. Additionally, this study provides original data on cost acceptability and willingness to recommend the method to others, which have important implications for programmatic scale-up in Indonesia. Unlike prior studies that focused solely on acceptability, this research comprehensively assesses concerns, ease of use, preferences, barriers, cost considerations, and willingness for routine use within a single cohort.

Despite its promising diagnostic performance, the success of HPV DNA self-sampling in real-world implementation depends largely on patient acceptance and willingness to adopt this method. Understanding patient perspectives—including perceived ease of use, concerns, cost considerations, and preferences—is essential to inform policy and optimize screening strategies.

Therefore, this study aims to evaluate patient perspectives on HPV DNA self-sampling, focusing on its acceptability, perceived barriers, and willingness for future use among women with abnormal Pap smear results (Bruni et al., 2021; Arbyn et al., 2021).

METHOD

This study was conducted as part of a cross-sectional diagnostic study to evaluate patient perspectives on HPV DNA self-sampling. The study was carried out at the gynecology and colposcopy clinics of a tertiary referral hospital between July and December 2022.

Participants were women with abnormal Pap smear results who attended the gynecology or colposcopy clinics during the study period. Subjects were recruited using a consecutive sampling method.

The inclusion criteria were: (1) abnormal Pap smear results, (2) history of sexual activity, (3) no sexual intercourse within 48 hours prior to sampling, and (4) no use of vaginal antiseptics or douching within 48 hours. Exclusion criteria included active vaginal bleeding, current menstruation, pathological vaginal discharge, and a prior diagnosis of cervical cancer.

A total of 48 participants who met the eligibility criteria were included in the analysis. After completing both sampling procedures, participants were asked to complete a structured questionnaire designed to evaluate their perspectives on HPV DNA self-sampling.
The questionnaire assessed the following domains:

1. Level of concern during self-sampling
2. Perceived ease of use
3. Preferred sampling method (self vs clinician)
4. Barriers to cervical cancer screening
5. Acceptable cost range for testing
6. Willingness to undergo routine screening
7. Willingness to recommend the method to others

This study was approved by the institutional ethics committee. All participants provided written informed consent prior to enrollment. The study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULT AND DISCUSSION

A total of 48 women with abnormal Pap smear results were included in this study. The baseline characteristics of the study population are summarized in Table 1.

Table 1. Charactheristic of Patient

Characteristic	n	%
Age (years)		
21–30	4	8.3
31–40	20	41.7
41–50	16	33.3
51–60	8	16.7
Education Level		
Junior High School	4	8.3
Senior High School	18	37.5
Diploma	7	14.6
Undergraduate	15	31.3
Postgraduate	4	8.3
Parity		
Nulliparous	8	16.7
Primiparous	7	14.6
Multiparous	33	68.8
Age at First Sexual Intercourse		
≤ 20 years	15	28.8
> 20 years	32	61.5
History of Hormonal Contraceptive Use		
Yes	26	54.2
No	22	45.8
Smoking History		
Yes	11	22.9
No	37	77.1

Most participants were aged 31–40 years (41.7%), followed by those aged 41–50 years (33.3%). The majority had completed secondary education (37.5%) or undergraduate education

(31.3%). In terms of reproductive history, most participants were multiparous (68.8%), and the majority reported first sexual intercourse after the age of 20 years (61.5%). More than half of participants (54.2%) had a history of hormonal contraceptive use, while 22.9% reported a history of smoking.

Table 2. Patient Perspectives on HPV DNA Self-Sampling Test (n = 48)

Variable	Category	n	%
Concerns when performing self-sampling	Yes	20	41.7
	No	28	58.3
Perceived concerns	Pain	10	20.8
	Inadequate sample collection	7	14.6
	Sampling device may fall	7	14.6
	Others	1	2.1
Ease of use of self-sampling	Easy	48	100
	Difficult	0	0
	Do not know	0	0
Preferred sampling method	Clinician-based sampling	19	39.5
	Self-sampling	29	60.5
Barriers to cervical cancer screening	Fear of precancerous/cancer diagnosis	42	87.5
	Healthcare facility far from home/work	4	8.4
	Perceived unnecessary (no symptoms)	5	10.5
	Transportation issues	2	4.2
	High cost of examination	18	37.5
	Concern about cost if result is positive	25	52.1
	Lack of partner approval	5	10.5
Acceptable cost for HPV DNA self-sampling	< IDR 500,000	37	77.0
	IDR 500,000–1,000,000	9	18.7

A total of 48 participants completed the questionnaire assessing their perspectives on HPV DNA self-sampling. Overall, the findings demonstrated a high level of acceptability and positive perception toward the method.

Most participants (60.4%) reported no concerns when performing self-sampling, while 39.6% expressed some degree of apprehension. Among those who reported concerns, the most common issues were fear of pain (20.8%), uncertainty regarding the adequacy of the collected sample (14.6%), and concerns about improper handling of the sampling device (14.6%). Despite these concerns, all participants (100%) reported that the procedure was easy to perform, indicating excellent usability across the study population. When asked about their preferred method of sample collection, the majority of participants (60.4%) preferred clinician-based sampling, while 39.6% preferred self-sampling.

Several barriers to cervical cancer screening were identified. The most frequently reported barrier was fear of receiving a diagnosis of precancerous lesions or cancer (87.5%). Other commonly reported barriers included concerns regarding the potential cost of treatment following a positive result (52.1%) and the perceived high cost of screening itself (37.5%). Less frequently reported barriers included distance to healthcare facilities, lack of symptoms,

transportation difficulties, and lack of partner support. Regarding cost perception, more than half of the participants (54.1%) considered a price below IDR 300,000 to be acceptable for HPV DNA self-sampling. Meanwhile, 20.8% found a price range of IDR 300,000–600,000 acceptable, and 25% were willing to pay between IDR 600,000 and 1,000,000.

Willingness to adopt this method for routine screening was very high, with 95.8% of participants expressing interest in undergoing HPV DNA testing every 1–3 years. Additionally, all participants (100%) stated that they would recommend the test to their relatives, friends, or peers.

This study demonstrates that HPV DNA self-sampling is highly acceptable among women with abnormal Pap smear results, with all participants reporting that the procedure was easy to perform and the majority expressing willingness to undergo routine screening. These findings support the growing evidence that self-sampling is a feasible and patient-centered approach to improving cervical cancer screening uptake.

The high level of acceptability observed in this study is consistent with previous literature showing that women generally find HPV self-sampling to be convenient, private, and less invasive compared to clinician-based sampling. A systematic review by Nelson et al. reported that self-sampling significantly improves participation among women who are under-screened or reluctant to attend clinical examinations (Nelson et al., 2017). Similarly, Yeh et al. demonstrated that offering self-sampling increases screening uptake across diverse populations, particularly in low-resource settings (Yeh et al., 2019b).

Despite the high acceptability, a considerable proportion of participants reported concerns related to self-sampling, including fear of pain and uncertainty regarding the adequacy of the collected sample. These findings align with prior studies indicating that lack of confidence in performing the procedure correctly is one of the main barriers to self-sampling adoption (Dzuba et al., 2002). This highlights the importance of providing clear instructions and patient education to ensure correct technique and reduce anxiety.

Interestingly, although self-sampling was widely accepted, a majority of participants still preferred clinician-based sampling. This reflects the persistent trust in healthcare providers and suggests that self-sampling should be positioned as a complementary option rather than a replacement for clinician-based screening. Similar findings have been reported in other studies, where women expressed greater confidence in clinician-collected samples despite acknowledging the convenience of self-sampling (Waller et al., 2004).

Psychological barriers were also prominent in this study, with fear of receiving a diagnosis of precancerous lesions or cancer identified as the most common barrier to screening. This finding is consistent with existing evidence that fear and stigma associated with cancer diagnosis significantly reduce participation in screening programs (Chorley et al., 2017). Addressing these psychological factors through education and counseling is essential to improve screening uptake.

Financial concerns were another important barrier identified by participants, particularly regarding the cost of follow-up care if test results were positive. This reflects broader challenges in healthcare accessibility and affordability in low- and middle-income settings. Previous studies have emphasized that cost remains a critical determinant of screening participation, and reducing financial barriers is essential for successful implementation of screening programs (Campos et al., 2015).

The findings on cost perception in this study provide valuable insights for policymakers. Most participants indicated that an acceptable price for HPV DNA self-sampling would be below IDR 500,000, suggesting that affordability will be a key factor in determining uptake. Integration of HPV self-sampling into national health insurance schemes could facilitate broader access and improve equity in screening services (Maver & Poljak, 2020).

Importantly, the high willingness of participants to undergo routine screening and recommend the method to others suggests strong social acceptability. This peer-driven dissemination could play a significant role in increasing community-level participation, particularly in settings where awareness and access remain limited. Similar trends have been observed in community-based screening programs, where social influence contributes to increased uptake (Gupta et al., 2018).

Overall, this study highlights that HPV DNA self-sampling is not only acceptable but also holds substantial potential to address multiple barriers to cervical cancer screening, including psychological, logistical, and financial challenges.

CONCLUSION

HPV DNA self-sampling is a highly acceptable and user-friendly method for cervical cancer screening among women with abnormal Pap smear results. The majority of participants reported no concerns during the procedure, and all found it easy to perform, indicating excellent feasibility for broader implementation. Despite this high acceptability, clinician-based sampling remains the preferred method for many women, reflecting continued trust in healthcare providers. However, self-sampling offers a valuable complementary approach, particularly for individuals who face psychological, logistical, or accessibility barriers to conventional screening. Key barriers identified in this study include fear of cancer diagnosis and concerns regarding the cost of screening and follow-up care. Addressing these barriers through patient education and affordable screening strategies will be essential to improve participation. Overall, HPV DNA self-sampling has strong potential to increase cervical cancer screening uptake and should be considered as part of integrated, patient-centered screening programs, especially in low-resource settings.

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