Open Journal of
Clinical & Medical
Case Reports

Volume 11 (2025)
Issue 16

Research Article ISSN: 2379-1039

A collaborative approach in management of high-risk HPV positive women in the national screening program in Nepal

Sunila Shakya[1,2]*; Sushmita Uprety[1]; Shriza Shrestha[1]; Shyam Khadka[3]; Sabina Basnet[3]; Manoj Tamang Lama[3]; Supriya Lamichhane[2]; Anjali Kumari Chaurasia[2]

***Corresponding Author: Sunila Shakya**

Department of Gynecology and Obstetrics, Dhulikhel Hospital/Kathmandu University Hospital, Dhulikhel, Kavre, Nepal.

Email: sunilashakya@kusms.edu.np

Abstract

Background: Cervical cancer is a major public health issue in Nepal, where screening coverage remains only around 8% despite national targets of 70%. Limited infrastructure, low awareness, and poor access hinder early detection. Human Papillomavirus (HPV) DNA testing offers a sensitive method suitable for low-resource settings. In 2022–2023, Nepal launched HPV-based pilot screenings in seven districts, but evidence on community-led approaches is limited. This retrospective study in Bhimeshwor Municipality, Dolakha, assesses a government-led HPV screening program implemented with Dhulikhel Hospital, focusing on screening coverage, referral, follow up and timely management of HPV-positive women.

Objective: This study describes the identification of women at risk of developing cervical cancer through the National community-based HPV DNA screening initiative at Bhimeshwor Municipality in Dolakha District and managing them with the collaboration of Dhulikhel Hospital.

Methods: A cross-sectional study was conducted in Bhimeshwor Municipality, Dolakha District, Nepal, using secondary data from the government-led National HPV DNA cervical cancer screening program implemented in collaboration with Dhulikhel Hospital. Data from 2,235 women aged 30 years and above with complete screening records were analyzed descriptively to assess screening outcomes, follow-up, referral and treatment status. Variables included age, ward, HPV and VIA results, biopsy findings, treatment received, and follow-up status. Data validity and reliability were ensured through the use of standardized national screening tools, and cross-checked data extraction. Microsoft Excel (Version 2508) was used to summarize the data.

Results: Out of 9,640 eligible women, 2,235 were screened, achieving a 23.18% coverage. A total of 210 women (9.4%) tested positive for HPV DNA. Among HPV-positive cases, 210 (99%) received follow-up care and among them 100% VIA positive cases received appropriate treatment based on tissue biopsy report.

Conclusion: Despite limited resources, the collaborative approach helped the program achieve full follow-up and treatment for HPV-positive women. The study highlights the need for collaboration of local stakeholders at planning level to improve the screening coverage.

Keywords: Bhimeshwor municipality; Cervical cancer; Community-based screening; HPV DNA testing.

Abbreviations: CIN: Cervical Intraepithelial Neoplasia; DNA: Deoxyribonucleic Acid; HPV: Human Papilloma Virus; LEEP: Loop Electrosurgical Excision Procedure; LMICs: Low- and Middle-Income Countries; VIA: Visual Inspection with Acetic Acid.

Introduction

Cervical cancer is a major public health challenge in LMICs, leading to high rates of morbidity and mortality among women [1,2]. Despite the National guidelines of Nepal recommending screening coverage of at least 70% of women aged 30 and above every five years, 90% access to treatment for cervical pre-cancer and cancer including access to palliative care, actual screening coverage remains only around 8% [3,4]. The screening efforts are limited by poor infrastructure, inadequate health budgets, and lack of access to advanced diagnostics [5].

HPV, the primary cause of cervical cancer, can be detected through HPV DNA testing, which is more sensitive than conventional cytology-based methods such as Pap smears [6-8]. Its high sensitivity and self-sampling potential make it suitable for low resource setting, yet barriers like stigma, low awareness, and poor access persist, especially for marginalized groups [9-12]. It enables identification of women at risk of cervical cancer, early detection of precancerous changes [5]. A recent study found that pap tests remain underutilized in Nepal, with only 22% of eligible women screened in tertiary hospitals [4]. A step survey conducted in 2019 reported that in the age group 30-49 years, only 8.2% of the women ever screened for cervical cancer [13].

Recognizing this need Nepal endorsed an HPV-DNA based pilot screening in 7 districts (Dolakha, Mahottari, Rautahat, Sarlahi, Lalitpur, Palpa, Sindhupalchowk and Sunsari) of Nepal in 2022-2023 [3]. However, evidence on coverage of cervical cancer screening and management of screen positive women remains limited. Likewise, there is no published data on HPV-based integrated, community-led collaborative screening approaches in Nepal including screening, follow up, referral and treatment.

To address these gaps, a retrospective study was conducted in Bhimeshwor Municipality, Dolakha which is one of the districts of the government's HPV-based pilot screening program. After the screening by the government, management of the positive cases were done in collaboration with Dhulikhel Hospital. This paper presents our experience of collaborative work between Bhimeshwor Municipality, Dolakha and Dhulikhel Hospital in management of women at risk for cervical cancer identified during HPV-based Natio-

nal screening programme.

Methods

We selected Bhimeshwor Municipality of Dolakha District, Nepal for study as it is one the eight districts in which the government has conducted HPV-DNA based pilot screening. The Municipality also has an outreach clinic of Dhulikhel Hospital which made it feasible for the collaboration.

A cross-sectional study was conducted using secondary data collected from the record of implementation of the government-led National HPV DNA cervical cancer screening program in Bhimeshwor Municipality, Dolakha District with clinical management of HPV positive women in collaboration with Dhulikhel Hospital.

We used a descriptive analysis method to source data, describe the results and list the variables such as screening participant's age, their respective residency at ward level, HPV report (Negative, Positive), VIA report (Negative, Positive), biopsy result (CIN I, CIN II, Carcinoma, negative), treatment received for cervical precancer (LEEP, thermocoagulation), cancer and follow up status (completed, lost to follow up).

A total of 2,235 women had participated in the HPV DNA based cervical cancer screening program. Data of married women aged 30–49 years and women aged 50 and above residing in different wards of Bhimeshwor Municipality with complete screening record were included in the study.

The validity of the tool was ensured through the use of secondary data provided by Bhimeshwor Municipality for National Cervical Cancer Screening Program, which follows standardized national guidelines and protocols developed by the Ministry of Health and Population. The secondary data includes record forms used in the program as per the Standard Operating Procedure and validated by experts to ensure accurate measurement of screening outcomes and related variables. Only complete and verified records were included in the study to maintain content validity.

To maintain reliability in this study, data extraction was performed using a pre-designed data extraction checklist, and consistency of data entry was cross-checked to minimize errors.

Collaborative approach with Dhulikhel hospital

Following the identification of HPV DNA-positive cases, government officials from Bhimeshwor Municipality approached Dhulikhel Hospital to establish a collaborative partnership for the clinical management of women with HPV test positive. The budgetary constraints and the absence of allocated funds for treatment within the municipality posed significant challenges for timely treatment and care. In response, Dhulikhel Hospital took full responsibility for the follow-up and clinical management of all HPV-positive cases. This collaboration has remained in place till date, ensuring continuity of care and access to necessary treatment for the women testing positive.

Statistical analysis and software used

Microsoft Excel (Version 2508) was used to summarize the descriptive statistics, including frequencies and percentages, to present ward-wise participation, screening uptake, HPV positivity rates, and their treatment. Ward-level comparisons are presented in tabular form to assess variations in coverage and positivity across the municipality.

Results

A total of 9,640 women aged 30-49 years and 50 plus years were eligible for screening through HPV DNA based cervical cancer screening in Bhimeshwor Municipality, based on the Health Management Information System target population data for 2080/2081 provided by the municipality. Of these, 2,235 underwent sample collection, resulting in an overall screening coverage of 23.18% (Figure 1).

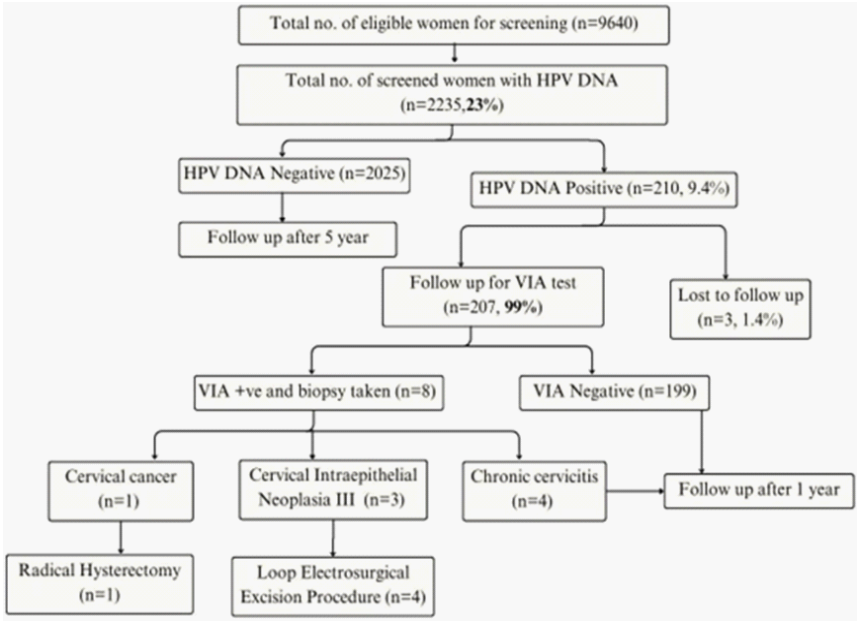

Figure 1: Cervical cancer screening and linkage to care.

Among those screened, 210 women (9.4%) tested positive for HPV DNA. Screening uptake varied significantly across the ward. Ward 1 had a relatively high coverage of 44% with 382 women screened out of 868 eligible women, identifying 27 positive cases. Similarly, Ward 3 had a notable screening rate of 38% (n=552) and detected the highest number of positive cases (n=69). Ward 9 also showed a high screening uptake at 35%, with 320 women screened and 34 positive cases. In contrast, Wards 2, 4, 6, and 8 showed low screening coverage, ranging from 10% to 14%, with comparatively fewer samples collected and positive cases detected. Although Ward 6 had the largest eligible population of 1,815 women, only 193 women were screened, with a low coverage of just 10.6% (Table 1).

Follow-Up and Clinical Findings

Following the initial HPV DNA testing, 207 HPV-positive women underwent further evaluation through VIA. Among them 8 women tested positive for VIA and tissue biopsies were taken for diagnosis.

Biopsy results revealed one case of endocervical adenocarcinoma, which was referred to Bhaktapur Cancer Hospital for further management. Additionally, three cases of CIN-III were identified and were treated with Loop Electrosurgical Excision Procedure (Figure 1).

Table 1: Ward-wise distribution of HPV DNA screening coverage and positivity among women aged 30 years and above in Bhimeshwor municipality.

Ward no	Total female population of 30-49 yrs and 50 plus	Total number of sample collected-B	Total positive cases	Total coverage proportion by government (B/A*100)
1	868	382	27	44%
2	1102	114	2	10%
3	1451	552	69	38%
4	583	61	7	10.50%
5	1215	255	18	21%
6	1815	193	21	10.60%
7	944	257	27	27%
8	744	101	5	14%
9	918	320	34	35%
Total	9640	2235	210(9.4%)	23.18%

(Source HMIS target population data 2080/2081 provided by the municipality for age 30-49 yrs and 50 plus)

Loss to follow-up

Three HPV-positive women (3.8%) were lost to follow-up due to inability to contact (n=2), self-check up in Kathmandu (n=5), and pregnancy at the time of follow up (n=1) (Figure 1).

Discussion

This study demonstrated the outcomes of implementation of a large-scale, National HPV DNA based screening initiative in Bhimeshwor Municipality, Nepal in collaboration with Dhulikhel Hospital. The key finding was that despite limited time and resources at government health facilities, through collaboration with Dhulikhel Hospital, a tertiary level hospital, a substantial number (99%) of screen positive women were followed-up. Through VIA and biopsy reports women with cervical precancers and cancer were identified and all of them (100%) received appropriate treatment highlighting the strength of coordinated intersectoral collaboration.

With a screening coverage of 23.18%, this initiative successfully identified 210 HPV-positive cases (9.4%). The screening coverage rate has increased as compared to the screening coverage of 8.2% as reported by STEPS survey, Nepal [13]. However, this initiative was not able to reach the target of the National guidelines recommending screening coverage of at least 70% of women aged 30-60 years [3]. This suggests that if collaboration with Dhulikhel Hospital was done from the planning stage rather than later, there would be higher chances of screening coverage that would help achieve the target.

The variation in screening coverage across wards also suggests disparities in screening participation, highlighting the need for more targeted approaches. These include enhanced behavior change communication, sustained community engagement, and collaboration with local health workers

and multisectoral partners. Similar disparities have been reported in other low- and middle-income country contexts, where factors such as geographic location, time constraints, health-seeking behavior, cost, local leadership, and community mobilization affect screening uptake [9–11,14].

One of the key strengths of this initiative was its collaboration with Dhulikhel Hospital for management of women with HPV positive results. While maximizing screening coverage is crucial, it must be well complemented by timely and appropriate clinical management. This collaborative approach bridged the gap between screening and treatment, ensuring continuity of care for women who tested positive and diagnosis of precancerous lesions and invasive cancer. The hospital's commitment to managing HPV-positive cases mitigated the municipality's limitations in funding and highlighted the importance of multisectoral collaboration for successful program implementation. Various other studies have also shown that, particularly in resource-constrained settings, such collaborations are effective in strengthening primary care, enhancing preventive services, and reducing health inequities especially where local budgets are insufficient to support treatment services [15-17].

Although the loss to follow-up rate in this study was relatively low (1.4%), it remains a persistent challenge, especially in geographically remote or socioeconomically disadvantaged areas. Contributing factors include migration, limited contact information, fear, stigma, and family responsibilities. Delays in follow-up for precancerous lesions can lead to missed opportunities for early intervention, thereby increasing the risk of advanced cancer and mortality [18].

Conclusion

This study highlights that community-based HPV DNA screening, supported by strong intersectoral collaboration between local government and healthcare providers, is a feasible and effective strategy for cervical cancer prevention in low-resource settings like Bhimeshwor Municipality, Nepal. The program achieved high follow-up and ensured 100% treatment for HPV-positive women, highlighting the scalability of this approach. To further strengthen such initiatives, future efforts should focus on improving community engagement, reducing diagnostic delays, and incorporating inclusive strategies such as self-sampling.

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Manuscript Information: Received: November 11, 2025; Accepted: December 16, 2025; Published: December 30, 2025

Authors Information: Sunila Shakya[1,2]*; Sushmita Uprety[1]; Shriza Shrestha[1]; Shyam Khadka[3]; Sabina Basnet[3]; Manoj Tamang Lama[3]; Supriya Lamichhane[2]; Anjali Kumari Chaurasia[2]

[1]Dhulikhel Hospital/Kathmandu University Hospital, Department of Gynecology and Obstetrics, Dhulikhel, Nepal.

[2]Kathmandu University School of Medical Sciences, Department of Gynecology and Obstetrics, Dhulikhel, Nepal.

[3]District Health Office, Bhimeshwor Municipality, Dolakha, Nepal.

Citation: Shakya S, Uprety S, Shrestha S, Khadka S, Basner S, Lama MT, Lamichhane S, et al. A collaborative approach in management of high-risk HPV positive women in the national screening program in Nepal. Open J Clin Med Case Rep. 2025; 2397.