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Knowledge, Awareness, and Perceived Barriers Regarding Cervical Cancer Screening Among Bangladeshi Women Suffering from Cervical Cancer: A Cross-sectional Study

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Abstract

Background: This study aimed to evaluate the knowledge, awareness, and perceived barriers regarding cervical cancer screening among women in Bangladesh.

Methods: A hospital-based survey was conducted from January to April 2021 among 200 female participants. Statistical analysis of this study was performed by using Stata 13 (StataCorp LP, 4905 Lakeway Drive, College Station, TX 77845, USA), where Chi-square test was used for the determination of the correlation among different variables.

Results: Among the participants, 86.5% were rural residents, 96% were married, 87.5% were housewives, 47% were uneducated, and 93.5% lived on a husband's income. Moreover, 84.5% hadn't any family history of cancer, 91.5% had no knowledge about cervical self-examination, 74.5% and 61.5% never heard of screening programs and cervical cancer, respectively ($p < 0.05$). In addition, 23.5% knew that early sexual activity was a risk factor for cervical cancer. Again, the outcome of ideas about other people's thinking (6%), the stigma of cancer diagnosis (15%), difficulty talking with doctors (5%), poor knowledge (12.5%), and fear of physicians and examiners (5%) were statistically significant ($p < 0.05$).

Conclusions: This study revealed that most female respondents lack knowledge and awareness regarding cervical cancer. To improve this situation, appropriate and socially acceptable awareness programs are necessary.

Keywords: awareness, barriers, cervical cancer, knowledge, screening

INTRODUCTION

Cervical cancer is the second most common cancer in women globally after breast cancer. Data suggest that human papillomavirus (HPV) infection causes cervical neoplasia. Malignant transformation is more likely to occur when high-risk HPV genital subtypes are present.[1] Early screening is necessary for cervical cancer detection; however, knowledge about early screening and uptake is very poor in developing countries.[2] On the contrary, in affluent countries, widespread adoption of the Papanicolaou smear has drastically lowered the prevalence of cervical cancer. The early detection of aberrant cytologic alterations early and accurately prevents the disease from progressing from being preinvasive to invasive.[3]

HPV spreads from one person to another during sexual activity. HPV will infect at least half of sexually active adults at some point in their lives; however, only a small percentage of women will develop cervical cancer.[4] The severity of the infection is determined by its size, extent of spread, and overall health. Cervical cancer was diagnosed in approximately 570,000 women worldwide in 2018, with approximately 311,000 women dying from the disease.[5] HPV can cause skin warts, genital warts, and other skin problems. Other symptoms are related to the vulva, vagina, anus, tongue, penis, and tonsils. The

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main symptom is unexpected vaginal bleeding. In addition, pain during sex and vaginal discharge are other common symptoms of cervical cancer.[6]

In this twenty-first century, cervical cancer is a major risk for women worldwide. Cervical cancer is the third most prevalent cancer in Asian women and is still the top cause of cancer-related death in women in low- and middle-income nations.[7] In Asia, approximately 500,000 new cases are identified annually, with a 50% fatality rate. In the United States, approximately 10,370 new cases of cervical cancer are reported annually, with approximately 3,710 fatalities, making it the sixth most prevalent form of cancer among American women.[6] More than 50 million women from Bangladesh are at a high risk of developing cervical cancer, from which there are 17,686 new cases annually. The number of deaths associated with cervical cancer is also alarming since 10,362 deaths occur annually.[8] Most of the women in developing countries such as Bangladesh have never heard of cervical cancer. Even if some women have heard about it, they have poor knowledge about cervical cancer, which would worsen the situation. Therefore, awareness among women by spreading knowledge should be the goal in reducing mortality associated with cervical cancer.[9]

The Government of Bangladesh introduced the visual inspection with acetic acid method for cervical cancer screening, which is convenient and economical and provides an opportunity for immediate treatment in a low-resource setting. Besides, the program offers rapid training for the provider. Colposcopy was referred to screen-positive patients who have been treated with local excision of the cervix by a local ablative method and those who are under precancerous or cancerous conditions. In addition, some women suffering from cervical cancers were also forwarded to government-owned oncology departments to undergo loop electrosurgical excision procedure and thermal ablation for selected cervical intraepithelial neoplasia and "see-and-treat" approach for high-grade diseases combining colposcopy and loop electrosurgical excision procedure.[10]

This study seeks to raise awareness about cervical cancer and give up-to-date information on the frequency and incidence of the disease throughout Bangladesh. Cervical cancer accounts for 6%–29% of all malignancies in women in India.[11] Moreover, 68.6 million women in Pakistan aged >15 years are at risk of cervical cancer. According to current statistics, 5008 women are diagnosed with cervical cancer annually, with 3197 dying from the illness.[12] These Asian neighboring country data concur a healthcare concern among Bangladeshi physicians. According to the International Agency for Research on Cancer, over 50 million Bangladeshi women are at risk of cervical cancer, with 17,686 new cases and 10,362 deaths occurring annually.[13] Conversely, cervical cancer may be effectively treated if detected at an early stage. Cervical cancer caused by HPV genotypes 16 and 18 accounts for approximately 70% of cases. Consequently, screening programs are needed to detect the illness before it becomes an aggressive malignancy.[14]

The results of this study will aid in the early prevention of cancer and the reduction of the suffering and untimely death of women with cervical cancer. This study aimed to evaluate knowledge, awareness, and perceived barriers regarding cervical cancer screening among women with cervical cancer in Bangladesh.

METHODS

Before the study started, a written consent form was obtained from all participants. The NICRH Ethical Research Committee approved the study protocol (Reference no. FO-NICRH/2020/65).

Study design and sampling

This hospital-based survey was conducted at the National Institute of Cancer Research & Hospital (NICRH), which is situated in Dhaka, the capital city of Bangladesh. This is a tertiary care hospital, and people of all cultures usually come here for cancer treatment. The study was conducted from January 2021 to April 2021, and only women were selected as respondents. The respondents were randomly selected by simple random sampling and lottery methods.[15] The sample size was calculated using the method described by Masood *et al*.[16] and an online calculator (http://www.raosoft.com/samplesize.html), with a confidence interval of 95% and a margin of error 5%. This method has a low chance of bias. Although bias is very rare in this method, bias may occur during sample selection. Therefore, an appropriate sample calculation method was used to prevent sample selection bias. For appropriate analysis, achievement of maximum validity, and consideration of allowable error and non-response rate, some additional samples were taken over the calculated sample size. In total, 200 participants were finally selected for this study, and each participant was assigned a unique identification number. The inclusion criteria were as follows: age >18 years, capability to understand English or Bengali, diagnosis of cervical cancer, and willingness to take part in this study. Some participants were excluded from the study because they did not satisfy the above criteria.

Study questionnaire

The written questionnaire was designed by following the previously published articles.[16–20] The whole questionnaire was composed of four segments: (1) demographic characteristics of respondents (6 questions), (2) general knowledge of participants regarding cervical cancer (6 questions), (3) awareness of cervical cancer symptoms (7 questions) and risk factors (9 questions), (4) barriers

toward cervical cancer screening (12 questions). English was used at first for the preparation of the questionnaire; then, for better understanding, it was translated into Bengali by a professional translator. Validation of the questionnaire is a necessary step, which was performed by a panel of experts such as oncologists, clinical pharmacists, social science graduates, and university professors with expertise in relevant fields and healthcare professionals. Few participants were first included in this study to find out if they face problems in understanding the questionnaire; however, any such difficulties were not observed. Different medical terms were elucidated in face-to-face interviews with the participants.

Data collection

Five dedicated pharmacy graduates and physicians were involved as volunteers in data collection. They received a 1-month training course on cervical cancer screening and risk assessment and were trained on handling the research questionnaire. They also took part in various seminars on cervical cancer by the arrangement of different medical institutions. Volunteers followed the above-mentioned steps for data collection. In the first step, the participants were requested to fill out a questionnaire on sociodemographic and anthropometric information. Trained volunteers provided support for those who were unable to fill out the questionnaire and those who face difficulties in understanding it. After the questionnaires were administered to the participants, they received an explanation of the study's purpose and were assured of their confidentiality. Any doubts or questions raised by the participants were clarified by the authors and trained volunteers. Immediately after the questionnaires were completed, they were collected by the volunteers.

Statistical analysis

Stata 13 (StataCorp LP, 4905 Lakeway Drive, College Station, TX 77845, USA) and Microsoft Excel 2013 were used for statistical analysis and data calculation. Microsoft Excel was utilized for data editing and sorting. Later, for descriptive statistics (frequencies, percentages) and first-order analysis (i.e., chi-square tests) Stata was used to import the file. Significant associations between categorical variables were determined with 95% confidence interval. When the *p*-value of these associations was found to be less than 0.05, it was considered statistically significant.

RESULTS

In total, 200 female patients with female cervical cancer participated in the study, with a response rate of 100%. The mean age of the participants was 34.5 years. Table 1 shows the sociodemographic characteristics of the participants. Most (96%) of the participants were married, 0.5% were single, 3% were widowed, and 0.5% were divorced. Most of them (87.5%) were homemakers, 11% were working women, and 1.5% were students. Of the participants, 47% were uneducated and 53% received education.

Most of the respondents (86.5%) were from rural areas, and 13.5% were from urban areas. Only 1.5% had a personal history of cervical cancer, and 15.5% had a family history of cervical cancer.

Their knowledge of cervical cancer was evaluated. All participants said that cervical cancer is rare, 91.5% did not know how to do a cervical self-examination, 61.5% had never heard of cervical cancer, and 74.5% had never heard of screening programs (Table 2).

Table 2 summarizes the participants' responses regarding cervical cancer symptoms and risk factors. The participants reported the following as cervical cancer symptoms: heavier or longer menstrual bleeding and bleeding between periods (N = 200; 100%), strong vaginal discharge with a strong odor (N = 199; 99.5%), pain during sexual intercourse (N = 197; 98.5%), and bleeding after intercourse (N = 197; 98.5%), and bleeding after menopause (N = 193; 96.5%). Responses regarding risk

TABLE 1. Sociodemographic characteristics of the participants

Variable	N (%)
Age in years	
<20	1 (0.5)
20–29	12 (6)
30–39	134 (67)
40–49	36 (18)
50–59	12 (06)
>60	5 (2.5)
Occupation	
Housewife	175 (87.5)
Student	3 (1.5)
Working woman	22 (11)
Educational qualification	
Uneducated	94 (47)
Educated	106 (53)
Marital status	
Single	1 (0.5)
Married	192 (96)
Widow	6 (3)
Divorced	1 (0.5)
Residence	
Urban area	27 (13.5)
Rural area	173 (86.5)
Family monthly income	
Husband	187 (93.5)
Wife	13 (6.5)

TABLE 2. History, women's awareness of symptoms, risk factors of cervical cancer, and barriers toward cervical cancer screening compared between uneducated and educated participants

Statements	Yes	No	*p*
	N (%)	N (%)	
History of cervical cancer			
Is cervical cancer a rare disease?	200 (100)	0 (0)	NA
Family history of cervical cancer	31 (15.5)	169 (84.5)	< 0.05
Do you know how to perform cervical self-examination?	17 (8.5)	183 (91.5)	< 0.05
Have you ever heard about cervical cancer?	77 (38.5)	123 (61.5)	< 0.05
Have you heard about screening programs?	51(25.5)	149 (74.5)	< 0.05
Symptoms of cervical cancer			
Increased vaginal discharge with a strong odor	199 (99.5)	1 (0.5)	
Havier or longer menstrual bleeding	200 (100)	0 (0)	
Pain during sexual intercourse	197 (98.5)	3 (1.5)	
Bleeding after menopause	193 (96.5)	7 (3.5)	
Persistent pelvic or back pain	191 (95.5)	9 (4.5)	
Bleeding after intercourse	197 (98.5)	3 (1.5)	
Bleeding between periods	200 (100)	0 (0)	
Risk factors for cervical cancer			
Have a weakened immune system	193 (96.5)	7 (3.5)	
Take birth control pill for five years or longer	111 (55.5)	89 (44.5)	
Early sexual activity	47 (23.5)	153 (77.5)	
Any sexually transmitted disease	2 (1)	198 (99)	
Poor personal hygiene	190 (95)	10 (5)	
Obesity	131 (65.5)	69 (34.5)	
Genetic factors	60 (30)	140 (70)	
Nutrient deficiency	180 (90)	20 (10)	
Viral factors (HPV and HIV)	140 (70)	60 (60)	
Barriers toward cervical cancer screening			
Embarrassed to tell people about cervical cancer	200 (100)	0 (0)	NA
No idea about what other people think	188 (94)	12 (6)	< 0.05
Fear of hospitals and health facilities	196 (98)	4 (2)	0.057
Stigma following the diagnosis of cancer	170 (85)	30 (15)	< 0.05
Feeling worried about what a doctor might find	200 (100)	0 (0)	NA
Difficulty talking to the doctor	190 (95)	10 (5)	< 0.05
Lack of knowledge	175 (87.5)	25 (12.5)	< 0.05
Fear of physicians and examiners	190 (95)	10 (5)	< 0.05
Afraid of having a Pap test	200 (100)	0 (0)	NA
Busy, no time to do it	196 (98)	4 (2)	0.057
Awareness programs are insufficient	200 (100)	0 (0)	NA
Acceptable to touch the body	200 (100)	0 (0)	NA

Chi-Square Value p <0.05

factors of cervical cancer include having a weakened immune system (N = 193; 96.5%), poor personal hygiene (N = 190; 95%), nutrient deficiency (N = 180; 90%), viral factor (HPV and HIV; N = 140; 70%), obesity (N = 131; 65.5%), taking birth control pill for five years or longer; (N = 111; 55.5%), genetic factors (N = 60; 30%), early sexual activity (N = 47; 23.5%), and any sexually transmitted disease (N = 2; 1%).

Table 2 also summarizes the barriers to cervical cancer screening. For all participants (100%), the barriers to cervical cancer screening were feeling embarrassed to tell people about cervical cancer, worrying about what a doctor might find, fear of having a Pap test, and insufficiency of awareness programs. Other barriers reported were being busy, having no time to do it and fear of hospitals and health facilities (N = 196; 98%), difficulty talking to doctors and fear of physicians and examiners (N = 190; 95%), having no idea about what other people think (N = 188; 94%), lacking knowledge (N = 175; 87.5%), and experiencing stigma following the diagnosis of cancer (N = 170; 85%).

DISCUSSION

Cervical cancer is one of the most common gynecological cancers in women that can be detected early and treated completely at precancerous stages.[17] Moreover, 70% of cervical cancers are caused by HPV (types 16 and 18). They also cause precancerous cervical lesions. Compared with other types, HPV types 16 and 18 are more frequently associated with invasive cervical cancer.[18] It is

considered a major public health trouble for women in Bangladesh.[19]

This hospital-based study aimed to examine women's knowledge, awareness, and perceived obstacles to cervical cancer in Bangladesh. Although the participants had previous experience with cervical cancer, most women lacked knowledge about it, which could be due to socioeconomic, sociocultural, and religious factors.[20] Therefore, they are unaware of screening methods, risk factors, and symptoms that ultimately cause cervical cancers at an advanced stage.[9] Several literature reviews have suggested that the mean age of cervical cancer onset in Bangladesh is lower than in other Asian countries. This young age significantly affects the lack of cervical cancer information and awareness among girls in this nation.[8]

This study found that most of the respondents were from rural areas, where the risk factors were weakened immune system, poor personal hygiene, nutrient deficiency, viral and genetic factors, obesity, and taking birth control pills for a longer period, which is similar to the results of a study conducted in rural and urban areas of North Bengal, India.[21] As cervical cancer symptoms, participants reported heavier or longer menstrual bleeding and bleeding between periods, strong vaginal discharge with a strong odor, pain during sexual intercourse, bleeding after intercourse, and bleeding after menopause similar to the results of a study conducted in Ghana, where qualitative data were collected from patients with cervical cancer in the Volta Region of Ghana.[22]

On the other hand, in our study a significant relationship was observed between educational qualification with history of cervical cancer, like patient's family history, knowledge about how to perform cervical cancer self-examination, knowledge about cervical cancer, knowledge about screening programs and some barriers toward cervical cancer screening such as no idea about what other people think, stigma following the diagnosis of cancer, difficulty talking to the doctor, lack of knowledge, fear of physicians and examiners. Previous study indicated, self-efficacy and accessibility to health care services were better in women who are educated.[23] Several studies conducted in Korea and Zimbabwe showed, those women who gained university-level education were most likely to get screened.[24]

Our findings imply that adequate and socially acceptable cervical cancer awareness initiatives will help in improving knowledge about cervical cancer.[25] Similar studies have shown that South Africa, India, Brazil, and China have high rates of cervical cancer because of a lack of education, unemployment, language unproficiency, communication barrier, and poor preventative strategy.[26] Immunization and screening may prevent cervical cancer with readily accessible technology.[13] As a result, in world regions such as North America and Australia, cervical cancer is not now among the top 20 causes of death. New Zealand and Australia also experience the same scenario. Developed countries have provided a good education in cervical cancer screening and have a high vaccine rate.[27] However, several studies have stated that citizens of developing countries lack confidence in talking about sex, screening problems, and education about cancer.[28] This clarifies why cervical cancer is detected at the last stages in Bangladesh. Bangladeshi women even feel ashamed to talk with doctors about vaginal problems, even with their families. By contrast, Western people are more open-minded, which ultimately helps in detecting cervical cancer at an early stage.[29]

Cervical cancer is most commonly diagnosed in younger women.[30] Women with HPV infection, being sexually active for a more extended period, use of oral contraceptives, cigarette smoking, and genital herpes have a higher risk of acquiring cervical cancer.[31] Better knowledge about cervical cancer is positively associated with women's monthly income and education level because they might share their experiences with other women, such as friends, family, and coworkers.[32,33] Furthermore, unmarried women were less concerned about cervical cancer than others, as married women get spousal support.[19]

Because cervical cancer may be detected early through screening programs, potential hurdles to screening must be identified. Similarly, a study carried out in North America reported that routine cervical cancer screening detected 83% of nonlocalized cancers.[34] Several literature reviews have shown that the most significant obstacle to cervical cancer screening programs is humiliation, fear, and shyness.[33] Lack of awareness, misunderstanding, and lower understanding correlated with education level; mistrust, gossip, and negative experiences in previous meetings with health service providers are significant barriers to cervical cancer screening,[20] which is similar to the study conducted in Nigeria, where the author mentioned a positive attitude toward cervical cancer screening but unsatisfactory uptake rate. The author also added that this uptake is caused by the cost and fear of getting a positive result.[35] This conclusion reflects the social condition where there is a division between afflicted women and the rest of society.[36] If people in the community had adequate counseling, awareness programs, education, and understanding of cervical cancer, the rate of a late diagnosis would be reduced, and individuals diagnosed with cervical cancer would be better managed.[37]

Qayum *et al*. suggested that a lack of cancer information and sociocultural factors that discourage screening may be the root reasons for the low cervical cancer awareness in Bangladesh.[38] Given the increasing cervical

cancer incidence, more awareness campaigns and adequate information delivery may help improve this situation.[37,39] Healthcare experts and the government may jointly work to develop an actionable policy to diagnose and raise awareness among women and the general public.[40] Cervical cancer is usually detected via a Pap test associated with HPV for early detection, which gives better sensitivity.[41] However, self-sampling and at-home tests are also available for cervical cancer screening, although new devices made most of them afraid to perform the screening.[42]

This study was performed at a cancer hospital in the nation's capital because the sociocultural setting did not allow for a broad range of demographic groups. Furthermore, no outside funding was used in this study. Larger-scale studies, with more respondents from various demographic groups and geographic places, can provide a better image of the overall situation, which might lead to the development of cervical cancer awareness initiatives.

CONCLUSIONS

In this study, most female respondents lacked knowledge and awareness of cervical cancer. Factors that may act as barriers to cervical cancer screening include shyness, fear, lack of knowledge, and deficiency of awareness programs. As early detection of this illness with screening can prevent it from becoming an aggressive malignancy, appropriate and socially acceptable awareness programs regarding cervical cancer screening should be arranged, and stakeholders and policymakers should remove all screening barriers.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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REFERENCES

1. Hu Z, Ma D. The precision prevention and therapy of HPV-related cervical cancer: New concepts and clinical implications. *Cancer Med*. 2018;7:5217–36.
2. Getachew S, Getachew E, Gizaw M, Ayele W, Addissie A, Kantelhardt EJ. Cervical cancer screening knowledge and barriers among women in Addis Ababa, Ethiopia. *PLoS One*. 2019;14:e0216522.
3. Bedell SL, Goldstein LS, Goldstein AR, Goldstein AT. Cervical cancer screening: Past, present, and future. *Sex Med Rev*. 2020;8:28–37.
4. Revathidevi S, Murugan AK, Nakaoka H, Inoue I, Munirajan AK. APOBEC: A molecular driver in cervical cancer pathogenesis. *Cancer Lett*. 2021;496:104–16.
5. Canfell K. Towards the global elimination of cervical cancer. *Papillomavirus Res*. 2019;8:100170.
6. 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;19:875–84.
7. Beharee N, Shi Z, Wu D, Wang J. Diagnosis and treatment of cervical cancer in pregnant women. *Cancer Med*. 2019;8:5425–30.
8. Hoque MR, Haque E, Karim MR. Cervical cancer in low-income countries: A Bangladeshi perspective. *Int J Gynaecol Obstet*. 2021;152:19–25.
9. Alam NE, Islam MS, Rayyan F, Ifa HN, Khabir MIU, Chowdhury K, *et al*. Lack of knowledge is the leading key for the growing cervical cancer incidents in Bangladesh: A population based, cross-sectional study. *PLOS Glob Public Health*. 2022;2:e0000149.
10. Nessa A, Chowdhury SB, Fatima P, Kamal M, Sharif M, Azad AK. Cervical cancer screening program in Bangladesh. *Bangladesh J Obstet Gynecol*. 2020;33:63–73.
11. Sundström K, Elfström KM. Advances in cervical cancer prevention: Efficacy, effectiveness, elimination? *PLoS Med*. 2020;17:e1003035.
12. Wang L, Zhao Y, Wang Y, Wu X. The role of galectins in cervical cancer biology and progression. *Biomed Res Int*. 2018;2018:2175927.
13. McGraw SL, Ferrante JM. Update on prevention and screening of cervical cancer. *World J Clin Oncol*. 2014;5:744–52.
14. Haldorsen IS, Lura N, Blaakær J, Fischerova D, Werner HMJ. What Is the role of imaging at primary diagnostic work-up in uterine cervical cancer? *Curr Oncol Rep*. 2019;21:77.
15. Mehejabin F, Rahman MS. Knowledge and perception of breast cancer among women of reproductive age in Chattogram, Bangladesh: A cross-sectional survey. *Health Sci Rep*. 2022;5:e840.
16. Masood I, Saleem A, Hassan A, Sadeeqa S, Akbar J. A quantitative study to assess breast cancer awareness among females in Bahawalpur Pakistan. *Cogent Med*. 2016;3:1236479.
17. Kunkule R, Pakale R, Jadhav S. Review on cervical cancer. *Curr Trends Pharm Pharm Chem*. 2020;2:39–44.
18. Ahmed HG, Bensumaidea SH, Alshammari FD, Alenazi FSH, ALmutlaq BA, Alturkstani MZ, *et al*. Prevalence of human papillomavirus subtypes 16 and 18 among yemeni patients with cervical cancer. *Asian Pac J Cancer Prev*. 2017;18:1543–8.

19. Mustari S, Hossain B, Diah NM, Kar S. Opinions of the urban women on Pap test: Evidence from Bangladesh. *Asian Pac J Cancer Prev*. 2019;20:1613–20.
20. Islam RM, Bell RJ, Billah B, Hossain MB, Davis SR. Lack of understanding of cervical cancer and screening is the leading barrier to screening uptake in women at midlife in Bangladesh: Population-based cross-sectional survey. *Oncologist*. 2015;20:1386–92.
21. Raychaudhuri S, Mandal S. Socio-demographic and behavioural risk factors for cervical cancer and knowledge, attitude and practice in rural and urban areas of North Bengal, India. *Asian Pac J Cancer Prev*. 2012;13:1093–6.
22. Binka C, Nyarko SH, Awusabo-Asare K, Doku DT. "I always tried to forget about the condition and pretend I was healed": Coping with cervical cancer in rural Ghana. *BMC Palliat Care*. 2018;17:24.
23. Mupepi SC, Sampselle CM, Johnson TR. Knowledge, attitudes, and demographic factors influencing cervical cancer screening behavior of Zimbabwean women. *J Womens Health (Larchmt)*. 2011;20:943–52.
24. Chang HK, Myong JP, Byun SW, Lee SJ, Lee YS, Lee HN, *et al*. Factors associated with participation in cervical cancer screening among young Koreans: A nationwide cross-sectional study. *BMJ Open*. 2017;7:e013868.
25. Lemp JM, De Neve JW, Bussmann H, Chen S, Manne-Goehler J, Theilmann M, *et al*. Lifetime Prevalence of cervical cancer screening in 55 low- and middle-income countries. *JAMA*. 2020;324:1532–42.
26. Mezei AK, Armstrong HL, Pedersen HN, Campos NG, Mitchell SM, Sekikubo M, *et al*. Cost-effectiveness of cervical cancer screening methods in low- and middle-income countries: A systematic review. *Int J Cancer*. 2017;141:437–46.
27. Hull R, Mbele M, Makhafola T, Hicks C, Wang SM, Reis RM, *et al*. Cervical cancer in low and middle-income countries. *Oncol Lett*. 2020;20:2058–74.
28. Soler ME, Gaffikin L, Blumenthal PD. Cervical cancer screening in developing countries. *Prim Care Update Ob Gyns*. 2000;7:118–23.
29. Brisson M, Kim JJ, Canfell K, Drolet M, Gingras G, Burger EA, *et al*. 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;395:575–90.
30. Benard VB, Watson M, Castle PE, Saraiya M. Cervical carcinoma rates among young females in the United States. *Obstet Gynecol*. 2012;120:1117–23.
31. Shepherd JP, Frampton GK, Harris P. Interventions for encouraging sexual behaviours intended to prevent cervical cancer. *Cochrane Database Syst Rev*. 2011;2011:CD001035.
32. Mitiku I, Tefera F. Knowledge about cervical cancer and associated factors among 15-49 year old women in Dessie Town, Northeast Ethiopia. *PLoS One*. 2016;11:e0163136.
33. Khazaee-Pool M, Yargholi F, Jafari F, Ponnet K. Exploring Iranian women's perceptions and experiences regarding cervical cancer-preventive behaviors. *BMC Womens Health*. 2018;18:145.
34. Landy R, Sasieni PD, Mathews C, Wiggins CL, Robertson M, McDonald YJ, *et al*. Impact of screening on cervical cancer incidence: A population-based case-control study in the United States. *Int J Cancer*. 2020;147:887–96.
35. Okolie EA, Barker D, Nnyanzi LA, Anjorin S, Aluga D, Nwadike BI. Factors influencing cervical cancer screening practice among female health workers in Nigeria: A systematic review. *Cancer Rep (Hoboken)*. 2022;5:e1514.
36. Jain A, Ganesh B, Bobdey SC, Sathwara JA, Saoba S. Sociodemographic and clinical profile of cervical cancer patients visiting in a tertiary care hospital in India. *Indian J Med Paediatr Oncol*. 2017;38:291–5.
37. Datchoua Moukam AM, Embolo Owono MS, Kenfack B, Vassilakos P, Petignat P, Sormani J, Schmidt NC. "Cervical cancer screening: awareness is not enough". Understanding barriers to screening among women in West Cameroon-a qualitative study using focus groups. *Reprod Health*. 2021;18:147.
38. Qayum MO, Billah MM, Akhter R, Flora MS. Women's knowledge, attitude and practice on cervical cancer and its screening in Dhaka, Bangladesh. *Asian Pac J Cancer Prev*. 2021;22:3327–35.
39. Mwaka AD, Orach CG, Were EM, Lyratzopoulos G, Wabinga H, Roland M. Awareness of cervical cancer risk factors and symptoms: Cross-sectional community survey in post-conflict northern Uganda. *Health Expect*. 2016;19:854–67.
40. Perehudoff K, Vermandere H, Williams A, Bautista-Arredondo S, De Paepe E, Dias S, *et al*. Universal cervical cancer control through a right to health lens: Refocusing national policy and programmes on underserved women. *BMC Int Health Hum Rights*. 2020;20:21.
41. Watson M, Benard V, King J, Crawford A, Saraiya M. National assessment of HPV and Pap tests: Changes in cervical cancer screening, National Health Interview Survey. *Prev Med*. 2017;100:243–67.
42. Gupta S, Palmer C, Bik EM, Cardenas JP, Nuñez H, Kraal L, *et al*. Self-sampling for Human Papillomavirus Testing: Increased cervical cancer screening participation and incorporation in international screening programs. *Front Public Health*. 2018;6:77.