Factors Associated with Cervical Cancer Screening Overuse and Underuse, and Attitude towards Human Papillomavirus Self-sampling among Hospital Staffs

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ABSTRACT

Objective: To investigate the rates of and factors associated with cervical cancer screening overuse and underuse, and the attitude towards human papillomavirus (HPV) self-sampling among hospital staffs.

Materials and Methods: This cross-sectional study included female hospital staff undergoing an annual health check-up. A questionnaire was used to collect sociodemographic characteristics, indication for cervical cancer screening, reasons for screening decision, and attitude toward HPV self-sampling. Screening overuse was defined as having cervical cancer screening without indication while screening underuse was having indication for screening but not receiving it.

Results: Among the 600 included participants, 220 and 380 women decided to screen and not to screen for cervical cancer, respectively. The prevalence of screening overuse and underuse was 11.8% and 33.0%, respectively. Multivariate analysis revealed age was associated with screening underuse (aOR: 1.06, 95% CI: 1.04-1.09; $p<0.001$), whereas married status was associated with screening overuse (aOR: 3.73, 95% CI: 2.05-6.79; $p<0.001$). The common reasons for screening were "add-on to annual health check-up" (93.2%), "fear of cancer" (84.1%), and "family/organizational support" (54.5%). The common reasons for not screening were "feeling healthy" (73.7%), "fear of pain" (58.7%), and "embarrassment" (57.1%). Most women (65.1%) expressed interest in screening via HPV self-sampling.

Conclusion: Overuse and underuse of cervical cancer screening were common. An accurate information regarding screening indication should be provided and indication restriction should be implemented to a health system to avoid screening overuse. In addition, an encouragement should be enhanced to the target population to attend the screening program.

Keywords: Attitude; human papillomavirus cervical self-sampling; cervical cancer screening overuse and underuse; female staff members (Siriraj Med J 2023; 75: 200-207)

INTRODUCTION

Cervical cancer is the fourth most common cancer and the leading cause of cancer-related death among women worldwide.[1] In Thailand, the age-standardized incidence (16.4%) and mortality (7.4%) rates are greater than the global rates. The global age-standardized incidence

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and mortality rates were reported to be 13.3% and 7.3%, respectively.[2] Cervical cancer screening is one of the most effective types of cancer screening as evidenced by a substantial decrease in the incidence and mortality rates of cervical cancer during the past few decades.[3] Although increased, cervical cancer screening coverage in Thailand increased from 46.3% in 2007 to only 59.7% in 2009.[4] Low screening coverage is commonly found in less-educated, poor, young, unmarried, and non-Buddhist women.[5]

Women that work in a hospital might be expected to have good knowledge about cervical cancer and good cervical cancer screening practices. These women are viewed as a reliable source of high-quality healthcare information, and as a role model that has the ability to inspire and encourage their friends and families to adopt and demonstrate good healthcare practices. This hypothesis, if it were found to be true, would results in increased cervical cancer screening coverage in general population. However and surprisingly, prior studies reported that only 20.7% of nurses have ever undergone cervical cancer screening.[6] In Siriraj Hospital, a university-based national tertiary referral center, cytology-based cervical cancer screening is provided free of charge; however, the proportion of female hospital staff members that agree to undergo screening remains low. Our 5-year data showed that only 2.7-6.5% of all female hospital staff attended the center's cervical cancer screening program. On the contrary, some women who repeat screening every year instead of every 2 years according to cervical cancer screening recommendation were observed.[7] Yet, the data regarding screening overuse has never been collected and published. To better understand the cervical cancer screening attitudes and habits of female staff at our center, the aim of this study was to investigate the rates of, and factors associated with cervical cancer screening overuse and underuse, and the attitude towards human papillomavirus (HPV) cervical self-sampling among female hospital staff members at a single-center, university hospital.

MATERIALS AND METHODS

Study design and study participants

This cross-sectional, questionnaire-based study was conducted at a single center, tertiary university hospital. Female hospital staff members who attended their annual health check-up during January 2020 to December 2020 study period were invited to participate. Those unwilling to join the study were excluded. The protocol for this study was approved by local Institutional Review Board (COA no. Si 616/2019), and written informed consent was obtained from all study volunteers. The study protocol complied in all ways with the principles set forth in the 1964 Declaration of Helsinki and all its subsequent amendments.

Study questionnaire

The study questionnaire was created by the authors, after which it was reviewed and approved by local experts in gynecologic oncology. The questionnaire comprised the 4 following parts: 1) sociodemographic characteristics, including age, marital status, education level, occupation, income, HPV vaccination status, and family history of cancer; 2) indication for cervical cancer screening, including age at first sexual intercourse and history of cervical cancer screening; 3) risk factors for or symptoms of cervical cancer, including first sexual intercourse at age ≤18 years, having given birth to three or more children, having multiple sexual partners, using oral combined contraceptive pills for longer than 5 years, cigarette smoke exposure, immunosuppressed status, and having abnormal vaginal bleeding or discharge; 4) decision to undergo or not undergo cervical cancer screening, and the reason(s) for their decision; and, 5) attitude towards HPV self-sampling for cervical cancer screening. Following the Royal Thai College of Obstetricians and Gynaecologists (RTCOG) guideline, indication for cervical cancer screening in this study was satisfied if all the following criteria was met: 1) age 25 to <30 years and currently sexually active or age 30 years or older regardless of sexual activity, and 2) not having cervical cancer screening within the past 2 years.[7] Screening underuse was defined as having the aforementioned indication for cervical cancer screening, but the screening had not been performed. Screening overused was defined as not having the indication for cervical cancer screening but the screening was performed.

Study process

After the purpose of the study was fully explained, instructions were given, and written informed consent was obtained to join the study, the study volunteer was given the questionnaire to be completed. Any questions regarding the questionnaire were addressed until the study volunteers were clearly understood. Then, the study participants were asked if they wanted to undergo cervical cancer screening. Those women were further subdivided into the declined cervical cancer screening or decided for cervical cancer screening groups. Among the women scheduled for screening, data specific to who did and did not attend the scheduled screening appointment were collected. Reasons for declining screening and not

attending the scheduled screening visit were collected and analyzed. Screening result data were also collected and analyzed.

Statistical analysis

Descriptive statistics were used to summarize study participant data. Chi-square test or Fisher's exact test was performed to compare differences in categorical variables, and those results are reported as frequency and percentage. Normally distributed continuous variables were compared using Student's *t*-test, and the findings are reported as mean plus or minus standard deviation. Non-normally distributed continuous data were compared using Mann-Whitney U test, and those results are given as median and interquartile range. Univariate and multivariate binary regression analysis was used to identify factors independently associated with the underuse or overuse of cervical cancer screening services. A p-value <0.05 was considered statistically significant for all tests. Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.

RESULTS

A total of 600 female hospital staff members were enrolled in this study. There were 220 women who decided to attend cervical cancer screening, and 380 women who decided not to do so (Fig 1). Of the 220 women who were scheduled for cervical cancer screening, 125 (56.8%) women showed up for screening at their appointed screening date and time. Taking the indication for cervical cancer screening into account, screening underuse was 33% while screening overuse was 11.8%. Among women having screening overuse, 21 (29.6%) women were aged less than the screening recommendation, 54 (76%) women had negative screening within 2 years, and 30 (42.3%) women had both.

Baseline sociodemographic and clinical characteristics of all study participants and compared between those who decided to and not to screen for cervical cancer are shown in Table 1. The comparative analysis between those two groups revealed a significant difference relative to age, marital status, occupation, and risk factors for cervical cancer.

The reasons given for screening or not screening are given in Fig 2. Among those who decided to screen, the top three reasons were "add-on of cervical screening to annual health check-up program" (91.9-93.2%), "fear of cancer" (79.1-86.3%) and "family/organizational support"(54.1-58.9%) in all women, women without indication, and women without risk. For women who decided not to screen, the top three reasons for not doing so were "screening is not necessary because I am healthy" (73.7-74.4%), "fear of pain" (52.7-61.5%), and "embarrassment" (52.1-68.6%) in all women, women without indication, and women without risk

Table 2 and Table 3 shows the factors significantly and independently associated with screening overuse and screening underuse, respectively. Univariate analysis showed

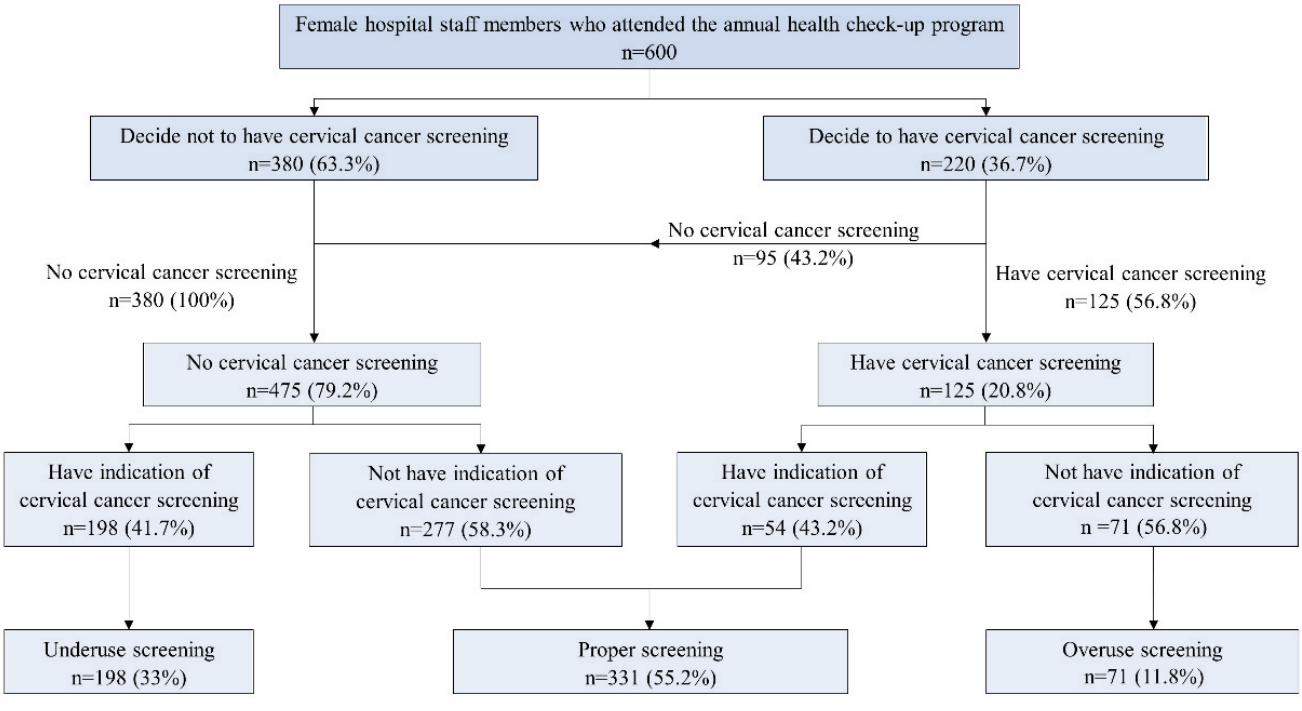

Fig 1. The flow of female staff members through the study.

TABLE 1. Baseline sociodemographic and clinical characteristics of all study participants, and compared between those who decided to and not to screen for cervical cancer.

Characteristics	All (N=600)	Decided not to screen (n=380)	Decided to screen (n=220)	*P*-value
Age (years)	34.5±9.3	33±9.2	37.2±9.0	**<0.001**
Marital status				**<0.001**
Single	393 (65.5%)	295 (77.6%)	98 (44.5%)	
Married	181 (30.2%)	69 (18.2%)	112 (51.0%)	
Widowed/divorced/separated	26 (4.3%)	16 (4.2%)	10 (4.5%)	
Level of education				0.569
Secondary school	20 (3.3%)	11 (2.9%)	9 (4.1%)	
High school	96 (16.0%)	58 (15.3%)	38 (17.3%)	
Bachelor's degree or higher	484 (80.7%)	311 (81.8%)	173 (78.6%)	
Occupation				**<0.001**
Doctor, dentist, nurse, or health scientist	393 (65.5%)	269 (70.8%)	124 (56.4%)	
Back office or others	207 (34.5%)	111 (29.2%)	96 (43.6%)	
Income (US dollar)				0.482
≤ 600	111 (18.5%)	68 (17.9%)	43 (19.5%)	
> 600-900	300 (50.0%)	198 (52.1%)	102 (46.4%)	
> 900	189 (31.5%)	114 (30.0%)	75 (34.1%)	
Had HPV vaccination	62 (10.3%)	40 (10.5%)	22 (10.0%)	0.840
Family history of cancer	163 (27.2%)	106 (27.9%)	57 (25.9%)	0.600
Had risk for cervical cancer	280 (46.7%)	146 (38.4%)	134 (60.9%)	**<0.001**
Median number of cervical cancer risks	0 (0, 1)	0 (0, 1)	1 (0, 2)	**<0.001**
Had indication for cervical cancer screening	252 (42.0%)	156 (41.1%)	96 (43.6%)	0.537

Data are presented as mean plus/minus standard deviation, number and percentage, or median (P25, P75)
A *p*-value<0.05 indicates statistical significance
Abbreviation: HPV, human papillomavirus

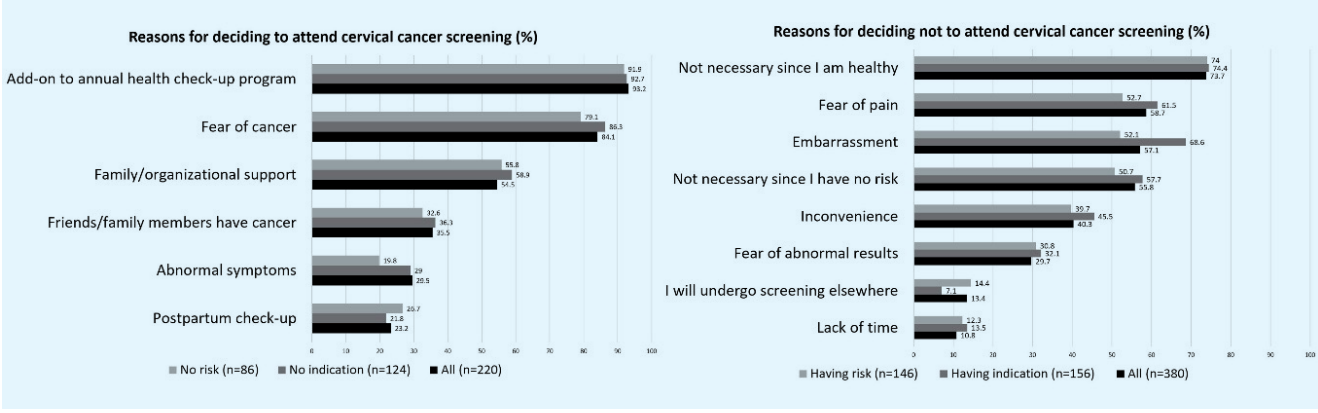

Fig 2. Reasons given for attending or not attending cervical cancer screening.

TABLE 2. Univariate and multivariate analysis to identify factors independently associated with overuse of cervical cancer screening.

Factors	N (%)	OR (95%CI)	*P*	Adjusted OR (95%CI)	*P*
Age		1.03 (1.01-1.06)	**0.011**		
Marital status					
Single	29 (40.8)	1		1	
Married	39 (54.9)	3.45 (2.05-5.79)	***<0.001***	3.73 (2.05-6.79)	***<0.001***
Widowed/divorced/separated	3 (4.2)	1.64 (0.46-5.78)	**0.444**	1.77 (0.47-6.69)	0.402
Level of education					
Secondary school	2 (2.8)	1			
High school	8 (11.3)	0.82 (0.16-4.18)	0.809		
Bachelor's degree or higher	61 (85.9)	1.30 (0.29-5.73)	0.731		
Occupation					
Doctor, dentist, nurse, and scientist	37 (52.1)	1			
Back office or others	34 (47.9)	1.89 (1.15-3.12)	***0.012***		
Income (US dollar)					
≤ 600	12 (16.9)	1			
> 600-900	40 (56.3)	1.27 (0.64-2.52)	0.538		
> 900	19 (26.8)	0.92 (0.43-1.98)	0.835		
Had HPV vaccination	10 (14.1)	1.50 (0.73-3.11)	0.272		
Family history of cancer	15 (21.1)	0.69 (0.38-1.26)	0.225		
Number of risk factors for cervical cancer		1.15 (0.90-1.47)	0.256		

TABLE 3. Univariate and multivariate analysis to identify factors independently associated with underuse of cervical cancer screening.

Factors	N (%)	OR (95%CI)	*P*	Adjusted OR (95%CI)	*P*
Age		1.06 (1.04-1.08)	***<0.001***	1.06 (1.04-1.09)	***<0.001***
Marital status					
Single	118 (59.6)	1			
Married	64 (32.3)	1.28 (0.88-1.85)	0.202		
Widowed/divorced/separated	16 (8.1)	3.73 (1.64-8.46)	***0.002***		
Level of education					
Secondary school	8 (4)	1			
High school	30 (15.2)	0.68 (0.25-1.84)	0.450		
Bachelor's degree or higher	160 (80.8)	0.74 (0.30-1.85)	0.520		
Occupation					
Doctor, dentist, nurse, and scientist	132 (66.7)	1			
Back office or others	66 (33.3)	0.93 (0.65-1.33)	0.673		
Income (US dollar)					
≤ 600	35 (17.7)	1			
> 600-900	78 (39.4)	0.76 (0.47-1.23)	0.266		
> 900	85 (42.9)	1.78 (1.09-2.90)	***0.022***		
Had HPV vaccination	13 (6.6)	0.51 (0.27-0.96)	0.036		
Family history of cancer	59 (29.8)	1.22 (0.83-1.77)	0.310		
Number of risk factors for cervical cancer		0.95 (0.79-1.14)	0.580		

age, married status, and back-office staff or others to be significantly associated with screening overuse. That same analysis demonstrated age, widowed/divorced/separated status, and income > 900 US dollar to be significantly associated with screening underuse. Multivariate analysis revealed age (aOR: 1.06, 95%CI: 1.04-1.09; $p<0.001$) to be independent predictors of screening underuse, whereas married status was found to associate with screening overuse (aOR: 3.73, 95%CI: 2.05-6.79; $p<0.001$).

Regarding the attitude of the hospital staff towards HPV self-sampling for cervical cancer screening, 391 of 600 women (65.1%) reported being interested in this screening method. The percentages of women interested in HPV self-sampling were similar between women who decided to screen (64.5%) and women who decided not to screen (65.5%).

Of 125 women undergoing cervical cancer screening, 2 (1.6%) women had abnormal cervical cytology. Yet, no cervical intraepithelial neoplasia or more severe lesions presented in this cohort. Among those who did not show up for their scheduled screening appointment, the most common reasons given were inconvenience (57.9%), having menstrual period (15.8%), and plan to seek or already had cervical screening elsewhere (6.3%).

DISCUSSION

Screening overuse

In the present study, 71 (11.8%) women decided to undergo cervical cancer screening despite the fact that they were not clinically indicated to do so. Among this group, 76% had negative screening within 2 years, 29.6% were aged less than the screening recommendation, and 42.3% women had both.

In this cohort, the screening without indication was found the most in women who underwent screening even though they had negative screening within 2 years. Prior studies from the United States also reported rates of screening overuse ranging from 45-65%.[8-10] A large-scale population-based study that was conducted in the US reported that up to two-thirds of women had repeated screening within three years of their index test.[10] The cumulative incidence of repeat cervical cancer screening was 17.7% (95% CI: 17.6-17.7%) at 12 months, 51.1% (95% CI: 51.0-51.2%) at 24 months, and 65.8% (65.7-65.8%) at 36 months. According to US guideline, cytology-based screening should be performed every 3 years. A multicenter European study reported a 0.28% risk of cervical intraepithelial neoplasia (CIN) 3 or cancer after negative cervical cytology.[11] A shorter duration screening interval yielded a negligible reduction in cancer risk, but it substantially increased unnecessary procedures and treatments, which resulted in significantly increased costs.[12,13] The number of colposcopies would be decreased by 50% if cervical cancer screening was performed every 3 years instead of every year.[14] In Thailand, cervical cytology is the most commonly used technique for cervical cancer screening. Due to the higher incidence of cervical cancer in Thailand, a 2 year-screening interval is recommended by Thai national guideline.[7,15] Considering the benefits and risks, annually screening is not recommended.[15]

Approximately one-third of women in this study were aged less than the screening recommendation. Prior studies revealed a low burden of cervical cancer in women aged less than 25 years. More specifically, the rates of cervical cancer-related incidence and mortality in this young age group was reported to be 0.8% and 0.5%, respectively.[16] In some contrast, the highest prevalence of HPV infection was found among younger aged women. Nevertheless, the rates of both persistent infection and cancer progression were lower in the younger age group compared to the older age group.[17-19] For the reasons, the American Cancer Society and the Royal Thai College of Obstetricians and Gynaecologists both recommend that cervical cancer screening should start at 25 years of age.[7,16]

Screening overuse was less common in our study compared to prior studies from the US.[8-10] This may be due to the fact that the present study enrolled hospital staff members who might be more aware of screening indication compared to the general populations enrolled in the US studies. The main reasons for cervical screening without screening indication in our study were add-on of cervical screening to the annual health check-up program, fear of cancer, and family/organizational support. Our study women who lived with their spouses were more likely to participate in cervical cancer screening. In contrast, a US study reported younger age, screening with cytology alone, more medical visits, contraceptive management visits, and gynecology provider specialty to be factors associated with screening overuse.[9] Those findings correspond other studies that found physician-related factors also to be related to screening overuse.[20-22] Since the cervical cancer screening guideline has changed overtime, updated information regarding screening interval and indication should be provided to healthcare providers, and physicians should be aware of the drawbacks of overscreening. Specific indication, as well as the risks and benefits of screening should be discussed with each patient. Interventions, such as reimbursement only in indicated cases, might decrease screening overuse.

Screening underuse

Screening underuse was found in 33% of women in this cohort. Prior studies reported that 20.7-53.0% of nurses had previously undergone cervical cancer screening.[6,23,24] Common reasons given for not undergoing screening included embarrassment and fear of pain. To overcome these concerns, HPV cervical sampling for cervical cancer screening may be a more attractive screening alternative for these women. Initially, HPV self-sampling was developed to increase screening coverage in rural or remote areas. Various methods were used for specimen collection, including brushes, swabs, vaginal patches, and lavage.[25] Regarding test accuracy, a meta-analysis reported the sensitivity and specificity of HPV self-sampling for detecting high-grade cervical lesion or cancer to be slightly lower than the sensitivity and specificity of clinician-collected sampling (ratio = 0.88, 95% CI 0.85-0.91: and 0.96, 95% CI 0.95-0.97, respectively).[26] Previous studies found that HPV self-sampling increased cervical cancer screening coverage to a level comparable to that observed in high-income countries.[25] The reported advantages of HPV self-sampling were privacy, convenience, less embarrassment and anxiety, user-friendly, and less discomfort and pain compared to clinician-collected specimen.[27-29] HPV self-sampling appears to be a potentially viable screening alternative in our setting because 65.1% of our study women expressed positive interest in HPV self-sampling for cervical cancer screening. However, some concerns about HPV self-sampling have been reported. For example, in low- and middle-income countries, the higher price of an HPV self-sampling test would be a financial barrier for many women. More study is needed to illuminate the benefits and drawbacks of HPV self-sampling for cervical cancer screening compared to traditional screening via clinician-collected sampling.

This study found that screening underuse was associated with age which was in accordance with the prior study.[9] To improve screening coverage among those who don't undergo screening often enough, and in those who have never undergone screening, interventions, such as a risk or indication assessment checklist, might be used to ensure that individual women are aware of their own screening indication and/or cancer risks, if any exist.

Strengths and limitations

In addition to providing cervical cancer screening overuse and underuse data, our study also explored the attitude of our study women towards the use of HPV self-sampling cervical cancer screening among our center's female staff. Concerning potential limitations, our data were collected among medical staff, so our data may not necessarily be applicable in non-medical settings. Lastly and given the sensitivity of some of our survey questions, it is possible that some women were reluctant to provide accurate data due to concerns about divulging such personal information.

CONCLUSION

Screening overuse and underuse were both found to be common among female hospital staff. An accurate information regarding screening indication should be provided and indication restriction should be implemented to a health system to avoid screening overuse. For women having screening indication, interventions such as a risk or indication assessment checklist should be implemented to enhance adherence to cervical cancer screening recommendation. HPV self-sampling for cervical cancer screening is a private and attractive screening technique that needs to be approved for use to improve a screening coverage.

Statements and declarations

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Conflict of interest statement

All authors declare no conflicts of interest.

Authors' contributions

Phaitoon Laowjan: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – review and editing, Supervision, Project administration; Kla Maichonklang: Methodology, Investigation, Resources; Pronnapa Permpool: Methodology, Investigation, Resources; Pattarawalai Talungchit: Conceptualization, Methodology, Formal analysis, Writing – review and editing, Supervision; Nida Jareemit: Conceptualization, Methodology, Formal analysis, Visualization, Writing – original draft, Writing – review and editing

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