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Implementation of cervical cancer prevention and screening at global and national levels: a review of evidence and research gaps

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ABSTRACT

Aims: To identify the existing solutions and research gaps globally and in Nepal to provide an overview on the existing solutions and research gaps.

Methods: Different databases such as PubMed, Google Scholar, registries, and relevant organizational websites were searched. The study designs included systematic reviews on cervical cancer prevention and screening globally and original studies and program related reports in Nepal. Narrative summary of the findings were performed.

Results: Globally, most of the systematic reviews are conducted in low and middle-income countries followed by high-income countries. The cost-effective and common interventions globally and in South Asia includes awareness and educational activities for cervical cancer screening and prevention, early medical interventions such as pap smears, HPV vaccination, and visual inspection with acetic acid. Barriers to cervical cancer screening include lack of education, low socioeconomic status, and lack of knowledge, lack of effective communication, embarrassment, time constraints, and preference of female doctors. In Nepal, the national guidelines on cervical cancer screening and prevention were published more than a decade ago. The published studies indicated a low level of knowledge and attitude related to cervical cancer prevention and screening.

Conclusions: Research in cervical cancer prevention and screening has received recognition globally in recent years. In Nepal, research that has explored the implementation and policy gaps at a deeper level through different dimensions remain inadequate. The findings of this review could pave way for designing better studies for sustainable interventions in the long run.

Keywords: cervical cancer; prevention; screening

INTRODUCTION

Cervical cancer continues to be a global public health concern.

In 2018, an estimated 570,000 women were diagnosed with cervical cancer worldwide and about 311,000 women died from the disease.¹ In Nepal, cervical cancer is ranked first as the most common cancer accounting for 21.4 percent of all cancers.²

When diagnosed early, cervical cancer is one of the most successfully treatable forms of cancer if managed effectively. An effective approach to prevent, screen, and treat can eliminate cervical cancer as a public health problem within a generation.¹ A comprehensive desk review of existing evidence on cervical cancer prevention and screening could pave way for implementing effective and sustainable interventions in the long run.

Therefore, this desk review aims to identify the existing solutions and research gaps at the global level and in Nepal to provide an overview of what works and what doesn't.

METHODS

Eligibility criteria: Studies focusing on cervical cancer screening strategies, intervention programs, and HPV vaccinations were included.

Study designs/ types of literature: This review included a diverse range of literature such as national reports, project reports of different organizations, and published research studies. The study designs included systematic reviews, intervention studies as well as observational studies, and qualitative studies. Publication and reports of governmental and non-governmental organizational publications and reports related to cervical cancer in Nepal were also included. The inclusion comprised any publication in English between 1 January 2011 to 31 December 2021.

Search strategy: Databases such as PubMed, and Google Scholar, cervical cancer related registries, and reports from relevant organizations' websites were searched using comprehensive search strategies using key words related to cervical cancer, cancer screening, and cancer prevention.

Data screening and extraction: Zotero, a research tool to collect, organize, and manage research publications, was used to keep a record of articles and remove duplicates. All studies retrieved from search strategies that met the eligibility criteria were imported to Zotero. Full texts were screened and assessed for eligibility to be included in the list of finalized studies for this review. The following information was extracted: study setting, study design, details of the intervention if applicable, and outcome.

Data synthesis: This review included a narrative synthesis of the relevant systematic reviews and original studies. The findings of studies were grouped at global and national levels. The studies were synthesized and summarized in terms of the baseline evidence, cost-effective interventions, and barriers to the implementation of cervical cancer screening and prevention. The research gap was explored and the recommendations of the key interventions were articulated based on what may work and what may not work.

RESULTS

Global evidence

Out of the 23 systematic studies that were reviewed, the majority of the studies i.e. 9 studies (44% of the total studies) were conducted in low and middle-income countries (LMIC), followed up by high-income countries (HIC) i.e. 8 (32% of the

total studies) and LMIC/HIC 6 (24% of the total studies). The systematic reviews on interventions on cervical cancer screening and prevention indicated positive results globally.

Major intervention practice for cervical cancer screening

The common interventions for cervical cancer screening and prevention includes

Table-1: Systematic reviews on interventions for cervical cancer screening and prevention

SN	Author's Name	Year	Country	HIC/LMIC	Studies included	Intervention	Outcome
1	Majid U, et al ³	2019	USA, Canada, and New Zealand	HIC	14	This SR focused on qualitative studies on women's access to cervical cancer prevention and screening	Women face challenges related to logistical and structural access to receive timely cervical cancer related prevention and screening services.
2	Mendes D, et. al ⁷	2015	Multiple countries around the world	HIC/LMIC	153	Mathematical models that can be used to assess the effectiveness and cost-effectiveness of cervical cancer screening strategies.	There is an increase use of mathematical models for cervical cancer screening enabling data driven decision making. However, it has not become a country specific standard practice.
3	Mapanga, W. et al ⁸	2018	Multiple countries around the world	HIC/LMIC	25	Cervical cancer prevention modalities for HIV sero-positive women	Cervical cancer screening exists in almost all developing countries, but lacks population based screening focusing on specific groups such as HIV
4	Fokom-Dongue P et al ⁶	2015	Sub-Saharan African region	LMIC	15	A) Visual inspection with Acetic Acid B) Visual inspection with Lugol's Iodine C) Human Papillomavirus testing	Visual inspection with Lugol's iodine was identified as a simple and affordable alternative to cytology that demonstrates higher sensitivity than VIA.
5	Jansen E.L.E., et. al ¹²	2020	European Countries	HIC	10	Organized screening for cervical cancer.	Organized cervical cancer screening reduced the cervical cancer related mortality in European countries.
6	Musa J., et. al ⁹	2017	United States of America	HIC	28	A) Cervical cancer education B) Provider recommendation.	Educational interventions that are theory based and use of culturally sensitive languages are effective interventions to improve cervical cancer screening rates.
7	Marzesh S.G N., et. al ⁵	2017	Iran	HIC	37	Educational Intervention	Different educational and behavior change interventions are effective for cervical cancer prevention.
8	Rahman R., et. al ⁴	2019	African countries (LMIC)	LMIC	19	Early medical interventions	Identified specific demand-side (clients and community) and supply-side (health service-level) barriers to implementation of cervical cancer screening services. Overall inadequate evidence from rural Africa
9	Lu M., et. al ^{4,11,12}	2012	Asian countries	HIC/LMIC	37	A) Home Visit B) Media Campaign C) Mailed culturally sensitive print materials D) Community- or work-based education E) Lay health worker outreach F) Mobile screening services G) Cultural awareness training for health care professionals	The studies reflect effectiveness of certain intervention programs. the cost effectiveness and sustainability of these programs remain uncertain

awareness interventions and early medical interventions. The awareness interventions included community-based interventions such as home visits for raising awareness and cultural awareness by the health

mathematical models for policy planning for country.⁷ A review also highlighted lack of specific population based screening such for women living with HIV.⁸ The interventions that were tailored to the local cultural needs worked better.^{4,5,9-11} The studies also

Table-2: Systematic review's related to knowledge, uptake, barriers and facilitators regarding the cervical cancer screening around the world.

SN	Author's Name	Year	Region	Number of studies	HIC/LMIC	Expected Outcome
1	Bogale AL., et. al. ¹³	2021	Africa	8	LMIC	The knowledge, attitude and practice were lower than other middle income countries
2	Sigfrid L., et. al. ²²	2017	Multiple countries around the world	21	HIC/LMIC	Effect of integration of cervical cancer and HIV healthcare services.
3	Kassie AM., et. al. ¹⁴	2020	Ethiopia	44	LMIC	Knowledge and attitude had a significant impact on the prevalence of cervical cancer screening test utilization rates among women in Ethiopia. However, the prevalence of cervical cancer screening service utilization among Ethiopian women is very low.
4	Hosono S., et.al. ²³	2018	Japan	17	HIC	The unsatisfactory rate was more likely to be lower for Liquid Based Cytology than conventional cytology. However, a direct comparison between the two methods did not show a significant difference.
5	Chorley A., et. al. ¹⁰	2017	Multiple countries (HIC)	39	HIC	Synthesized the qualitative literature on women's perceptions and experiences of cervical screening. Tailored interventions are needed to improve the uptake of screening.
6	Desta M., et. al. ²⁰	2021	Ethiopia	25	LMIC	The percentage of cervical cancer screening was lower than the WHO recommendations. Education, knowledge towards cervical cancer screening, perceived susceptibility and severity to cervical cancer and history of STIs significantly increased the uptake of screening practice.
7	Yimer N. B., et. al. ²¹	2021	Sub-Saharan African region	29	LMIC	Cervical screening uptake is low in Sub-Saharan Africa
8	Majidi A., et. al. ³	2017	Iran	72	LMIC	The awareness level and uptake of screening is low in general
9	Pittalis C., et. al. ¹⁸	2020	Malawi	6	LMIC	Various factors at sociocultural level, facility level and policy levels affect the uptake of screening of cervical cancer.
10	Ferdous M., et. al. ¹⁷	2018	Canada	28	HIC	Lack of education, low income, preference for a female physician, lack of knowledge, lack of effective communication, and embarrassment were some of the most common barriers for immigrant women in Canada.
11	Chua B., et. al. ¹⁹	2021	Southeast Asian Countries	93	HIC/LMIC	Pap smears were the most common screening modality. The most common barriers were embarrassment, time constraints, and poor knowledge of screening. The most common facilitators were related to age, advice from healthcare workers, and education status
12	Black E., et. al. ²⁴	2019	Uganda	14	LMIC	Barriers included embarrassment, fear of the screening procedure or outcome, residing in a remote or rural area, and limited resources / health infrastructure.
13	Devarapalli P., et. al. ²⁵	2018	Different LMICs	31	LMIC	Lack of knowledge and awareness, education, embarrassment were identified as common barriers
14	Anderson de Cuevas RM., et. al. ¹⁵	2018	South Asian Countries	51	LMIC	South Asian women had poorer knowledge of cancer and cancer prevention and experienced more barriers to screening.

professionals, educational interventions, and media campaigns. The early medical interventions included pap smears, HPV vaccination, and visual inspection with acetic acid.³⁻⁶ The studies also highlighted the need of country specific use of technology and

highlighted under-representation across different countries, especially poorer countries within each region such as Africa, Europe, and Asia.^{4,11,12} Moreover, the sustainability of the interventions remained inconclusive in the long run. [Table-1]

Table-3: Summary of findings from studies in Nepal

Author's Name	Publication Year	Study Design	Outcome
Darj et al ²⁶	2019	Qualitative	Women had misconceptions about the screening and low levels of knowledge. Sociocultural barriers, service providers' behavior, geographical challenges, and limited finances were all perceived as obstacles to attending screening centers. Facilitating factors, such as participation in awareness programs and support from family and women's groups, may convince women to attend screening clinics.
Shrestha, et al ²⁷	2020	Community-based, open-label, two-armed, cluster-randomized trial	Ongoing Trial
Thapa N, et al ²⁸	2018	Hospital-based cross-sectional study	A significant portion of women had never done any cervical cancer screening test. Despite being higher literacy rate of the Brahmin and Chhetri ethnic group, they were less likely to attend the cervical cancer screening than Dalit and Janajati and those who had a positive family history of cancer were more likely to attend the cervical cancer screening. Similarly, married women, who had adequate knowledge and or a favorable attitude, were more likely to practice cervical cancer screening. Lack of awareness and embarrassment were the most barriers identified.
Shrestha et al ²⁹	2017	Community-based cross-sectional study	Among the participants, 44.9% were ever screened for cervical cancer. However, only 10.4% of participants received timely repeated screening for cervical cancer. The median knowledge score remained low.
Acharya et al ³⁰	2020	Descriptive cross-sectional study	The results showed that the screening rate was low. Being older and having a positive family history of cervical cancer were shown to be predictors of screening practice. Women preferred female doctors for screening.
Maharjan et al ³¹	2015	Population-based cross-sectional study	Among the participants, 30% had at least one Pap test prior to coming to the clinic.
Sherpa et al ³²	2018	Analytical cross-sectional study	The sensitivity vs specificity of cytology, VIA, and VILI was 57.1% vs 98.3%, 71.4% vs 88.8%, and 78.6% vs 85.1%, and of the co-testing of 'Both positive VIA and VILI' and 'Either positive VIA or VILI' was 64.3% vs 85.7% and 90.1% vs 83.7% respectively.
Shakya et al ³³	2021	Cross-sectional study	The findings of this study concluded that the prevalence of uptake of cervical cancer screening was below half. Determinants of uptake of cervical cancer screening were age and awareness on the cost of screening services
Ghimire B, Pathak P ³⁴	2018	Descriptive cross-sectional study	The knowledge and the practice of Pap smear test was poor. Good educational status of the women was found to influence the knowledge of cancer cervix and uptake of Pap smear test.
Thapa et al ³⁵	2016	Secondary analysis of data	The participants rarely underwent cervical smear screening, with the lowest prevalence recorded among the illiterate and those living in rural areas.
Ranjit et al ³⁶	2014	Cross-sectional study	Among the pap smear taken inflammatory smear was found to be the predominant finding and it was found in reproductive age group.
Marahatta et al ³⁷	2013	Cross-sectional study	High level of illiteracy among women and their problematic health-seeking behavior for gynecological symptoms are responsible for late diagnosis of cervical cancer in Nepal.
Gyenwali et al ³⁸	2018	Retrospective study	The VIA positivity rate of study population is comparable to the global magnitude. Screening for cervical cancer with VIA and treatment with cryotherapy is a feasible and acceptable form of screening.
Rijal, et al ³⁹	2018	Retrospective study	Lower education level was significantly associated with poor knowledge on cervical cancer and poor uptake of its screening

Knowledge, barrier and facilitator for uptake of cervical cancer screening for people regarding the intervention of cervical cancer screening

Majority of the studies on cervical cancer screening and prevention globally have concluded the knowledge and uptake of cervical cancer screening to be low across all regions, especially in poorer countries.^{13,14} Studies globally have also identified barriers to cervical cancer screening which included lack of education, low socioeconomic status, and lack of knowledge, lack of effective communication, embarrassment, time constraints, and preference of female doctors.^{3,15-17} Whereas, the common facilitators included supportive community-based and facility-based interventions on raising awareness. Education also played an important enabling role to encourage screening and prevention of cervical cancer. Interventions tailored to the sociocultural aspects and proper counseling by health providers were identified as the common facilitators.^{3,15,18-21} [Table-2]

Nepal

Cervical cancer is the most common cancer in Nepalese women, accounting for 21.4 percent of all cancers. 80.9% of cervical cancer cases are diagnosed in the late stage in Nepal. The age-standardized yearly incidence of cervical cancer in Nepal is 16.4 per 100,000, making it one of the countries in South Asia with the highest cervical cancer rates followed by India and Bangladesh.² The national guidelines on

cervical cancer screening and prevention (2010) suggested screening at least 50 percent of women aged 30–60 years, with recommended screening every five years to reduce cervical cancer mortality by 10%.¹²

Majority of the studies conducted in Nepal are single-centered hospital based studies or

community based observational studies. The intervention studies remain inadequate. Majority of the studies assessed the knowledge of cervical cancer and screening and also assessed the uptake of screening practices. The knowledge and uptake of cervical cancer screening remained low in most studies. The barriers identified are aligned with the global literature which included poor literacy, lack of awareness, sociocultural aspects, and embarrassment etc. All the studies recommended culturally contextual and tailored interventions to improve the knowledge and practices. However, there is lack of evidence of effective interventions improving knowledge and practice related to cervical cancer screening.

The review of program, related documents and guidelines reflected that cervical cancer screening is currently available at district, provincial, and tertiary care centers. The budget was allocated for the cervical cancer screening and prevention program in all 753 local levels, and national coverage was attained in around 2016-2017.¹⁶ Despite the coverage, the services are inaccessible to persons living in rural and isolated locations. [Table-3]

DISCUSSION

This desk review has identified that research in cervical cancer prevention and screening has received recognition and the cost-effective interventions have been identified and implemented. Globally, most of the systematic reviews are focused on low and middle-income countries followed by high-income countries. The major research gap highlighted by most reviews include lack of evidence on sustainability of the interventions in the long run.

The review of global literature also indicated under-representation of evidence from

poorer countries and rural areas in different regions such as Europe, Africa, and Asia.^{11,31,32} Moreover, the reviews highlighted under-representation of studies from minority population such as immigrants, specific population such as people living with HIV, and rural population.^{8,17} The global review as well as the studies from Nepal highlighted the inequitable access to the screening services in resource constraint settings and difficult geographical terrain.⁴ The findings highlight the universal need of population-specific interventions to improve accessibility focusing on marginalized and under-resourced populations.

The cost-effective and common interventions globally include awareness and educational activities for cervical cancer screening and prevention, early medical interventions such as pap smears, HPV vaccination, and visual inspection with acetic acid.^{4,9,11,12} However, the reviews also highlighted the need of country specific and population specific interventions that are socioculturally contextual.^{7,8}

Despite the evidence of cost-effective interventions on improving cervical cancer screening, majority of the systematic reviews globally reported poor knowledge and uptake of screening services, especially in African and Asian countries.^{3,13–15,19,20} Similarly, the existing original observational studies from Nepal also reported low knowledge and poor practices related to cervical cancer screening.^{27,28,30,31–34} The findings highlight the gaps and inadequacies on effective interventions to improve knowledge and practices related to cervical cancer that may have important implications for global health researchers as well local policy makers.

The barriers to implementation in Nepal are similar to those identified in global

literature.^{26,28,30} The sociodemographic characteristic such as age, education, socio-cultural practices seemed to have influenced the knowledge and practices related to cervical cancer screening globally as well as in Nepal. Other socio-cultural aspects such as embarrassment and preference of female doctors were also common factors in global and national literature. Well organized screening programs, proper counseling by health workers, and regularly updated policies played important role as facilitators for women to improve their knowledge and uptake of cervical cancer screening services.^{3,15,18–21} The findings highlight the need of designing tailored interventions contextual to different cultural practices across worldwide as well as diverse cultural practices in Nepal.

In Nepal, the national guidelines on cervical cancer screening and prevention were published more than a decade ago which suggested screening at least 50 percent of women aged 30–60 years, with recommended screening every five years to reduce cervical cancer mortality by 10%. Cervical cancer screening is currently available at district, provincial, and tertiary care centers.⁴⁰

Despite the well-acknowledged importance of cervical cancer prevention, there is a lack of deep insights on cervical cancer screening and prevention in Nepal. There is not enough evidence, strategy, and educational insights for promoting the uptake of cervical cancer screening. Most of the studies conducted in Nepal are single-centered hospital-based, cross-sectional studies with smaller sample sizes. This desk review, particularly on Nepal highlights the need for better-designed, larger studies looking into different dimensions of the implementation. Moreover, Nepal lacks well-designed

evidence of effective intervention studies to improve the implementation.

This review has certain limitations. As a desk review, the search performed was more generic in nature as compared to more robust methods such as in systematic review. Therefore, the included systematic reviews and original studies may not represent all the existing evidence. Moreover, the quality of the included systematic reviews and original studies was not assessed. Therefore, the certainty of the evidence based on existing literature cannot be concluded.

Despite the limitations, this desk review highlights the need for a context-specific implementation, better coordination between the program and basic health facilities, timely remuneration, better maintenance of data, and a strong monitoring system for LMICs such as Nepal. Enabling factors such as participation in community awareness programs and support from family and women's groups may convince women to attend screening clinics. Culturally appropriate educational interventions focused on the benefits and obstacles of screening are needed to improve the beliefs of cervical cancer and increase the screening rate.

More importantly, there's an urgent need to address the research gaps. Studies with better designs carefully looking into different dimensions of implementation could pave way for designing more effective and sustainable interventions in the long run.

CONCLUSIONS

Research in cervical cancer prevention and screening has received recognition globally. The cost-effective interventions have been identified and implemented globally as well as regionally in South Asia. However, in Nepal, proper documentation of the national

policies is not updated. The existing studies globally and in Nepal indicate a low level of knowledge and attitude among people related to cervical cancer prevention and screening. However, ways to address such gaps have not been explored adequately in Nepal. The desk review highlights the need for better-designed studies that will explore the gaps and identify the solutions in the long run.

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REFERENCES

1. Cervical cancer [Internet]. [cited 2022 Mar 17]. Available from: <https://www.who.int/westernpacific/health-topics/cervical-cancer>
2. IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Nepal. Summary Report [Internet]. 2021 Oct. Available from: <https://hpvcentre.net/statistics/reports/NPLfamily>
3. Majidi A, Majidi S, Salimzadeh S, Khazaei Pool M, Sadjadi A, Salimzadeh H, et al. Cancer Screening Awareness and Practice in a Middle Income Country; A Systematic Review from Iran. *Asian Pac J Cancer Prev.* 2017;18(12):3187–94. DOI: 10.22034/APJCP.2017.18.12.3187
4. Rahman R, Clark MD, Collins Z, Traore F, Dioukhane EM, Thiam H, et al. Cervical cancer screening decentralized policy adaptation: an African rural-context-specific systematic literature review. *Glob Health Action.*

- 2019;12(1):1587894.
DOI: 10.1080/16549716.2019.1587894
5. Saei Ghare Naz M, Kariman N, Ebadi A, Ozgoli G, Ghasemi V, Rashidi Fakari F. Educational Interventions for Cervical Cancer Screening Behavior of Women: A Systematic Review. *Asian Pac J Cancer Prev.* 2018;19(4):875–84. DOI: 10.22034/APJCP.2018.19.4.875
 6. Fokom-Domgue J, Combescure C, Fokom-Defo V, Tebeu PM, Vassilakos P, Kengne AP, et al. Performance of alternative strategies for primary cervical cancer screening in sub-Saharan Africa: systematic review and meta-analysis of diagnostic test accuracy studies. *BMJ.* 2015;351:h3084. DOI: 10.1136/bmj.h3084
 7. Mendes D, Bains I, Vanni T, Jit M. Systematic review of model-based cervical screening evaluations. *BMC Cancer.* 2015;15(1):334. DOI: 10.1186/s12885-015-1332-8
 8. Mapanga W, Chipato T, Feresu SA. Treatment of cervical cancer in HIV-seropositive women from developing countries: a protocol for a systematic review. *Syst Rev.* 2018;7(1):22. DOI: 10.1186/s13643-018-0686-9
 9. Musa J, Achenbach CJ, O'Dwyer LC, Evans CT, McHugh M, Hou L, et al. Effect of cervical cancer education and provider recommendation for screening on screening rates: A systematic review and meta-analysis. *PloS One.* 2017;12(9):e0183924. DOI: 10.1371/journal.pone.0183924
 10. Chorley AJ, Marlow LAV, Forster AS, Haddrell JB, Waller J. Experiences of cervical screening and barriers to participation in the context of an organised programme: a systematic review and thematic synthesis. *Psychooncol.* 2017;26(2):161–72. DOI: 10.1002/pon.4126
 11. Lu M, Moritz S, Lorenzetti D, Sykes L, Straus S, Quan H. A systematic review of interventions to increase breast and cervical cancer screening uptake among Asian women. *BMC Public Health.* 2012;12(1):413. DOI: 10.1186/1471-2458-12-413
 12. Jansen EEL, Zielonke N, Gini A, Anttila A, Segnan N, Vokó Z, et al. Effect of organised cervical cancer screening on cervical cancer mortality in Europe: a systematic review. *Eur J Cancer Oxf Engl.* 2020;127:207–23. DOI: 10.1016/j.ejca.2019.12.013
 13. Bogale AL, Teklehaymanot T, Ali JH, Kassie GM. Knowledge, attitude and practice of cervical cancer screening among women infected with HIV in Africa: Systematic review and meta-analysis. *PLOS ONE.* 2021;16(4):e0249960. DOI: 10.1371/journal.pone.0249960
 14. Kassie AM, Abate BB, Kassaw MW, Aragie TG, Geleta BA, Shiferaw WS. Impact of knowledge and attitude on the utilization rate of cervical cancer screening tests among Ethiopian women: A systematic review and meta-analysis. *PLOS ONE.* 2020;15(12):e0239927. DOI: 10.1371/journal.pone.0239927
 15. Anderson de Cuevas RM, Saini P, Roberts D, Beaver K, Chandrashekar M, Jain A, et al. A systematic review of barriers and enablers to South Asian women's attendance for asymptomatic screening of breast and cervical cancers

- in emigrant countries. *BMJ Open.* 2018;8(7):e020892.
DOI: 10.1136/bmjopen-2017-020892
16. DoHS-Annual-Report-FY-2074-75-date-22-Ashad-2076-for-web-1.pdf [Internet]. [cited 2022 Mar 17]. Available from: <https://dohs.gov.np/wp-content/uploads/2019/07/DoHS-Annual-Report-FY-2074-75-date-22-Ashad-2076-for-web-1.pdf>
 17. Ferdous M, Lee S, Goopy S, Yang H, Rumana N, Abedin T, et al. Barriers to cervical cancer screening faced by immigrant women in Canada: a systematic scoping review. *BMC Womens Health.* 2018;18:165. DOI: 10.1186/s12905-018-0654-5
 18. Pittalis C, Panteli E, Schouten E, Magongwa I, Gajewski J. Breast and cervical cancer screening services in Malawi: a systematic review. *BMC Cancer.* 2020;20(1):1101. DOI: 10.1186/s12885-020-07610-w.
 19. Chua B, Ma V, Asjes C, Lim A, Mohseni M, Wee HL. Barriers to and Facilitators of Cervical Cancer Screening among Women in Southeast Asia: A Systematic Review. *Int J Environ Res Public Health.* 2021;18(9):4586. DOI: 10.3390/ijerph18094586
 20. Desta M, Getaneh T, Yeserah B, Worku Y, Eshete T, Birhanu MY, et al. Cervical cancer screening utilization and predictors among eligible women in Ethiopia: A systematic review and meta-analysis. *PloS One.* 2021;16(11):e0259339. DOI: 10.1371/journal.pone.0259339
 21. Yimer NB, Mohammed MA, Solomon K, Tadese M, Grutzmacher S, Meikena HK, et al. Cervical cancer screening uptake in Sub-Saharan Africa: a systematic review and meta-analysis. *Public Health.* 2021;195:105–11. DOI: 10.1016/j.puhe.2021.04.014
 22. Sigfrid L, Murphy G, Haldane V, Chuah FLH, Ong SE, Cervero-Liceras F, et al. Integrating cervical cancer with HIV healthcare services: A systematic review. *PLoS ONE.* 2017;12(7):e0181156. DOI: 10.1371/journal.pone.0181156
 23. Hosono S, Terasawa T, Katayama T, Sasaki S, Hoshi K, Hamashima C. Frequency of unsatisfactory cervical cytology smears in cancer screening of Japanese women: A systematic review and meta-analysis. *Cancer Sci.* 2018;109(4):934–43. DOI: 10.1111/cas.13549
 24. Black E, Hyslop F, Richmond R. Barriers and facilitators to uptake of cervical cancer screening among women in Uganda: a systematic review. *BMC Womens Health.* 2019;19(1):108. DOI: 10.1186/s12905-019-0809-z
 25. Devarapalli P, Labani S, Nagarjuna N, Panchal P, Asthana S. Barriers affecting uptake of cervical cancer screening in low and middle income countries: A systematic review. *Indian J Cancer* [Internet]. [cited 2022 Mar 17]. Available from: <https://www.indianjancer.com/article.asp?issn=0019-509X;year=2018;volume=55;issue=4;page=318;epage=326;aulast=Devarapalli>
 26. Darj E, Chalise P, Shakya S. Barriers and facilitators to cervical cancer screening in Nepal: A qualitative study. *Sex Reprod Healthc Off J Swed Assoc*

- Midwives. 2019 Jun;20:20–6. DOI: 10.1016/j.srhc.2019.02.001
27. Shrestha AD, Neupane D, Ghimire S, Campbell C, Kallestrup P. Community-based intervention for cervical cancer screening uptake in a semi-urban area of Pokhara Metropolitan, Nepal (COBIN-C): study protocol for a cluster-randomized controlled trial. *Trials*. 2021 Jan 26;22(1):94. DOI: 10.1186/s13063-021-05049-3
 28. Thapa N, Maharjan M, Petrini MA, Shah R, Shah S, Maharjan N, et al. Knowledge, attitude, practice and barriers of cervical cancer screening among women living in mid-western rural, Nepal. *J Gynecol Oncol*. 2018 Jul;29(4):e57. DOI: 10.3802/jgo.2018.29.e57
 29. Shrestha AD, Neupane D, Vedsted P, Kallestrup P. Cervical Cancer Prevalence, Incidence and Mortality in Low and Middle Income Countries: A Systematic Review. *Asian Pac J Cancer Prev APJCP*. 2018 Feb 26;19(2):319–24. DOI: 10.22034/APJCP.2018.19.2.319
 30. Acharya Pandey R, Karmacharya E. Cervical cancer screening behavior and associated factors among women of Ugrachandi Nala, Kavre, Nepal. *Eur J Med Res*. 2017 Sep 19;22(1):32. DOI: 10.1186/s40001-017-0274-9
 31. Thapa N, Shrestha G, Maharjan M, Lindell D, Maskey N, Shah R, et al. Burden of cervical neoplasia in mid-western rural Nepal: a population-based study. *J Gynecol Oncol*. 2018 Sep;29(5):e64. DOI: 10.3802/jgo.2018.29.e64
 32. Sherpa AT, Karki BS, Sundby J, Nygard M, Franceschii S, Clifford G. Population Based Study of Cervical Cancer Screening in Bharatpur, Nepal. *J Manmohan Meml Inst Health Sci*. 2015 Jan 31;1(4):3–8. DOI: <https://doi.org/10.3126/jmmihs.v1i4.11994>
 33. Shakya S, Karmacharya BM, Afset JE, Bofin A, Åsvold BO, Syversen U, et al. Community-Based Health Education has Positive Influence on the Attitude to Cervical Cancer Screening among Women in Rural Nepal. *J Cancer Educ Off J Am Assoc Cancer Educ*. 2016 Sep;31(3):547–53. DOI: 10.1007/s13187-015-0863-7
 34. Ghimire B, Pathak P. Determinants of Uptake of Cervical Cancer Screening among Women Attending Tertiary Level Hospital. *J Nepal Health Res Counc*. 2021 Jan 21;18(4):649–54. DOI: 10.33314/jnhrc.v18i4.2848
 35. Thapa M. Cervical Cancer Awareness and Practice of Pap Smear Test Among Women with Gynecological problems. *JNMA J Nepal Med Assoc*. 2018 Apr;56(211):654–7. <https://pubmed.ncbi.nlm.nih.gov/30381758/>
 36. Ranjit A, Gupta S, Shrestha R, Kushner AL, Nwomeh BC, Groen RS. Awareness and prevalence of cervical cancer screening among women in Nepal. *Int J Gynecol Obstet*. 2016 Jul 1;134(1):37–40. DOI: 10.1016/j.ijgo.2015.11.019
 37. Marahatta Khanal R. Value of conventional cervical cytology as a screening test for cervical cancer. *Nepal Med Coll J NMCJ*. 2014 Sep;16(1):63–7. <https://pubmed.ncbi.nlm.nih.gov/25799815/>

38. Gyenwali D, Pariyar J, Onta SR. Factors associated with late diagnosis of cervical cancer in Nepal. *Asian Pac J Cancer Prev APJCP*. 2013;14(7):4373–7. DOI: 10.7314/apjcp.2013.14.7.4373
39. Rijal S, Rijal A, Deo SK. Cervical Cancer and its Screening: A Cross-Sectional Study among Married Women in Sankhu, Kathmandu. *Birat J Health Sci*. 2018;3(3):519–23. DOI: <https://doi.org/10.3126/bjhs.v3i3.22167>
40. Cervical Cancer Screening And Prevention Project In Nepal [Internet]. Karuna Foundation Nepal. [cited 2022 Mar 17]. Available from: <https://karunanepal.org/projects/ccsp/>