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Strategies to Increase Participation in Early Detection of Cervical Cancer in Women of Childbearing Age: A Systematic Review

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KEYWORDS
cervical cancer, early detection, women of childbearing age

ABSTRACT
Background: Cervical cancer is one of the most common cancers in the world and Indonesia, with a low rate of early detection. Cervical screening is an important intervention, especially for women of childbearing age (WUS). Objectives: This literature review aims to summarize effective interventions in increasing WUS participation in the early detection of cervical cancer. Methods: A total of 20 studies with 10,396 WUS were included. These studies were grouped based on intervention methods, namely Self-Sampling, SMS Reminders, Health Counseling, Family Support, Cervical Cancer Cadres, and Motivational Interviewing. The analysis was carried out with a PICO (Population, Intervention, Comparison, Outcome) framework. Results: Health counseling was the most common intervention (8 studies, 1,053 interventions). Self-sampling, evaluated in 3 RCTs (1,953 WUS), showed a significant improvement in screening, especially in developed countries. SMS reminders, which were tested in 4 RCTs (4,905 WUS), also increased participation, with one study reporting a five-fold improvement. Family support, which was studied in 3 studies in Indonesia, emphasized the importance of the role of husbands in encouraging screening. The Cervical Cancer Cadre method in Cameroon shows that community workers can mobilize WUS for screening. Motivational Interviewing in one study in Iran increased the screening of women who were motivated face-to-face or over the phone. Conclusion: Six intervention strategies have been proven to be effective in increasing WUS participation in the early detection of cervical cancer. The support of facilities and resources is critical to the effectiveness and sustainability of the program.

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INTRODUCTION

Cancer, a non-communicable disease, is the leading cause of death globally, with the number of cases and deaths expected to rise significantly. In 2018, there were 18.1 million cancer cases and 9.6 million deaths, with projections reaching over 13.1 million deaths by 2030 (GLOBOCAN). Cervical cancer, one of the most prevalent cancers worldwide, particularly in Indonesia, is a malignant neoplasm originating from uterine cervical cells. Despite being preventable, it remains a top gynecological cancer, ranking fourth among all cancers affecting women. In 2018, an estimated 570,000 cases and 311,000 deaths occurred globally, with these numbers rising to 604,127 cases and 341,831 deaths in 2020.

Cervical cancer is most commonly diagnosed between ages 35 and 44, often in individuals who do not undergo regular screenings. In Indonesia, cervical cancer is the second most common cancer in women, with 36,633 cases and 21,003 deaths reported in 2021, reflecting a twofold increase since 2008.

Central to this process is persistent infection by high-risk human papillomavirus (HPV) strains, especially HPV-16 and HPV-18, which subtly integrate their genetic material into the host genome (Burmeister et al., 2022). This invasion paved the way for the emergence of cervical cancer intraepithelial neoplasia (CIN), which is a spectrum of pre-cancerous lesions (Halle et al., 2021). These lesions, characterized by irregular cell growth and increased proliferation, act as an intermediary in the progression toward invasive carcinoma (Burmeister et al., 2022). The pathway to invasive cancer involves the relentless accumulation of genetic mutations, particularly the inactivation of critical tumor suppressor genes such as p53 and pRB. These changes give neoplastic cells the ability to evade regulatory mechanisms, allow for uncontrolled cell division, and inhibit programmed cell death (George et al., 2023). This abnormal cell behavior ultimately leads to a violation of the underlying membrane, facilitating the invasion of surrounding tissues and potential metastases to regional and distant lymph nodes, characterizing the culmination of this complicated pathophysiological narrative (Burmeister et al., 2022). Risk factors for cervical cancer include persistent infection by high-risk HPV, high-risk sexual behaviors, such as having multiple sexual partners or having sex at a young age, not getting the appropriate HPV vaccination, smoking, as well as a family history of cervical cancer (Delam, Izanloo, Bazrafshan, & Eidi, 2020). High-risk HPV infection is a major factor, while HPV vaccination is effective in preventing it (Khabibah, Adyani, & Rahmawati, 2022).

The increasing prevalence and high incidence of cervical cancer in developing countries can be caused by the lack of awareness among women to immediately check themselves. Most cervical cancer patients come when they are at an advanced stage, so they do not get effective treatment. Interventions for cervical cancer focus on primary and secondary prevention. Primary prevention and early screening are the best methods to reduce the burden of cervical cancer and reduce mortality (Pimple & Mishra, 2019). IVA (Visual Inspection with Acetic Acid) is a screening method used to detect early signs of cervical cancer. In this procedure, a medical professional will apply acetic acid to the surface of the cervix. Acetic acid will react with potentially cancerous cells, causing discoloration of the affected area. By using light and lup, doctors can clearly see this discoloration, which can indicate the presence of precancerous or cancerous cells. The incidence rate of cervical cancer decreased by more than 50% from the mid-1970s to the mid-2000s, partly due to increased screening that can detect cervical changes before they become malignant (Hu, Cao, Zeng, Luo, & Fan, 2022). Statistical data found that the 5-year relative survival rate for cervical cancer was 67%. However, early-stage detection significantly enhances outcomes, with the 5-year relative survival rate for cervical cancer increasing to 92% (Hu et al., 2022), underscoring the critical importance of early intervention strategies in improving patient prognosis.

METHOD

Search Techniques

In preparing this systematic review, a meticulous literature search process was conducted to ensure that the most relevant studies were included. This process, aimed at addressing the research questions and achieving the review's primary objectives, took place on October 9-10, 2023. During this period, research articles were carefully selected based on predetermined inclusion and exclusion

criteria. The review focused on studies published between 2019 and 2023 that explored strategies or efforts to enhance women's participation in cervical cancer screening. To ensure a broad and comparative analysis, articles written in both Indonesian and English were considered, allowing the authors to gain a comprehensive perspective on the approaches used in Indonesia and other countries. Additionally, these language choices were intended to enhance the authors' ability to analyze and interpret diverse findings. Further criteria were applied to evaluate the studies' relevance and quality, ensuring that only the most pertinent research was included in the review, which can be found in more detail in Table 1.

Table 1.
Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Written in Indonesian or the United Kingdom	Full text is not accessible
Year of publication last 5 years (2019-2023)	
Performing interventions for women of childbearing age to increase participation in early detection of cervical cancer	Involves other cancers other than cervical cancer
The average age of the study subjects was women of childbearing age (15-49 years old)	Review or case report

The literature search process is carried out by entering keywords into the Google Scholar, Cochrane, and Pubmed search engines, with the use of Boolean operators such as AND and OR. The purpose of this step is to collect journals that will then be compared and adjusted to the focus of the discussion in the literature review. The authors have set publication restrictions in the last five years as a search guideline. When using Google Scholar, search involves using synonyms of relevant keywords. On the other hand, searches in Cochrane and Pubmed rely on the term MeSH (Medical Subject Headings) as a guide in finding appropriate literature.

Keywords

The author utilized sources from Google Scholar, Cochrane, and PubMed to gather relevant information. Keywords were carefully selected and translated into both Indonesian and English to optimize the search process. Using these keywords, the author conducted comprehensive searches across the mentioned databases. The study selection was then guided by the criteria outlined in the PRISMA chart. During the initial screening, the author reviewed the titles of the top 280 articles from Google Scholar, 133 articles from Cochrane, and 30 articles from PubMed. This process was followed by a detailed assessment of the literature's relevance and quality through full-text reviews.

RESULT AND DISCUSSION

Summary of Study Results

Based on the results of the literature search, there were 20 articles involving 10,396 women of childbearing age (WUS) who met the inclusion criteria in this literature review. From the 20 articles, the author then grouped the intervention methods to increase WUS participation in the early detection of cervical cancer into 6 methods in general, namely the Self-Sampling method, the SMS Reminder

method, the Health Counseling method, and the Family Support method. Cervical Cancer Cadre method, Motivational Interviewing method. Each of these articles is then summarized based on population, intervention and comparison, and outcome (PICO).

The self-sampling method was carried out on 3 RCT studies (Scarinci et al., 2021) involving 1,953 WUS in New Zealand, France, and the United States. These studies provide the option to perform the pap smear sample themselves after education by the team. These studies found that in developed countries, understanding self-sampling is more in demand because of privacy factors. Research offers self-sampling at clinical visits. They found that cervical cancer screening rates were 2.8-fold increased compared with no self-sampling option (RR: 2.8; 95%CI: 2.4–3.1; p <0.0001). Research offered refugees in France self-screening for cervical cancer. This increased cervix cancer screening by 2.48 times compared to the group that was only offered to be performed by officers (RR: 2.48; 95%CI: 1.99-3.08; p < 0.001). Research by Scarinci et al (Scarinci et al., 2021) found that offering door-to-door pap smears increased the screening rate by 5.62 times compared to conventional methods (RR: 5.62; 95%CI: 1.71-18.44; p < 0.005).

The SMS reminder method was studied in 4 RCTs in the United Kingdom, Nigeria, and Tanzania involving 4,905 WUS (Erwin et al., 2019; Huf et al., 2020). Research by Huf et al (Huf et al., 2020) reminded as many as once to do screening, compared to not being reminded at all. The result was an increase in cervical cancer screening by 1.29 times [RR: 1.29; 95%CI: 1.09–1.51; p = 0.002]. Looked at the number of screenings in six months after being reminded twice a month compared to not getting a memory message. Cervical cancer screening increased by 5.13 times (RR: 5.13; 95%CI: 1.55 – 16.95; p < 0.001). The results of the study conducted by Erwin et al (Erwin et al., 2019) found a similar thing, namely an increase in cervical cancer screening cases by three times after the provision of messages 15 times (RR: 3.0; 95%CI: 1.5 - 6.2; p <0.001), while when added to the provision of vouchers, the screening rate increased to 4.7 times. Found that after 10 educational messages and 3 visit reminders in a ten-month period, the attendance rate of cervical cancer screening did not increase significantly (RR: 1.02; 95%CI: 0.79 -1.33; p >0.05).

The health counseling method was carried out in 8 studies, making it the most widely used method to increase WUS participation in the early detection of cervical cancer ; (Baezconde-Garbanati et al., 2020; Devi & Dasila, 2020; Tafwidhah & Wulandari, 2015). The study involved 1,053 WUS. The six studies were conducted in Indonesia (Tafwidhah & Wulandari, 2015). Health counseling is carried out in various ways, namely. The provision of educational materials carried out by all studie (Baezconde-Garbanati et al., 2020; Devi & Dasila, 2020; Tafwidhah & Wulandari, 2015). Video screenings conducted in 3 studies (Baezconde-Garbanati et al., 2020; Devi & Dasila, 2020). Education with print media such as leaflets and brochures in 3 studies (Tafwidhah & Wulandari, 2015). Submission of counseling with presentation and discussion media and Counseling via social media groups (Imelda, Tarigan, & Santosa, 2022).

The family support method was carried out in 3 cross-sectional analytical studies covering 425 WUS in Indonesia. Found that there is a relationship between family support and women's intention to undergo cervical cancer screening. Research from Juwitasari et al (Juwitasari, Harini, & Rosyad, 2021) examined the factors of husband support that were found to play an important role. Education for support for husbands increased the screening rate from 7.31% to 65.75%. Similarly, found that husband

support can increase cervical cancer screening rates by 5.38 times (OR: 5,382; 95%CI: 2,156 - 13,438; p<0.0001).

The cervical cancer cadre method was investigated by 1 quasi-experimental study in Cameroon involving 1,940 WUS. This study involved 4 sub-regions in the Dschhang area. The researchers recruited 52 cadres who had major jobs in their respective areas to be educated for two days. After the education program, they were released to their respective areas to invite women of childbearing age in their areas to take part in cervical cancer screening. The study found that cadres were able to invite 584 WUS to do screening.

The motivational intervewing method involved 120 Iran WUS in 1 prospective cohort study (Pourebrahim-Alamdari et al., 2022). Participants were motivated to carry out cervical cancer screenings either face-to-face or by phone. Researchers found that in the face-to-face motivational intervention group, 32% of women underwent screening. Meanwhile, 22% of women who received phone motivation screened. However, only 4% of the control population (not receiving motivation) were screened for cervical cancer.

Cervical cancer remains the main focus of educational efforts to raise awareness in the community, especially for individuals who are already sexually active. Regular check-ups are highly recommended for early detection of cervical cancer. In the early stages, cervical cancer often shows no obvious symptoms. By the time symptoms begin to appear, the disease has usually reached the pre-cancer or cancer stage, thus confirming the need for regular early detection. Available cervical cancer screening methods include visual examination with IVA, Pap smear test, and HPV DNA testing. The high incidence of cervical cancer in Indonesia is greatly influenced by the low rate of cervical cancer screening. In 2021, only about 6.83% of women aged 30-50 years have undergone IVA screening (Farahdiba, Situmorang, Sari, & Noviani, 2023). Projections for 2023 show that cervical cancer screening coverage in Indonesia will only reach around 7.02% of the target that should reach 70% (Indarti, 2023).

Self-Sampling Method

HPV self-sampling is a process in which a person uses a kit to take a sample of the vagina by himself or herself and then send it for analysis in a laboratory. Sampling uses lavage, brushes, swabs, and vaginal patches. HPV self-sampling cannot diagnose (pre-)cervical cancer but only identify a person who is at high risk (World Health Organization, 2022). If the laboratory results are positive for HPV or cannot be interpreted, then the participant will be referred for a pap smear.

The self-sampling method as a primary screening has the opportunity to expand the scope of screening, especially in low-resource conditions, where infrastructure and labor are very limited. The implementation of self-sampling can save time and lower the cost of cervical screening because patients do not need to go to the clinic for smear collection (Polman et al., 2019). Another advantage is that the privacy and autonomy of the participants are better maintained so that the sense of physical or emotional discomfort is lost compared to sampling by the clinician (Gupta et al., 2018). This method also has the same sensitivity and is slightly less specific compared to cervical samples taken by clinicians.

Based on the results of the research of Scarinci et al. (2021), this method has been proven to be effective in the promotion of cervical cancer screening to rural women who have never or rarely screened. Women who were given the choice between self-sampling at home or at a local health department were 5.62 times more likely to be compliant with cervical screening compared to women who were only invited to take samples at the health department. As many as 76% of women who were

given the choice tended to be selective and obedient to take samples at home (Scarinci et al., 2021). Similar results were also found in other studies that self-sampling options expanded screening coverage and increased cervical screening participation.

SMS Alert Method (Reminder)

The most common obstacle to a person not getting screened for cervical cancer is forgetting and procrastinating (Huf et al., 2020). Scheduled SMS alerts can be one of the reminder methods to increase cervical cancer skiing participation. The frequency and content of the SMS affect the participation rate of participants. In Huf et al's research, SMS containing the due date of screening, the phone number of the family doctor, and the encouragement to make an appointment were proven to increase participant participation. Personalization of messages, such as mentioning participant names, also makes it possible to increase the number of participants compared to general messages (Huf et al., 2020). Another study stated that sending SMS messages accompanied by round-trip transportation coupons to the nearest clinic further increased the number of screening participants in both rural and urban areas. Although the increase occurred in these two areas, the increase in screening was more pronounced in rural areas (Erwin et al., 2019).

The SMS alert method has been shown to increase the coverage of screening tests, but a 2-way SMS is needed for more effective results (Erwin et al., 2019). 2-way SMS allows the sender of the message to receive a message back and respond to the message personally. Linde et al revealed that 1-way SMS had no effect on screening attendance rates, so making phone calls or in-home HPV testing services was likely more promising than sending 1-way SMS or in-clinic check-ups.

Health Counseling Methods

The main strategy to reduce the incidence of cervical cancer is education about primary and secondary prevention for women and their families. Education through counseling can use verbal, written, and video communication media. Thus, the woman and her family will be motivated to do cervical screening for themselves and vaccinate their daughters against HPV (Hande et al., 2018). The material contained in the media can be in the form of definitions of cervical cancer, incidence rates, causes, symptoms, risk factors, how to detect symptoms before they appear, and treatment (Imelda et al., 2022).

Counseling, both using leaflets and videos, is known to increase knowledge about cervical cancer. If looked at further, video media has proven to be more effective than leaflets because there is a significant increase in knowledge. A narrative online video style with a storyline according to the local culture can be one option because it helps to increase the psychosocial variables of participants (Calderón-Mora, Alomari, Byrd, & Shokar, 2022). Another study stated that leaflet media was more effective at improving the attitude of early detection of cervix. This is because the leaflet can be taken home to be read and re-studied. Another option for written media counseling is through a WhatsApp group. If carried out on a scheduled basis within a certain time span, this media has also been shown to increase participants' knowledge and attitudes towards cervical cancer (Imelda et al., 2022).

Family Support Methods

The low number of women of childbearing age who undergo cervical cancer screening is influenced by several factors including a lack of awareness regarding cervical cancer, fear of cervical cancer screening, and diverse beliefs and cultures. This is despite the wide opportunity to access adequate healthcare for cervical cancer screening. Related to this, the World Health Organization states that men's involvement in the prevention of cervical cancer is often an opening of access to health

services for wives and girls in the family. The support of a husband or father in the family is considered necessary for women of childbearing age to undergo cervical cancer screening. When families better understand the risk factors associated with cervical cancer and how cervical cancer screening can benefit them, they are more likely to be motivated to support cervical cancer screening for their female partners (Adegboyega, Aleshire, Dignan, & Hatcher, 2019).

One of the many cervical cancer examinations, the Visual Inspection of Acetic Acid (IVA) is a simple and adequate examination. Family support and family knowledge are thought to be related to the intention of women of childbearing age to carry out cervical cancer prevention with IVA. In addition to the level of education and distance from health services, a person who does not receive support or approval from his family will tend to be reluctant to undergo such screening (Fitriah, Kania, Triawanti, Arifin, & Nugroho, n.d.). As an effort to raise awareness of women of childbearing age to undergo IVA screening, family involvement is considered important. Support and motivation from families to get screened, can encourage women of childbearing age to get screened and prioritize their health (Darj, Chalise, & Shakya, 2019).

Cervical Cancer Cadre Method

Many levels of society do not have enough knowledge regarding the prevention and early detection of cervical cancer. One of the efforts in cervical cancer prevention that can be done is to involve the role of cadres in the community so that there is an increase in knowledge related to early detection of cervical cancer. Cadres are placed in the community to increase cultural legitimacy, trust, and public acceptance of cervical cancer screening interventions in their areas. Cadres are also trained to hold community-based programs in conducting cervical cancer screening and treatment.

Cadres can play a role in increasing public knowledge, behavior, and awareness in the early detection of cervical cancer through examination. The cadres formed also need to be trained first before going into the community to provide education related to early detection and prevention of cervical cancer (Fitriah et al., n.d.). Cadres are expected to be able to mobilize the community to carry out early detection with the aim of improving the status of public health. Cadres are considered very close to the community and play a leading role in finding a problem in society. He considers cadres as role models for the community; cadres should be able to provide comprehensive information related to early detection, one of which is the IVA examination. In addition to sufficient knowledge related to examinations, cadres are expected to increase public awareness to carry out early detection. As a form of public trust in cadres, it is important for the community that cadres themselves have carried out early detection of cervical cancer as a form of awareness of one's health (Hanifah & Sari, 2020).

The application of cadres is not only influential and used in Indonesia. In some countries such as El Salvador, cadres identify women of childbearing age who have not been screened and conduct home visits to convey education to the community, including examination and treatment methods for cervical cancer, to find out the reasons why people have not been screened. In another area, namely Iran, cadres are trained to convey information to women regarding the importance of screening and how to carry out self-detection using a pap test. Even in Nigeria, cadres are trained to conduct direct screening using IVA under supervision. In positive cases that are found, they are directed to do therapy. The roles of these cadres certainly show that cadres play an active role in increasing the screening rate of cervical cancer in various countries in the world.

Motivational Interviewing Method

Motivational interviewing or motivational interview is a method of approach that is centered on the purpose of increasing motivation in behavior change. Motivation is considered a source of change that can last for a long time. Motivational interview is an intervention that aims to change health-related motivations and behaviors. Motivational interviewing strategies can improve and facilitate decision-making related to change among women and women of childbearing age. Motivational interviewing (MI) is considered to play a role in community compliance with cervical cancer screening. In an experimental study of 150 women of childbearing age, divided into 3 groups based on the face-to-face call group, telephone group, and control group where the women of childbearing age will receive 3 face-to-face and telephone calls 3 times in one week, with the results that through the intervention the results were obtained that both methods had an effective impact in motivating WUS to carry out early detection in the form of pap smears.

This method is considered effective in increasing motiation in performing a pap smear. This suggests that MI can help reduce cervical cancer screening barriers and may improve cervical cancer screening rates. MI-based interventions are considered effective for increasing the number of cervical cancer screenings and related studies recommend using this type of MI intervention to increase the frequency of regular screening in addition to early detection. MI involves a strategy that increases a person's motivation to switch from the stage of pre-contemplation and contemplation to the stage of continuous action (Alizadeh Sabeg, Mehrabi, Nourizadeh, Poursharifi, & Mousavi, 2019).

CONCLUSION

To optimize cervical cancer screening rates among women of childbearing age, this research will compare the effectiveness of six intervention strategies self-sampling methods, SMS warnings, health counselling, family support, cervical cancer cadre methods, and motivational interviews to identify the most impactful approaches. It will also explore strategies for ensuring the long-term sustainability of these interventions, examining the necessary support for facilities and resources. The study will assess barriers and facilitators to screening across different demographic groups, considering socio-economic status, education, and geography, and explore how these interventions can be integrated into existing health services. Additionally, the role of technology in enhancing screening rates through digital tools for self-sampling, reminders, and motivational support will be evaluated, alongside cultural and behavioural factors influencing participation in screening.

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