RESEARCH PAPER

Knowledge, Awareness, and Barriers Regarding Cervical Cancer Screening: A Comparative Study Among Women Attending a Tertiary Care Hospital in Chennai

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ABSTRACT

Background: Cervical cancer remains a leading preventable malignancy among women in India. Despite established screening and vaccination strategies, uptake remains suboptimal. Understanding the knowledge–practice gap and associated barriers is critical for effective program implementation.

Objectives: To assess the knowledge, awareness, and perceived barriers to cervical cancer screening among women attending a tertiary care hospital in Chennai.

Materials and Methods: This hospital-based quantitative cross-sectional observational study included 250 women aged 21–60 years attending the gynecology outpatient department. Data were collected using a validated, structured interviewer-administered questionnaire assessing socio-demographic characteristics, knowledge of cervical cancer etiology and risk factors, awareness of screening modalities, HPV infection, and HPV vaccination, as well as perceived barriers to screening. Descriptive and inferential statistical analyses were performed.

Results: Among 250 participants, 90.9% were aware that cervical cancer can be detected early through screening and 82% recognized the association between HPV infection and cervical cancer. However, only 9.1% had undergone screening more than once. Awareness of HPV vaccination was limited, with only 27.3% reporting some knowledge and none vaccinated. Major perceived barriers included lack of knowledge (90.9%), partner disapproval (81.8%), fear of positive results (54.5%), embarrassment (36.4%), and privacy concerns (36.4%). Community-based medical institutions (54.4%) were identified as the primary source of information.

Conclusion: Despite high levels of general awareness, screening uptake remains critically low, reflecting a substantial knowledge–practice gap. Psychosocial and sociocultural barriers predominate over structural access issues. Strengthening organized screening programs, expanding HPV vaccination coverage, and implementing culturally sensitive community-based interventions are essential to improve participation and reduce cervical cancer burden.

Keywords: Cervical cancer; screening; awareness; HPV infection; HPV vaccination; barriers; India.

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INTRODUCTION

Cervical cancer is a preventable malignancy arising from persistent infection with oncogenic human papillomavirus (HPV) affecting the transformation zone of the cervix (1). The pathogenesis involves viral DNA integration and disruption of tumor suppressor pathways,

leading to progressive cervical intraepithelial neoplasia (CIN) and eventual invasive carcinoma (2). The prolonged pre-invasive phase allows detection and treatment before progression, forming the scientific basis for screening (3).

The World Health Organization (WHO) launched the Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem in 2020, establishing vaccination, screening, and treatment targets (4). According to the WHO Cervical Cancer Fact Sheet (2023), cervical cancer is the fourth most common cancer among women globally, with more than 600,000 new cases and over 340,000 deaths annually (5). GLOBOCAN 2020 estimates from the International Agency for Research on Cancer confirm that the highest mortality occurs in low- and middle-income countries (6). The ICO/IARC HPV Information Centre report (2023) documents that high-risk HPV types 16 and 18 account for the majority of invasive cervical cancers worldwide (7).

In India, cervical cancer remains a major contributor to female cancer burden. The Ministry of Health and Family Welfare, through the Operational Framework for Management of Common Cancers, recommends population-based screening for early detection (8). Under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), visual inspection with acetic acid (VIA) has been adopted as a feasible screening strategy at primary healthcare level (9). Despite these policies, NFHS-5 (2019–21) reports that only a small proportion of eligible women have ever undergone cervical cancer screening, indicating low coverage (10).

Global epidemiological analysis by Arbyn et al. in *The Lancet Global Health* quantified cervical cancer incidence and mortality using 2018 data and confirmed persistent high burden in resource-limited regions (11). De Sanjosé et al., in *The Lancet Infectious Diseases*, demonstrated worldwide prevalence and genotype distribution of cervical HPV DNA, establishing the universal role of high-risk HPV in cervical carcinogenesis (12). Bruni et al., in *The Journal of Infectious Diseases*, further confirmed global distribution patterns of oncogenic HPV genotypes (13).

Evidence supports both primary and secondary prevention. The Cochrane review by Arbyn et al. concluded that prophylactic HPV vaccination significantly reduces high-grade CIN lesions (14). Basu et al., in the *International Journal of Cancer*, demonstrated acceptable diagnostic accuracy of VIA and HPV testing in an Indian screening demonstration project (15).

Despite availability of screening and vaccination strategies, uptake remains inadequate in India. National survey data show screening coverage far below WHO elimination targets . Persistent gaps between policy and utilization indicate the influence of limited awareness, sociocultural barriers, and health system constraints.

Given the established preventability of cervical cancer, the documented global and national burden, and the persistently low screening uptake in India, it is essential to evaluate knowledge, awareness, and perceived barriers among women accessing tertiary healthcare services.

The present study was undertaken to assess the level of knowledge and awareness regarding cervical cancer, screening methods, HPV infection, and vaccination, and to identify perceived barriers to cervical cancer screening among women attending a tertiary care hospital in Chennai.

MATERIALS AND METHODS

Study Design and Setting

This hospital-based quantitative cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology of a tertiary care teaching hospital in South India over a period of six months.

Study Participants

Women aged 21–60 years attending the Gynecology Outpatient Department during the study period were screened for eligibility. Participants were recruited consecutively until the required sample size was achieved. Women who provided written informed consent were included. Women who were critically ill, previously diagnosed with cervical malignancy, or unable to comprehend the questionnaire were excluded.

Sample Size

The sample size was calculated using the single population proportion formula:

$$n = \frac{Z^2 pq}{d^2}$$

where Z = 1.96 at 95% confidence level, p = anticipated prevalence (20%), q = 1−p, and d = 5% absolute precision. The minimum calculated sample size was 246. Considering feasibility and minor non-response, the final sample size was fixed at 250 participants.

Data Collection

Data were collected using a structured interviewer-administered questionnaire. Eligible participants were approached in the outpatient department, the objectives of the study were explained, and written informed consent was obtained prior to participation. Interviews were conducted in a private setting to maintain confidentiality.

The questionnaire was developed after a comprehensive literature review and expert consultation. Content validity was established through expert review, and the tool was pretested on a subset of women not included in the final analysis. Necessary modifications were incorporated prior to administration.

The questionnaire assessed socio-demographic characteristics (age, education, occupation, socioeconomic status, residence, and parity), knowledge regarding cervical cancer (etiology, risk factors, and symptoms), awareness of screening modalities such as Pap smear and visual inspection with acetic acid, knowledge of HPV infection and vaccination, perceived barriers to cervical cancer screening using a 22-item Likert scale (agree, uncertain, disagree), and sources of information regarding cervical cancer. The questionnaire was administered in English and the local language to ensure comprehension.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants, and confidentiality of collected data was strictly maintained.

Statistical analysis

Data from this quantitative observational study were organized and presented in tabular form, with variables summarized using frequencies and percentages. Inferences were drawn by comparing these percentage distributions across relevant categories.

RESULTS

A total of 250 women participated in the study. The results are presented under three domains: socio-demographic characteristics, knowledge and awareness regarding cervical cancer and screening, and perceived barriers to cervical cancer screening. Descriptive statistics were used to summarize the distribution of responses across these domains.

Demographic profile

TABLE 1		
Socio-demographic Characteristics	**Number**	**Percentage**
Age (years)		
<20	25	10
20-29	60	24
30-39	85	34
40-49	68	27.2
>50	12	4.8
Parity		
Nulliparous	18	7.2
1-2	195	78
>2	37	14.8
Residency		
Urban	210	84
Rural	40	16
Occupation		
Housewife/Unemployed	138	55.2
Employed	85	34
Own business	27	10.8
Level of education		
Illiterate	60	24
Primary education	70	28
Secondary education	88	35.2
Graduate	32	12.8
Socio economic status		
Lower class	113	45.2
Middle class	90	36
Higher class	47	8.8

Among 250 participants, the age distribution was as follows: <20 years, 10% (n=25); 20-29 years, 24% (n=60); 30-39 years, 34% (n=85); 40-49 years, 27.2% (n=68); >50 years, 4.8% (n=12). The majority of women (84%, n=210) resided in urban areas, while 16% (n=40) were from rural areas. Educational status showed 24% (n=60) illiterate, 28% (n=70) with primary education, 35.2% (n=88) with secondary education, and 12.8% (n=32) with graduate-level education. Regarding socioeconomic status, 45.2% (n=113) belonged to the lower class, 36% (n=90) to the middle class, and 8.8% (n=22) to the higher class. Occupation distribution revealed 55.2% (n=138) housewives or unemployed, 34% (n=85) employed, and 10.8% (n=27) self-employed. Parity distribution indicated 7.2% (n=18) nulliparous, 78% (n=195) with 1-2 children, and 14.8% (n=37) with >2 children.

Knowledge and awareness findings

TABLE 2

S. No	Question	Response	Frequency	Percentage
1	Did you know about cervical cancer screening?	Heard but not screened	136	54.5
		Never heard it	23	9.1
		Screened (> 1time)	23	9.1
		Understood but not screened	68	27.3
2	Is it known that cervical cancer associated with HPV infection?	Known	205	82
		No idea	45	18
3	Have you heard of HPV vaccine?	No Idea	182	72.7
		Injected	0	0
		Known but not injected related to cervical screening	68	27.3
4	Did you know that cervical cancer can be detected and prevented early through screening?	Know	227	90.9
		No idea	23	9.1
5	Access to cervical cancer Knowledge	Community based medical institutions	136	54.4
		Leaflets distribution	23	9.2
		Tv programme and advertisements	23	9.2
		Neighborhoods and friends	22	8.8
		Newspaper and blackboard news	0	0
		Nowhere	0	0
		Family	46	18.4

Regarding cervical cancer screening awareness, 54.5% (n=136) had heard about screening but were not

screened, 27.3% (n=68) understood its importance but had not undergone testing, 9.1% (n=23) had been screened more than once, and 9.1% (n=23) had never heard of cervical cancer screening. Concerning HPV knowledge, 82% (n=205) recognized the association between cervical cancer and HPV infection, while 18% (n=45) had no knowledge. However, HPV vaccine awareness was strikingly low: 72.7% (n=182) had no idea about the vaccine, 0% (n=0) were vaccinated, and 27.3% (n=68) knew of it but had not received vaccination. Notably, 90.9% (n=227) understood that cervical cancer can be detected and prevented early through screening, yet actual screening uptake remained minimal. Primary sources of information were community-based medical institutions (54.4%, n=136), family members (18.4%, n=46), television programs and advertisements (9.2%, n=23), and leaflets distribution (9.2%, n=23). No women obtained information from newspapers or blackboard announcements.

Barriers to cervical cancer screening

TABLE 3

S.No	Factors related to cervical Cancer screening	Agree	percentage	Uncertain	percentage	Disagree	percentage
1	The test is required only when symptoms are present	68	27.3	68	27.3	114	45.5
2	The screening test is expensive	68	27.3	23	9.1	159	63.6
3	The private part should be exposed	91	36.4	0	0	159	63.6
4	Test is embarrassing	91	36.4	0	0	159	63.6
5	Test is uncomfortable	68	27.3	23	9.1	159	63.6
6	The test result may come positive	136	54.5	0	0	114	45.5
7	Sexually active femal es only need to do test	205	81.8	23	9.1	23	9.1
8	Partner does not allow for test	205	81.8	0	0	46	18.2
9	The screening test can be delayed	68	27.3	68	27.3	114	45.5

10	Only need to do if a doctor advised	91	36.4	23	9.1	136	54.5
11	No time to go for testing	91	36.4	23	9.1	136	54.5
12	One screening test is enough for a lifetime	114	45.5	23	9.1	114	45.5
13	Religious beliefs do not allow	68	27.3	46	18.2	136	54.5
14	Difficult to locate screening area	23	9.1	23	9.1	205	81.8
15	Unavailability of facility	68	27.3	68	27.3	114	45.5
16	Lack of knowledge	227	90.9	0	0	23	9.1
17	Inadequate health education	68	72.7	68	18.2	114	9.1
18	Pap smear test is painful	227	9.1	36.4	0	54.5	23
19	The test is not covered by insurance	0	0	36.4	91	63.6	159
20	HPV vaccinated person does not need test	27.3	68	36.4	91	36.4	91
21	HPV can clear up their own	9.1	23	27.3	68	63.6	159
22	Difficulty to schedule test appointment	36.4	91	0	0	63.6	159

Analysis of the 22-item barriers assessment scale revealed several major obstacles to cervical cancer screening. The most prominent barriers identified were lack of knowledge (90.9%, n=227), lack of partner support for testing (81.8%, n=205), the belief that only sexually active females need testing (81.8%, n=205), fear of a positive test result (54.5%, n=136), embarrassment associated with the test (36.4%, n=91), concerns about exposing private parts (36.4%, n=91), discomfort during the test (27.3%, n=68), and the misconception that testing is only necessary if symptoms are present (27.3%, n=68).

Additionally, while 63.6% (n=159) disagreed that the screening test is expensive, a significant 81.8% (n=205) disagreed that it is difficult to locate the screening area.

DISCUSSION

In the present study, screening uptake was **9.1% (23/250)** despite **90.9% awareness** that cervical cancer is preventable and **82% knowledge** of HPV causation. HPV vaccination uptake was **0%**, and **72.7% lacked vaccine awareness**. Psychosocial barriers predominated, including **partner disapproval (81.8%)**, **fear of positive results (54.5%)**, embarrassment (36.4%), and misconceptions such as "screening only when symptomatic" (27.3%) and "one test sufficient for lifetime" (45.5%). Structural barriers were less frequently endorsed.

When compared with global modelling evidence, the implementation gap becomes evident. Canfell et al. (16) projected that achieving WHO 90–70–90 targets would reduce cervical cancer mortality by **over 60%** in 78 LMICs by 2070. Our screening coverage of **9.1%** is markedly lower than the **70% screening target**, indicating that mortality reduction at population level is unlikely under current uptake levels. Similarly, Brisson et al. (17) demonstrated that high HPV vaccination coverage (>90%) combined with twice-lifetime screening could reduce incidence to **<4 per 100,000 women-years**. In contrast, vaccination coverage in our study was **0%**, and screening <10%, making elimination-level incidence reduction unattainable in this setting without scale-up.Cost-effectiveness modelling by Campos et al. (18) showed that HPV-based screening provides substantial lifetime cancer risk reduction when coverage exceeds **50%**. Compared to this benchmark, our 9.1% uptake represents less than one-fifth of the required coverage, limiting both cost-effectiveness and equity gains.

Massad et al. (19) emphasized that HPV vaccination strengthens cervical cancer prevention by reducing circulation of oncogenic types, thereby enhancing screening efficiency. Although **82% of our participants knew HPV causes cervical cancer**, vaccination uptake remained absent, demonstrating a disconnect between etiological knowledge and preventive action.Population-level vaccine impact was quantified by Drolet et al. (20), who reported an **83% reduction in HPV-16/18 prevalence** and significant decline in CIN2+ lesions in vaccinated populations, along with herd protection effects. In comparison, the absence of vaccination in our cohort precludes both direct and indirect protective benefits.

Regarding screening modalities, Koliopoulos et al. (21) found that HPV testing has higher sensitivity than cytology for detecting CIN2+ lesions. While modality sensitivity is important, our data show that the principal limitation is participation—only **9.1% screened**—suggesting that improving test performance alone will not overcome low coverage.

Organized HPV-based screening programs in Europe, as described by Maver et al. (22), incorporate structured call–recall systems and centralized follow-up mechanisms, resulting in improved participation and continuity of care. In contrast, our study revealed that although the majority of women reported that screening facilities were accessible and not financially prohibitive, **54.5% had heard about screening but had never undergone it**. This indicates that the limiting factor in our setting is not geographic access but the absence of systematic invitation and recall mechanisms that actively convert awareness into participation.

A large randomized controlled trial from rural India by Sankaranarayanan et al. (23) demonstrated that even a **single round of HPV screening significantly reduced advanced cervical cancer incidence and mortality** compared to control groups. Despite such high-quality Indian evidence showing measurable mortality reduction, screening uptake in our urban tertiary-based cohort remained **only 9.1%**, reflecting inadequate translation of trial evidence into routine service delivery and community practice.

System-level challenges in cervical cancer management within India have been outlined by Basu et al. (24), who reported delayed referrals, incomplete diagnostic pathways, and fragmentation between screening and treatment services. In the present study, however, structural barriers such as cost and facility availability were less commonly endorsed, whereas psychosocial barriers—particularly **partner disapproval (81.8%)** and **fear of positive results (54.5%)**—were dominant. This suggests that even when tertiary care infrastructure exists, behavioral and sociocultural constraints may override structural readiness.

Underutilization of early detection strategies has also been emphasized by Mishra et al. (25), who highlighted inadequate integration of screening into routine health services. Our findings support this observation: although **90.9% were generally aware of cervical cancer prevention**, the same proportion cited "lack of

knowledge" as a barrier, indicating shallow awareness without sufficient procedural understanding or actionable guidance. This gap between conceptual awareness and operational knowledge underscores incomplete service integration.

National burden analyses by Bobdey et al. (26) confirm that cervical cancer continues to constitute a significant proportion of female malignancies in India. The persistently low screening uptake of **9.1%** in our study suggests that existing preventive outreach has not achieved the coverage required to meaningfully influence national burden trends.

Risk factor analyses from rural India by Thulaseedharan et al. (27) demonstrated that lower educational attainment and socioeconomic disadvantage significantly increase cervical cancer risk. In the present cohort, **48% had at least secondary education**, yet screening uptake remained low across educational strata. This indicates that literacy alone does not ensure behavioral compliance, reinforcing that structural facilitation and sociocultural engagement are equally critical.

Community-based implementation data provide further contrast. A seven-year VIA screening initiative in rural South India reported by Poli et al. (28) showed improved early detection when sustained outreach and active mobilization were employed. Compared to such structured community engagement, our opportunistic tertiary-care-based recruitment model resulted in lower engagement, suggesting that passive availability of services is insufficient without continuous community mobilization.

Global coverage analyses by Gakidou et al. (29) documented screening prevalence below **20%** in several low- and middle-income countries, with wide inequalities both between and within nations. The **9.1% screening coverage** observed in our cohort falls within this lower international range, demonstrating that inequities persist even in urban tertiary healthcare environments.

Innovative participation strategies offer potential solutions. International implementation studies by Gupta et al. (30) showed that HPV self-sampling significantly increased screening participation, particularly among women hesitant to undergo clinician-based pelvic examination. Given that **36.4% of women in our study reported embarrassment** and **54.5% feared positive results**, self-sampling could directly address these psychosocial barriers and potentially improve participation rates in similar settings.

CONCLUSION

The present study highlights a critical knowledge–practice gap in cervical cancer prevention. Although a high proportion of women were aware that cervical cancer is preventable (90.9%) and recognized the role of HPV (82%), only 9.1% had undergone screening and none had received HPV vaccination. The findings clearly indicate that awareness alone does not translate into preventive action. Psychosocial barriers—including partner disapproval (81.8%), fear of positive results (54.5%), embarrassment (36.4%), and misconceptions regarding screening necessity—were more prominent than structural barriers such as cost or facility access. These results underscore the need for interventions that move beyond information dissemination to address behavioral, cultural, and gender-related determinants of health-seeking behavior.

To achieve meaningful progress toward cervical cancer elimination targets, preventive strategies must incorporate organized screening programs with recall systems, integration of screening into routine gynecological and primary care visits, expansion of HPV vaccination coverage, and culturally sensitive community engagement. Male partner involvement and destigmatization efforts are particularly important in contexts where household decision-making influences women's healthcare utilization.Certain limitations must be acknowledged. The study was hospital-based and conducted in a single tertiary care center, which may limit generalizability to the broader community, particularly rural or primary care populations. The cross-sectional design restricts causal inference between awareness levels and screening behavior. Self-reported responses may be subject to recall bias or social desirability bias. Additionally, the study did not assess clinical verification of prior screening or vaccination status, relying on participant reporting.

Despite these limitations, the study provides valuable insight into persistent barriers within an urban healthcare-accessible population. The findings reinforce that strengthening implementation frameworks and addressing sociocultural constraints are essential for improving screening uptake and reducing cervical cancer burden.

References

1. Berek JS. Berek & Novak's Gynecology. 16th ed. Philadelphia: Wolters Kluwer; 2020.

2. Kumar V, Abbas AK, Aster JC. Robbins and Cotran Pathologic Basis of Disease. 10th ed. Philadelphia: Elsevier; 2020.
3. Denny L, Hacker NF. Hacker & Moore's Essentials of Obstetrics and Gynecology. 6th ed. Philadelphia: Elsevier; 2016.
4. World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem. Geneva: WHO; 2020. Available from: https://www.who.int/publications/i/item/9789240014107
5. World Health Organization. Cervical cancer. WHO Fact Sheet. 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/cervical-cancer
6. International Agency for Research on Cancer. GLOBOCAN 2020: Cervical cancer fact sheet. Lyon: IARC; 2020. Available from: https://gco.iarc.fr
7. Bruni L, Albero G, Serrano B, et al. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases Report. 2023. Available from: https://hpvcentre.net
8. Ministry of Health and Family Welfare, Government of India. Operational Framework: Management of Common Cancers. New Delhi: MoHFW; 2016. Available from: https://main.mohfw.gov.in
9. National Health Mission. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS). MoHFW; 2023. Available from: https://nhm.gov.in
10. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-5), India, 2019–21. Mumbai: IIPS; 2021. Available from: https://dhsprogram.com
11. Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, Bray F. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. Lancet Glob Health. 2020 Feb;8(2):e191-e203. doi: 10.1016/S2214-109X(19)30482-6. Epub 2019 Dec 4. Erratum in: Lancet Glob Health. 2022 Jan;10(1):e41. doi: 10.1016/S2214-109X(21)00554-4. PMID: 31812369; PMCID: PMC7025157.
12. de Sanjosé S, Diaz M, Castellsagué X, Clifford G, Bruni L, Muñoz N, Bosch FX. Worldwide prevalence and genotype distribution of cervical human papillomavirus DNA in women with normal cytology: a meta-analysis. Lancet Infect Dis. 2007 Jul;7(7):453-9. doi: 10.1016/S1473-3099(07)70158-5. PMID: 17597569.
13. Bruni L, Diaz M, Castellsagué X, Ferrer E, Bosch FX, de Sanjosé S. Cervical human papillomavirus prevalence in 5 continents: meta-analysis of 1 million women with normal cytological findings. J Infect Dis. 2010 Dec 15;202(12):1789-99. doi: 10.1086/657321. Epub 2010 Nov 10. PMID: 21067372.
14. Arbyn M, Xu L, Simoens C, Martin-Hirsch PP. Prophylactic vaccination against human papillomaviruses to prevent cervical cancer and its precursors. Cochrane Database Syst Rev. 2018 May 9;5(5):CD009069. doi: 10.1002/14651858.CD009069.pub3. PMID: 29740819; PMCID: PMC6494566.
15. Basu P, Mittal S, Banerjee D, Singh P, Panda C, Dutta S, Mandal R, Das P, Biswas J, Muwonge R, Sankaranarayanan R. Diagnostic accuracy of VIA and HPV detection as primary and sequential screening tests in a cervical cancer screening demonstration project in India. Int J Cancer. 2015 Aug 15;137(4):859-67. doi: 10.1002/ijc.29458. Epub 2015 Feb 12. PMID: 25631198.
16. Canfell K, Kim JJ, Brisson M, Keane A, Simms KT, Caruana M, Burger EA, Martin D, Nguyen DTN, Bénard É, Sy S, Regan C, Drolet M, Gingras G, Laprise JF, Torode J, Smith MA, Fidarova E, Trapani D, Bray F, Ilbawi A, Broutet N, Hutubessy R. Mortality impact of achieving WHO cervical cancer elimination targets: a comparative modelling analysis in 78 low-income and lower-middle-income countries. Lancet. 2020 Feb 22;395(10224):591-603. doi: 10.1016/S0140-6736(20)30157-4. Epub 2020 Jan 30. PMID: 32007142; PMCID: PMC7043006.
17. Brisson M, Kim JJ, Canfell K, Drolet M, Gingras G, Burger EA, Martin D, Simms KT, Bénard É, Boily MC, Sy S, Regan C, Keane A, Caruana M, Nguyen DTN, Smith MA, Laprise JF, Jit M, Alary M, Bray F, Fidarova E, Elsheikh F, Bloem PJN, Broutet N, Hutubessy R. Impact of HPV vaccination and cervical screening on cervical cancer elimination: a comparative modelling analysis in 78 low-income and lower-middle-income countries. Lancet. 2020 Feb 22;395(10224):575-590. doi: 10.1016/S0140-

6736(20)30068-4. Epub 2020 Jan 30. PMID: 32007141; PMCID: PMC7043009.

18. Campos NG, Tsu V, Jeronimo J, Mvundura M, Kim JJ. Evidence-based policy choices for efficient and equitable cervical cancer screening programs in low-resource settings. Cancer Med. 2017 Aug;6(8):2008-2014. doi: 10.1002/cam4.1123. Epub 2017 Jul 14. PMID: 28707435; PMCID: PMC5548874.
19. Massad LS, Einstein M, Myers E, Wheeler CM, Wentzensen N, Solomon D. The impact of human papillomavirus vaccination on cervical cancer prevention efforts. Gynecol Oncol. 2009 Aug;114(2):360-4. doi: 10.1016/j.ygyno.2009.04.005. Epub 2009 May 1. PMID: 19410282; PMCID: PMC2703690.
20. Drolet M, Bénard É, Pérez N, Brisson M; HPV Vaccination Impact Study Group. Population-level impact and herd effects following the introduction of human papillomavirus vaccination programmes: updated systematic review and meta-analysis. Lancet. 2019 Aug 10;394(10197):497-509. doi: 10.1016/S0140-6736(19)30298-3. Epub 2019 Jun 26. PMID: 31255301; PMCID: PMC7316527.
21. Koliopoulos G, Nyaga VN, Santesso N, Bryant A, Martin-Hirsch PP, Mustafa RA, Schünemann H, Paraskevaidis E, Arbyn M. Cytology versus HPV testing for cervical cancer screening in the general population. Cochrane Database Syst Rev. 2017 Aug 10;8(8):CD008587. doi: 10.1002/14651858.CD008587.pub2. PMID: 28796882; PMCID: PMC6483676.
22. Maver PJ, Poljak M. Primary HPV-based cervical cancer screening in Europe: implementation status, challenges, and future plans. Clin Microbiol Infect. 2020 May;26(5):579-583. doi: 10.1016/j.cmi.2019.09.006. Epub 2019 Sep 17. PMID: 31539637.
23. Sankaranarayanan R, Nene BM, Shastri SS, Jayant K, Muwonge R, Budukh AM, Hingmire S, Malvi SG, Thorat R, Kothari A, Chinoy R, Kelkar R, Kane S, Desai S, Keskar VR, Rajeshwarkar R, Panse N, Dinshaw KA. HPV screening for cervical cancer in rural India. N Engl J Med. 2009 Apr 2;360(14):1385-94. doi: 10.1056/NEJMoa0808516. PMID: 19339719.
24. Basu P, Meheus F, Chami Y, et al. Management of cervical cancer in India: challenges and opportunities. Int J Gynaecol Obstet. 2018;143(S2):S47–52.
25. Mishra GA, Pimple SA, Shastri SS. An overview of prevention and early detection of cervical cancers. Indian J Med Paediatr Oncol. 2011 Jul;32(3):125-32. doi: 10.4103/0971-5851.92808. PMID: 22557777; PMCID: PMC3342717.
26. Bobdey S, Sathwara J, Jain A, Balasubramaniam G. Burden of cervical cancer and role of screening in India. Indian J Med Paediatr Oncol. 2016 Oct-Dec;37(4):278-285. doi: 10.4103/0971-5851.195751. PMID: 28144096; PMCID: PMC5234166.
27. Thulaseedharan JV, Malila N, Hakama M, Esmy PO, Cheriyan M, Swaminathan R, Muwonge R, Sankaranarayanan R. Socio demographic and reproductive risk factors for cervical cancer - a large prospective cohort study from rural India. Asian Pac J Cancer Prev. 2012;13(6):2991-5. doi: 10.7314/apjcp.2012.13.6.2991. PMID: 22938495.
28. Poli UR, Bidinger PD, Gowrishankar S. Visual Inspection with Acetic Acid (VIA) Screening Program: 7 Years Experience in Early Detection of Cervical Cancer and Pre-Cancers in Rural South India. Indian J Community Med. 2015 Jul-Sep;40(3):203-7. doi: 10.4103/0970-0218.158873. PMID: 26170547; PMCID: PMC4478664.
29. Gakidou E, Nordhagen S, Obermeyer Z. Coverage of cervical cancer screening in 57 countries: low average levels and large inequalities. PLoS Med. 2008 Jun 17;5(6):e132. doi: 10.1371/journal.pmed.0050132. PMID: 18563963; PMCID: PMC2429949.
30. Gupta S, Palmer C, Bik EM, Cardenas JP, Nuñez H, Kraal L, Bird SW, Bowers J, Smith A, Walton NA, Goddard AD, Almonacid DE, Zneimer S, Richman J, Apte ZS. Self-Sampling for Human Papillomavirus Testing: Increased Cervical Cancer Screening Participation and Incorporation in International Screening Programs. Front Public Health. 2018 Apr 9;6:77. doi: 10.3389/fpubh.2018.00077. PMID: 29686981; PMCID: PMC5900042.