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Pilot Project on HPV Cervical Cancer Prevention via Self-Sampling in Bandung, Indonesia

[1]Nurul Rasihan, [2]Pauline Sng, [3]Joyce Tan and [4]Daniel Edbert
[1]Department of Infectious Disease, Health Regency, West Bandung, Indonesia
[2]Managing Partner, Project Manager, Singapore
[3]Managing Partner, Project Manager, Singapore
[4]Department of Microbiology/Health, Jakarta, Indonesia

ABSTRACT

Background and Objective: Cervical Cancer is the second highest cause of death in Indonesia. A lack of awareness, embarrassment, cultural sensitivities, and low accessibility to healthcare facilities primarily cause low screening rates of HPV amongst women. The pilot study's objective is to enhance publicity and awareness of HPV amongst the women at West Bandung and to establish the end-to-end process on self-sampling HPV screening with the aim for scaling up to other regions and provinces in Indonesia. **Materials and Methods:** The primary HPV genotypes to be detected are HPV genotypes 16 and 18, in addition to other high-risk HPV genotypes. Self-Sampling Swab was used to collect specimens from the vaginal cell walls of female participants. Real-time PCR on DNA extraction from the specimen was conducted to detect the presence of any HPV 16 or 18 genotypes. The HPV screening results were qualitatively analyzed, while participant feedback on self-sampling kits was descriptively analyzed with a 99.5% significance level to assess acceptability. **Results:** Of the 335 women who participated in the pilot study, 4.2% (14 participants) were detected to be HPV positive. The 83.5% (280 out of 335 participants) provided feedback on the ease and comfort of use. 99.64% provided positive feedback. This indicated a 0.05 level of significance from the feedback from the participants. **Conclusion:** The pilot study, the first of its kind in Indonesia, demonstrated high acceptability and feasibility of HPV self-sampling, with 99.64% positive feedback. These findings support its potential to enhance HPV screening uptake nationwide.

KEYWORDS

HPV, cervical cancer, self-sampling swab, screening

INTRODUCTION

Indonesia has high incidences of cervical cancer, resulting in high death rates, primarily due to low screening rates amongst women. The significance of this study lies in its potential to identify the importance of early screening for HPV amongst women in Indonesia using a self-sampling swab to encourage women to enhance screening initiatives. Indonesia has very low HPV screening rates primarily due to embarrassment amongst the women[1], lack of awareness or education, and lower accessibility to health care facilities due to the wide geographical spread. It is therefore important to advocate early detection amongst the women in Indonesia to reduce the healthcare burden for potential late treatments, and it is the backbone to the initiation of this project.

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From a WHO 2021 country profile report, as of 2023, Indonesia has an estimated population of 189 mL women 15-64 years old, and as of 2019, 843,000 have died due to cervical cancer. Current estimates indicate that every year, 36633 women are diagnosed with cervical cancer, and in 2023, 21003 died from the disease. From the ICO/ARC fact sheet, about 4.0% of women in the general population are estimated to harbor cervical HPV-16/18 infection at a given time, and 87.0% of invasive cervical cancers are attributed to HPV-16 or 18. There were not many research studies conducted on the use of self-sampling swabs amongst women in Indonesia[2-4].

Advocacy on self-sampling has been on the rise in developed and higher-income countries, from a recent article cited in the International Journal of Cancer. This forms part of the WHO strategy to eliminate cervical cancer by 2030. However, the self-sampling method is still an unknown methodology in developing countries that depend primarily on visual inspection using acetic acid (VIA) for screening, which largely contributes towards low acceptance by the women in rural regions. From a 2023 study in The Lancet Regional Health[5], the authors reviewed the latest national cervical cancer Indicators and barriers to HPV vaccination and cervical cancer screening across the 21 member countries of the Asian National Cancer Centers Alliance (ANCCA). Their findings revealed that only 4 of these countries utilize HPV screening methods, while the remaining nations, including Indonesia, rely on VIA or cytology-based screening. More than half the countries cited inadequate accessibility to healthcare facilities in urban and rural areas as primary reasons for low screening.

In a review study in 2025 cited in The Annals[6] on the barriers to cervical cancer screening and the potential role for HPV self-sampling, the authors found that with the introduction of self-sampling screening, the uptake of cervical cancer screening can increase by 8%. This is, however based on the survey performed in one country and may not be a good representation across South East Asia. There were not many studies done amongst Indonesian women on cervical cancer screening, and this pilot project aims to address the critical issue of cervical cancer in Indonesia, as well as the importance of early detection through screening. The objective of this project was to establish an End-to-End process for HPV awareness and screening for early detection services to 320 women in West Bandung, Indonesia, using HPV self-sampling kits. With the success of such a pilot program, it will encourage wider adoption of screening through HPV self-sampling, thereby contributing to the national need to reduce and eventually eliminate cervical cancer in Indonesia.

MATERIALS AND METHODS

Ethics consideration: The ethics/legal committee of the Health Regency in Bandung has approved to conduct this pilot study. As part of the Personal Data Protection Law 2022, all patients data collected during this pilot project are strictly kept with the respective Primary health care centres, and consent forms from the patients have been obtained and signed accordingly. All information used for the assessments only reflects Specimen IDs and not patients' information.

Study design: This was a controlled study that began in June, 2024 and concluded in August, 2024, and involved the midwives in West Bandung Regency to provide awareness of HPV to the women. At the same time, 32 of the Pukesmas (Primary Health Centres) across the districts were engaged to recruit women to participate in this pilot study. The midwives who ran private services and the midwifery school at the KITKes UNJANI (Faculty of Medicine at the Jenderal Achmad Yani University in Bandung) were also engaged to recruit women to participate in this pilot study.

Table 1: Project plan and timeline

Process	June	July	August	September
Preparation	✓			
Distribution		✓	✓	
Collection		✓	✓	
Test/Response		✓	✓	
Final conclusion				✓

✓: Occur

Materials use: Materials used for this pilot study included HPV self-sampling kits with transport media (IMOQ Self-Sampling Kit), DNA extraction Reagents (MEDLAB Direct Extraction) for DNA extraction, and RT PCR Reagents (MEDLAB HPV Screening RT PCR 18 High Risk Kit) to run the assays. The instrument used as RT RT-PCR instrument is the VitroCycler. In addition to these materials and instruments, every center has also provided a Video to train the respondents on the use of the sampling kits and how to self-collect the specimens. Online feedback forms were also used to obtain feedback from the participants on the ease and comfort of usse of the sampling kits.

Selection criteria for the participants: The female respondents were recruited from the 32 primary health centers, private midwife clinics, and the midwife faculty from the medical university in Bandung. The respondents should be <50 years old and sexually active. On day of specimen collection, respondents should have abstained from sexual intercourse for 24 hrs, her last day of menstruation should be at least 1 week ago and did not use any soap or cream at the vagina region for past 2 days.

Process: Project initiation started end of June, 2024, where close to 40 midwives from the 32 Puskesmas gathered at the West Bandung regency to receive instructions on building awareness through various media platforms, including face-to-face sharing and the TikTok platform.

The project plan and timeline are as per Table 1.

In the first week of August, 2024, the distribution of 320 HPV self-sampling kits were distributed to the various Puskesmas leads as well as the group of midwives. Video training on the use of the product was shared, and instructions on the process were shared.

In total, there were 320 self-sampling kits issued to the 32 Puskesmas and Midwives groups. The women recruited were required to sign a consent form, watch the video on how to use the self-sampling kit, and provide feedback on the kit before leaving the venue. Each sample collected is stored in the transport media provided and is stored in the refrigerator and transported at 2-8°C using ice boxes.

Outcomes measures: Over the next 5 days, the Puskesmas and midwives recruited women based on the stated criteria and collated the specimens, and delivered them to the Lembang Regional Hospital in Bandung for the assays to be conducted. All validated instruments and reagents were supplied to the Lembang Regional Hospital Lab for the PCR tests to be run.

The Bandung Regional Laboratory was not used as the site to run the assays, as it was undergoing audit preparations. Feedback forms were provided to each respondent to collate their experiences on the ease of use and comfort of use of the self-sampling kits.

Statistical analysis: Qualitative analysis was used to report the results of the HPV screening using self-sampling kits. Descriptive analysis was used to report the feedback on the use of the kits by individual participants, with a significance level of 99.5% to indicate acceptability.

RESULTS

Awareness: During July, 2024, awareness campaigns conducted by midwives successfully reached 4,741 women across West Bandung. These campaigns included in-person sessions and digital outreach (e.g., TikTok), raising awareness of HPV and its screening options.

Self-sampling results: A total of 320 self-sampling kits were distributed to 32 Puskesmas and midwife groups. An additional 19 kits were used for staff at RSUD Lembang, totaling 339 distributed kits. Of these, 335 valid samples were received and assayed at Lembang Regional Hospital.

Among the tested samples:

- 14 participants (4.2%) tested positive for HPV
- 9 participants (2.7%) had other high-risk HPV (HPV HR) genotypes
- 3 participants (0.9%) tested positive for HPV16
- 2 participants (0.6%) tested positive for HPV18

The positive cases were distributed across different subdistricts without a clear geographic clustering (Table 2, Fig. 1).

Table 2: Distribution of HPV-positive cases by genotype (HPV HR, HPV16 and HPV18) and geographic location in west bandung

Location	HPV HR	HPV16	HPV18
Cibodas_1.1.2	1		
Cililin_4.2.6			1
Cipatat_5.3.11	1		
Cipatat_5.3.14		1	
Cipeundeuy_5.4.6	1		
Ckalongwetan_4.5.15	1		
Gununghalu_7.2.1	1		
Jayamekar_3.4.6	1		
Mukapayung_4.3.2	1		
Mukapayung_4.3.5		1	
Parongpong_1.5.3	1		
Pataruman_4.1.1		1	
Saguling_6.1.2	1		
Tagogapu_3.3.4			1
Grand total	9	3	2

1 under HPV HR → 1 person tested positive for a high-risk genotype 1 under HPV18 → 1 person tested positive for HPV18

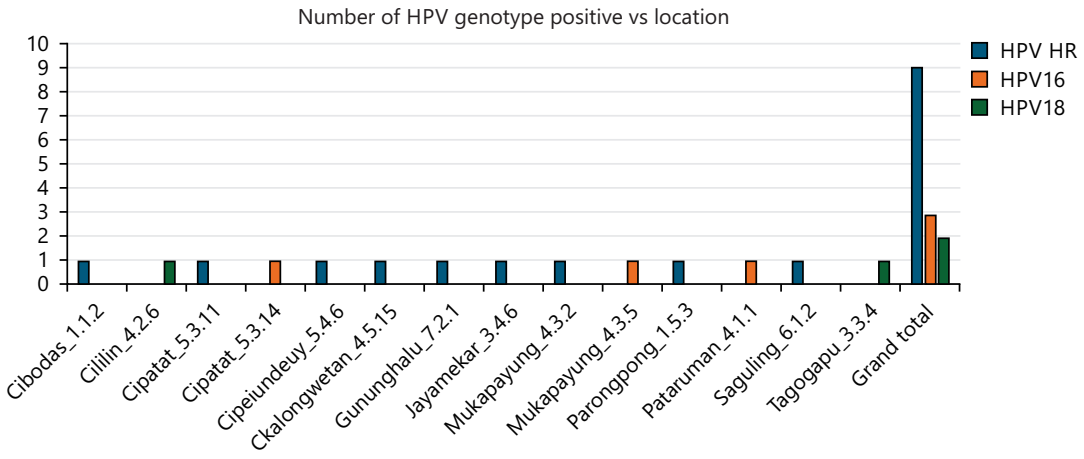

Fig. 1: Summary of HPV genotype detection results from the 335 tested self-sampling kits across the study population

Table 3: Qualitative feedback on the ease of use of HPV self-sampling kits among respondents (n = 280)

Ease of use feedback	
Easy but need help	2
Easy but scared	3
Easy to use: Fabric should be smaller like cotton bud	1
Not easy to use: Spatula is not flexible enough	1
Easy to use: Spatula is flexible but some efforts needed to insert	1
Easy to use: Should make product more comfortable	1

1, 2, 3 present respondents

Table 4: Participant comfort levels and suggestions for improvement in self-sampling kit usage

Comfortable to use feedback	
Not comfortable: Dragging feeling	1
Not comfortable: Dragging feeling and feel pinching pain	1
Not comfortable: Must make it smoother	2
Not comfortable: Need a lubricant	2
Not comfortable: Need to make it smaller like a cotton bud	1
Not comfortable: Long waiting time	2
Not comfortable: Hurts when inserted	2
Not comfortable: It's somewhat rough	1
Not comfortable: Pain when pulling out	1

1, 2, 3 present respondents

Feedback analysis: Out of 335 participants, 280 (83.5%) submitted feedback on the self-sampling kit. The responses revealed:

- 279 participants (99.6%) found the kit easy to use
- Only 1 participant stated the kit was not easy to use

Regarding comfort, 265 participants (94.6%) reported the kit was comfortable, while 15 (5.4%) found it uncomfortable.

A breakdown of qualitative feedback is provided in Table 3. Comments included:

- "Easy but scared" (3 participants)
- "Easy but need help" (2 participants)

Minor concerns about the spatula's size and flexibility were raised by a few respondents.

Additional comfort and product suggestions are compiled in Table 4, highlighting minor design improvements suggested by users.

DISCUSSION

About 335 women were recruited to self-test using the HPV self-sampling swab, with 4% positive for HPV genotypes 16, 18, and other high-risk genotypes. This is the very first study conducted in Indonesia where women were recruited to use a self-sampling kit for HPV DNA screening, and specimens were collected for testing. This study not only was able to identify positive cases but also demonstrated the ease and comfort of using a self-sampling swab with a significance level of 99.5%.

To date, there have been very few papers published on HPV screening in Indonesia, and those studies were mainly focused on the perception of HPV screening, socio-demographic influences, and stakeholders perspectives of HPV DNA screening. This study may be a catalyst for a potential solution to encourage more women in Indonesia to go for HPV screening willingly. The current HPV screening method in Indonesia is primarily visual inspection by acetic acid (VIA).

Many of the respondents were taught how to use the self-sampling kit through a video training, and 99% of the participants who provided feedback shared that it was easy to use. Even though some shared that they found it a little uncomfortable or needed some help, the majority found the process of self-sampling comfortable. Of the respondents who provided feedback, 91.3% have never had an HPV screening before, and 94% are willing to share with other women the use of HPV self-sampling for screening. This study will also provide very good data points to advocate for self-sampling for HPV screening, thus contributing to the Indonesian government's commitment to increasing HPV screening efforts under the cervical cancer elimination plan by 2030.

From a study published in 2018[1] reviewing the number of women screened for cervical cancer between the periods 2007-2018, only 9.8% of the population were screened using the VIA method. This was part of a national program on cervical and breast cancer screening that was piloted in 2007 across all the provinces and districts in Indonesia.

Barriers to cervical cancer screening include lack of support from husbands, embarrassment[1], fear of results, inadequate accessibility to healthcare facilities[5], lack of knowledge[7] or awareness, cost concerns[8] and fear of pain. Against the cultural and religious backdrop, women would rather avoid screening than be screened positive, which may result in backlash of abandonment or divorce by their husbands.

Since 2008, under the national program for cervical cancer screening, VIA was recommended as an affordable screening method paired with cryotherapy for positive cases[3,4]. However, the uptake by the women remained low and the number of cervical cancers and deaths continues to remain high[2]. Furthermore, VIA requires the women to be at the clinic and a health practitioner to perform the procedure, which not only takes a lot of time but also probably causes the women to feel uncomfortable. The self-sampling kit, on the other hand, will provide convenience and privacy in the comfort of the woman's home, which will be a better alternative and perhaps a catalyst to encourage more women to be screened.

CONCLUSION

There is a huge female proportion in Indonesia who could have avoided death from HPV cervical cancer if they had only been screened earlier. Reasons for not getting screened could vary from costs, immediate availability of healthcare services, to embarrassment. The use of a self-sampling kit and a simple process will also help to protect the dignity of Muslim women in the safety of their homes. This pilot project has demonstrated the effectiveness of HPV awareness coupled with the use of a self-sampling kit that is easy and comfortable to use. The positive rate of 4% is also in line with the IOC/IARC HPV Information's data on HPV incidences based on cytology assessment for Indonesia. This pilot project to establish the end-to-end process of awareness, education, distribution, sampling, collection, and assays of the specimens will pave the way for the respective health regencies in Indonesia to embark on reaching wider target groups across the other parts of Indonesia.

SIGNIFICANCE STATEMENT

This study identified that the use of HPV self-sampling swabs is beneficial for women in the rural regions of Indonesia to prevent cervical cancer through early detection. Through this initial pilot, further studies are warranted for researchers to continue to uncover the critical areas of early detection of HPV using innovative methods, an area that has remained unexplored by many, especially in sea countries.

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