SYSTEMATIC REVIEW

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Barriers and facilitators of pap-smear test uptake in Asia: a systematic review



Aisa Maleki¹, Bahman Ahadinezhad², Ahad Alizadeh² and Omid Khosravizadeh^{2*}

Abstract

Background In addition to the establishment of screening procedures, it is important to identify the barriers and facilitators for promoting preventive behavior. Many studies have been conducted in the field of investigating the factors affecting Pap smear test uptake and the barriers related to it. However, a systematic approach is still needed. Therefore, this present study was conducted with the aim of systematically reviewing the barriers and facilitators of Pap smear test uptake in Asia.

Methods To collect the data, searches were performed in PubMed, WOS, ProQuest, Scopus and Cochrane databases from January 1, 2018 to January 15, 2025. Two people separately and independently evaluated the quality of the studies by Newcastle-Ottawa Scale. To conceptualize influential factors, barriers and facilitators of Pap-smear test uptake among Asian women, a theoretical thematic analysis was applied.

Results A search yielded 4057 records, of which 44 documents discussing the determinants, barriers, and facilitators of Pap smear uptake were included in the review. There were economic, social, awareness, test and provider characteristics, and lifestyle and health behaviors dimensions in both categories of barriers and facilitators. In addition, two religious and psychological dimensions were included in the barriers category. In total, 55 components representing barriers and 51 components representing facilitators were identified.

Conclusion To improve Pap smear uptake, implement financial assistance and comprehensive insurance coverage. Enhance community engagement through outreach and support groups, provide counseling, and create positive messaging. Increase accessibility with mobile clinics, flexible hours, and train providers. Promote health education and offer incentives to motivate women to participate in screenings.

Keywords Pap-smear test, Cervical cancer screening, Barriers, Facilitators, Systematic review

Introduction

Cervical cancer is the second most common cancer in the world and is the second cause of death among women [1]. Countries with a low Human Development Index

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(HDI) have the highest incidence and mortality rates of cervical cancer [2]. Five-year survival of this type of cancer in countries with low HDI is about 40% lower than in countries with high HDI [3]. Nearly 85% of deaths due to this type of cancer are imposed on low- and middle-income countries, and these countries endure the greatest burden [4–6].

Six hundred sixty-two thousand three hundred one new cases and 348,874 deaths from cervical cancer were documented globally in 2022 [7]. Recent estimates indicate that cervical cancer will likely cause 600,000 new cases and 300,000 deaths yearly [4]. It's predicted that new cases arise to 908,612 up to 2045 [7, 8]. Asia, the



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most populous continent (2,273,786,930), had the highest number of new cases in 2022 (397,082) and predictions for 2045 (543,703) [8]. Globocan stated in 2020 that the number of new cases of cervical cancer in countries with very high HDI was 98,675, with high HDI 240,400, with medium HDI 182,866, and with low HDI 81,922 [9]. According to this report, deaths from this cancer in countries with very high HDI was 42,920, with high HDI 129,444, with moderate HDI 113,149, and with low HDI 56,167 [9].

This cancer is often preventable [5]. The five-year survival rate of this cancer in case of early diagnosis is about 70% higher than late diagnosis or metastasis [10]. Vaccination against HPV and secondary preventive measures (types of screening) are preventive ways to deal with this type of cancer [1, 10].

According to the statements of the World Health Organization, a non-communicable disease control program should be implemented by relying on a surveillance and monitoring system that includes reliable and quality population data [1]. In the last 50 years, the incidence and death caused by this type of cancer have decreased in all countries that have a composed screening program and have implemented it effectively [11].

In 1970, the traditional screening method for this type of cancer (Cytology test or Pap-smear test) was proposed and recommended for the first time [12]. For individuals aged 23 to 50 years, this test should be conducted every three years, while for those aged 51 to 60 years, it should be performed every five years [13]. Many experimental studies have confirmed the effectiveness of the Pap smear test in reducing the incidence and death of cervical cancer [12]. In the last 50 years, the regular program of Pap smear tests has decreased the incidence and death of this cancer to one-fifth [14]. Regular, timely, and high-quality screening in countries with high HDI has made this program successful [5]. At the same time, screening depends on factors such as socioeconomic level, education level, place of residence, race, sexual orientation, and insurance [15]. These factors may appear as barriers or incentives to Pap smear test uptake.

The World Health Organization has identified the cervical cancer prevention program as a key priority. On the other hand, in addition to the establishment of screening procedures, it is important to identify the barriers and facilitators for promoting preventive behavior. By identifying and removing barriers and facilitating screening, people can be led to prevent the incidence or deterioration of cancer. Many studies have been conducted in the field of investigating the factors affecting Pap smear test uptake and the barriers related to it. However, there is a need for a more rigorous search to cover gaps in previous studies and provide more comprehensive and up-to-date results. Therefore, this present study was conducted with the aim of systematically reviewing the barriers and facilitators of Pap smear test uptake in Asia. The specific study of Asia is important because it accounts for about 60% of the world's population and more than 50% of new cases of cervical cancer. Focusing on Asia for a systematic review of barriers and facilitators of pap-smear test uptake is crucial due to diverse cultural norms, varying healthcare systems, and significant cervical cancer rates in the region. Economic disparities and differences in health education impact screening access and awareness. Understanding region-specific challenges can inform targeted interventions and improve preventive healthcare outcomes for women across diverse Asian contexts.

Materials and methods

Search strategy

This research was accomplished based on PRISMA guidelines [16]. Searches were performed in PubMed, WOS, ProQuest, Scopus and Cochrane databases. The keywords used in the search are: Pap smear, Pap test, Papanicolaou test, Papanicolaou smear, Vaginal smear, Cervical cancer, Cervix cancer, Cervical cancer screening, Cervix cancer screening, Cervical cancer, Cervix cancer, Determin*, Factor, Barrier, obstacle, Facilitator. Sample search strategies according to databases are presented in Table 1.

Eligibility criteria

We included studies that fulfilled the following eligibility criteria: 1) studies of all design types, 2) investigations of determinants, factors, barriers, obstacles, and facilitators affecting pap-smear test uptake among Asian women, 3) written in English, and 4) published between 2018 and 2025. Additionally, we excluded narratives and qualitative investigations.

Study selection

Two researchers independently compared each of the obtained documents with respect to the objective of the current study as well as the inclusion and exclusion criteria. Studies that were not related to the objective and did not meet the entry conditions were removed. Any disagreement between the two researchers regarding the evaluation of the documents was resolved by a third researcher.

Data extraction

From the reviewed studies, information such as the name of the first author, year of publication, country of study, study design, study population, and key results about determinants, factors, barriers, obstacles and facilitators

Table 1 Search strategies

Data base	Search strategy	#
PubMed	("pap smear"[Title/Abstract] OR"Pap test"[Title/Abstract] OR"Papanicolaou test"[Title/Abstract] OR"Papanicolaou smear"[Title/ Abstract] OR"Vaginal smear"[Title/Abstract] OR"Cervical cancer screening"[Title/Abstract] OR"Cervix cancer screening"[Title/ Abstract]) AND (Determinant[Title/Abstract] OR Factor[Title/Abstract] OR Barrier[Title/Abstract] OR obstacle [Title/Abstract] OR Facilitator[Title/Abstract]) Filters: 2018–2025	1975
Scopus	(TITLE-ABS-KEY ("pap smear"OR"pap test"OR"papanicolaou test"OR"papanicolaou smear"OR"vaginal smear"OR"cervical can- cer screening"OR"cervix cancer screening") AND TITLE-ABS-KEY (Determinant OR Factor OR Barrier OR obstacle OR Facilitator)) AND PUBYEAR > 2017	741
Cochrane	"pap smear"OR"Pap test"OR"Papanicolaou test"OR"Papanicolaou smear"OR"Vaginal smear"OR"Cervical cancer screening"OR"Cervix cancer screening"in Title Abstract Keyword AND Determinant OR Factor OR Barrier OR obstacle OR Facilitator in Title Abstract Keyword—with Publication Year from 2018 to 2025, with Cochrane Library publication date Between Jan 2018 and January 2025, in Trials (Word variations have been searched)	25
WOS	(TI = (("pap smear"OR"Pap test"OR"Papanicolaou test"OR"Papanicolaou smear"OR"Vaginal smear"OR"Cervical cancer screening") AND (Determinant OR Factor OR Barrier OR obstacle OR Facilitator)) OR AB = (("pap smear"OR"Pap test"OR"Papanicolaou test"OR"Papanicolaou smear"OR"Vaginal smear"OR"Cervical cancer screening") AND (Determinant OR Factor OR Barrier OR obstacle OR Facilitator)) OR AB = (("pap smear"OR"Pap test"OR"Papanicolaou test"OR"Papanicolaou smear"OR"Vaginal smear"OR"Cervical cancer screening") AND (Determinant OR Factor OR Barrier OR obstacle OR Facilitator)) Document Types: Article or Proceeding Paper Languages: English Timespan: 2018–01-01 to 2025–01–15 (Publication Date)	266
ProQuest	noft("pap smear"OR"Pap test"OR"Papanicolaou test"OR"Papanicolaou smear"OR"Vaginal smear"OR"Cervical cancer screening"OR"Cervix cancer screening") AND noft(Determinant OR Factor OR Barrier OR obstacle OR Facilitator) Additional limits— Date: From January 01 2018 to January 15 2025	320

of Pap-smears test uptake among Asian women have been extracted in the form of an Excel checklist.

Literature quality assessment

Two people separately and independently evaluated the quality of the studies. In this way, all the sections of individual study were scored based on the descriptive study checklist of Newcastle-Ottawa Scale, and at the end, the studies that had a score lower than the acceptable threshold have been excluded. The Newcastle-Ottawa Scale (NOS) is utilized to assess the quality of non-randomized studies, particularly cohort and case-control studies, based on three main criteria: selection of study groups, comparability of groups, and outcome assessment. The NOS scores range from 0 to 9 points, with a score of 7 or higher generally considered indicative of good quality. Scores below 7 suggest potential issues with study quality that may affect the reliability of the findings. Typically, a score of 7 to 9 points indicates high quality, 4 to 6 points signifies moderate quality, and 0 to 3 points reflects low quality.

Data analysis process

To conceptualize influential factors, barriers and facilitators of Pap-smear test uptake among Asian women, a theoretical thematic analysis was applied. Thematic analysis is a method of qualitative analysis that identifies the semantic pattern or themes in a qualitative data set [12]. First, researchers familiarized themselves with the data by reading and re-reading it to immerse themselves in the content and note initial observations. Next, they generated initial codes by systematically identifying and coding interesting features of the data using manual methods. Following this, they searched for themes by grouping codes into potential themes based on patterns and relationships. Researchers then reviewed these themes, refining them by checking their accuracy against the dataset to ensure they were distinct and representative. After defining and naming each theme and detailing their significance, they wrote a report that integrated the themes into a coherent narrative, supporting each with evidence from the data, including quotes and examples. To enhance validity and reliability, the three researchers collaboratively reviewed the findings, incorporating feedback to adjust themes or interpretations as necessary. Finally, they prepared the final report, ensuring clarity and coherence while highlighting implications and recommendations based on their findings. Consequently, themes relating to conceptualizations were generated by systematically coding all included articles. After the initial coding, the articles and their associated quotes were reviewed to ensure their adequacy and consistency. In the process of this analysis, three researchers formulated the factors, determinants, barriers and facilitators extracted from the studies separately; the prepared themes were then compared and any disagreements were resolved by reaching consensus.

Ethical approval

This study is a master's thesis that has been done by obtaining the necessary licenses from Qazvin University of Medical Sciences, the Vice Chancellor for Health of Qazvin University of Medical Sciences and Qazvin Health Center (ethics code IR.QUMS. REC.1402.002).

PROSPERO

This systematic review was registered in PROSPERO (ID: CRD42023414592).

Results

Four thousand fifty-seven records were obtained through a search. 1083 records were duplicates and dismissed. The title and abstract of 2974 papers were matched with inclusion and exclusion criteria and incompatibles were removed. The papers that conducted in countries in other continents and different had aims from present study was removed based on title and abstract. 867 lessquality full texts were removed. Finally, 44 documents on the determinants, barriers, and facilitators of Pap-smear uptake were entered into the study and its characteristics reported in Table 2 (Fig. 1).

Table 3 highlights barriers to pap smear test uptake in the form 7 dimensions of economic (10 components), social (11 components), awareness (9 components), belief (5 components), psychological (3 components), related to the test and provider (13 components) and life style and health behaviors (4 components). Economic factors such as the high cost of tests, transportation expenses, and low income create significant barriers, making it difficult for women to prioritize screenings. Social factors like low literacy levels, traditional gender roles, and lack of support from family and friends contribute to a culture where women may feel discouraged from seeking preventive care. Additionally, social stigmas surrounding cancer and the testing process can further inhibit participation. Beliefs such as religious views, superstitions, and a fatalistic attitude toward cancer can deter women from pursuing necessary medical interventions. Awareness is also crucial; a lack of knowledge about cervical cancer and the importance of pap smears can lead to underestimating personal risk and the necessity of screenings. Psychological factors like embarrassment, fear, and anxiety about the testing process can prevent women from attending appointments. Finally, logistical issues, such as lack of access to healthcare facilities and busy lifestyles, further complicate efforts to increase screening rates. Together, these factors create a complex barrier to papsmear uptake.

Table 4 outlines facilitators of pap smear test uptake in the form of 5 dimensions of economic (10 components), social (11 components), awareness (11 components), related to the test and provider (17 components), and lifestyle and health behaviors (2 components). Economic factors such as free testing, high income, and insurance coverage can remove financial barriers, encouraging women to seek screenings. Additionally, women's financial independence and access to subsidies enhance their ability to prioritize health. Social factors play a critical role as well, with high literacy levels and strong family and community support fostering an environment that promotes health-seeking behavior. Women's empowerment and positive community recommendations can further motivate individuals to undergo screenings. Awareness is another vital dimension; knowledge about cervical cancer and the importance of pap smears can drive women to act. Understanding the benefits of early detection and the safety of the test is crucial for encouraging participation. Moreover, factors related to the test and provider, such as trust in healthcare providers, confidence in hygiene, and the availability of female providers, can alleviate fears and enhance comfort during the testing process. Finally, lifestyle and health behaviors, including regular health check-ups and a proactive approach to health, are essential for fostering a culture of preventive care. Together, these dimensions create a comprehensive framework that can significantly impact pap-smear uptake among women.

Table 5 outlines various demographic factors and medical history determinants that significantly influence the uptake of pap-smear tests among women. Age plays a crucial role, as younger women may have lower awareness or perceived need for screenings, while older women are often more proactive due to increased health risks. The age at first sex and age of first pregnancy can also impact screening behavior, with earlier sexual activity potentially prompting earlier engagement in preventive measures. Additionally, the number of children a woman has may correlate with increased health awareness, as those with multiple children often have more frequent interactions with healthcare systems. Marital status or sexual activity can further influence access to healthcare, with married women being more likely to seek screenings. Nationality and ethnicity affect attitudes toward preventive care, while residence status highlights disparities in healthcare access, particularly between urban and rural areas. Medical history determinants, such as menstrual and menopausal status, can also shape screening behaviors, as women with regular cycles or those who are postmenopausal may be more attuned to their reproductive health. Factors like the number of sexual partners, contraceptive use, and history of sexually transmitted diseases may heighten awareness of the importance of regular screenings. Moreover, a history of IUD use, abortion, or cancer in family and friends can motivate individuals to prioritize preventive care. Lifestyle factors, including smoking and physical activity,

Tab	ile 2 Data ext	racted	from incluc	ded studies									
Ref	First Author	Year	Country	Urben/ Rural	Population (patient or provider perspective)	Study design	Sample size	Average age Mean	Average age SD	Instrument	Proportion of women ever screened (%)	Analysis	Region
[1]	Mukta Agarwal	2022	India	Urban	Highly Educated Women	Descriptive study	150	36.9	9.7	Questionnaire	1	Descriptive statistics Chi-square test	South Asia
[18]	Jyoshma Preema Dsouza	2020	India	Urban	women aged 30–59	A qualitative exploratory multi-centric cross-sec- tional study	45	I	I	Questionnaire & interview	I	Content analysis	South Asia
[19]	Yuvaraj Krishna- moorthy	2021	India	Urban & Rural	Women aged between 30 and 49 years	Descriptive- analytical cross-sec- tional study	336,777	I	I	Secondary data analysis of National Family Health Survey	I	Poisson regres- sion model	South Asia
[20]	Vasundhara Y. Kulkarni	2022	India	Urban & Rural	Mumbai police personnel	Cross-sec- tional study	3,017	34.92	7.64	Questionnaire, Standardized intensive training in the Depart- ment of Preventive Oncology Clinic	69.95	Univariable logistic regression analysis	South Asia
[21]	Selvam Mahalakshmi	2020	India	Urban	Womwn aged 32 to 58 years	Descriptive qualitative study	19	I	I	Interview	16.7	Manual descrip- tive thematic analysis	South Asia
[22]	Nilima Nilima	2022	India	Urban & Rural	Women in their reproductive ages, 15–49 years	A Gen- eralized Structural Equation Modeling Approach	699,686	25	I	Questionnaire & interview	21	Chi-squared test and rank- sum test, Path analysis,structural equation mod- eling	South Asia
[23]	Elahe Allah- yari	2022	Iran	Urban & Rural	female employ- ees of govern- mental agencies of Birjand	Descriptive- analytical cross-sec- tional study	1898	I	1	Questionnaire	I	Regression analy- sis & Artifificial Neural Network (ANNs)	West Asia

Tab	le 2 (continu	(pər											
Ref	First Author	Year	Country	Urben/ Rural	Population (patient or provider perspective)	Study design	Sample size	Average age Mean	Average age SD	Instrument	Proportion of women ever screened (%)	Analysis	Region
[24]	Towhid Babazadeh	2018	Iran	Urban	Housewife women in Islamabad	Cross-sec- tional study	280	38.9	6.21	Questionnaire	45.7	One-way ANOVA, independent t-test, Pearson correlation coefficient test, Logistic Regres- sion analysis	West Asia
[25]	Tayebeh Marashi	2021	Iran	Urban	Women, health staff, obstetricians, and gynecolo- gists, and the research site was Osh- navithe County in northwestern Iran	Qualitative study Focus group discussions Interviews	32	38.75	I	Interview	31.25	Qualitative con- tent analysis	West Asia
[26]	Rahimeh Momeni	2020	Iran	Urban	Women visit- ing the health centers	Cross- sectional, descriptive, analytical study	202	32.75	6.82	Questionnaire	14.8	Linear regression analysis, logistic regression, and multi- variate regression analysis	West Asia
[27]	Mansoureh Refaei	2018	Iran	Urban	Women referring to health centers	Qualitative study	31	I	I	Semi-struc- tured in-depth interviews & Questionnaire	I	Qualitative con- tent analysis	West Asia
[28]	Johanne Greibe Andersen	2020	Nepal	Urban	Womens	Qualitative study Focus group discussions In-depth interviews	48	36	1	Questionnaire	2.8	in-depth inter- views	South Asia

Tab	le 2 (continu	(pər											
Ref	First Author	Year	Country	Urben/ Rural	Population (patient or provider perspective)	Study design	Sample size	Average age Mean	Average age SD	Instrument	Proportion of women ever screened (%)	Analysis	Region
[29]	Elisabeth Darj	2019	Nepal	Rural	women were in the age range 25–60 years. Most of them were farmers' wives and worked in households and in the fields	Qualitative study Focuds group discussions In-depth interviews	7871	1	1	Questionnaire	1	Qualitative manifest content analysis	South Asia
[30]	Bijaya Ghimire	2020	Nepal	Urban	Women Attend- ing Tertiary Level Hospital	Descriptive- analytical cross-sec- tional study	220	34.38	4.0	Semi structured interview questionnaire	38.6	Descriptive statistics, chi- square, odds ratio, and binary logis- tic regression	South Asia
[31]	Heera KC	2022	Nepal	Rural	30–60 years married women in Biratnagar, Morang	Cross-sec- tional study	280	40.2	9.16	Face to face interview using a semi structured questionnaire	30	statistical package for the social science	South Asia
[32]	Nepal J	2022	Nepal	Urban	Women of age 30–60 years in Bhaktapur	Cross-sec- tional study	360	40	1	Interview	32.2	Descriptive analy- sis, Principal Com- ponent Analysis, Chi square test, Logistic regres- sion analysis	South Asia
[33]	Niresh Thapa	2018	Nepal	Rural	Women living in mid-western rural	A hospital- based cross- sectional study	360	30.13	10.4	Interview using a structured questionnaire	13.6	Descriptive statistics, Binary logistic regression analysis, <u>X</u> 2 test	South Asia
[34]	Sumadi L. Anwar	2018	Indonesia	Urban & Rural	women aged 40 and older with- out any history of cancer	Descriptive- analytical cross-sec- tional study	5397	52.9	I	Questionnaire	I	Multilevel model- ling	Southeast Asia
[35]	Sumarmi Sumarmi	2021	Indonesia	Rural	Married women	A descrip- tive cross- sectional study	687	42	8.	Questionnaire	19	Independent t-tests, simple logistic regres- sions, and a hier- archical logistic regression	Southeast Asia

Tab	le 2 (continu	(pər											
Ref	First Author	Year	Country	Urben/ Rural	Population (patient or provider perspective)	Study design	Sample size	Average age Mean	Average age SD	Instrument	Proportion of women ever screened (%)	Analysis	Region
36	Chin SS, Jamonek NA	2022	Malaysia	Urban	Women visiting outpatient clinics	Cross-sec- tional study	452	37.7	11.5	Questionnaire	48.5	Logistic regres- sion analysis	Southeast Asia
[37]	Yunus NA	2018	Malaysia	Urban	Women aged 20 to 65 years	Cross-sec- tional study	316	I	I	Questionnaire	41.8	Descriptive statis- tics and multiple logistic regression	Southeast Asia
[38]	Seyhan Cankaya	2020	Turkey	Urban	all \geq 18 year-old women who were mar- ried or living with a partner and presented to the selected health center	Descrip- tive study & Cross- sectional study	294	39.9	10.3	Questionnaire	47.6	Independent samples t-tests, descriptive statistical values, Chi-square test	West Asia
[39]	Raziye Özdemir	2020	Turkey	Urban	Women in Safran- bolu District of Karabuk aged 30–65	Cross-sec- tional study	374	I	I	Face-to-face interview using ques- tionnaires	26.2	chi-squared test, binary logistic regression model	West Asia
[40]	Duygu Ürek	2022	Turkey	Urban	Women aged 25 and over	Cross-sec- tional study	8606	I	I	Face-to-face interview	35.4	Chi-square test	West Asia
[41]	Huinan Han	2022	China	Rural	Women under 35 Years	Cross-sec- tional study	1,949	I	I	Questionnaire	I	Binary logistic regression analy- sis, Chi-square test, Sensitivity analyses	Southeast Asia
[42]	Wei Lin	2022	China	Urban & Rural	Women aged 20 to 65 years	Cross-sec- tional study	3,651	40.65	I	Questionnaire	63.9	Descriptive analysis, logistic regression analy	Southeast Asia
[43]	Huan Yang	2019	China	Rural	Women in east- ern China	A qualitative study	21	48.7	6.4	Semi-struc- tured in-depth interviews	52.4	Transcribed ver- batim and sub- jected to the- matic analysis	Southeast Asia
[44]	Shilpa Suren- dran	2023	Singapore	Urban	Womwn aged 25–69 years	Qualitative study	40	54.5	I	Semi- structured interviews	I	A qualitative data analysis	Southeast Asia

Tabl	e 2 (continu	led)											
Ref	First Author	Year	Country	Urben/ Rural	Population (patient or provider perspective)	Study design	Sample size	Average age Mean	Average age SD	Instrument	Proportion of women ever screened (%)	Analysis	Region
[45]	Celestine Yeo Mun Ting	2018	Singapore	Urban	Postnatal women of at least 21 years old	A descrip- tive cross- sectional study	268	1	1	Questionnaire	1	Logistic regres- sion	Southeast Asia
[46]	Zhengai Cui	2022	Japan	Urban & Rural	Japanese Women in Their 20 s and 30 s	Cross-sec- tional study	3249	30.85	I	Internet survey & Ques- tionnaire	39.3	A factor analysis, Cronbach's alpha coefficient, logistic regression analysis	East Asia
[47]	Noriyo Kaneko	2018	Japan	Urban	young unmar- ried Japanese women	Internet- based survey	700	26	I	Internet-based survey	I	Univariate analy- sis, the Pearson's chi-squared test, Mann–Whitney U test	East Asia
[48]	Misato Kaso	2019	Japan	Urban & Rural	women of chil- drearing age	Cross-sec- tional study	49,217	30.8	I	Questionnaire	39.7	Descriptive sta- tistics, univariable logistic regression analysis	East Asia
[49]	Suzanne Q. Al-amro	2020	Jordan	Urban	Married Jorda- nian women aged 21 to 65 years	Cross-sec- tional study	500	38.64	9.39	Questionnaire	31.2	Descriptive and inferential analyses	West Asia
[20]	Nasar Alwa- haibi	2018	Oman	Urban	patients who attended Outpa- tient Gynecology Department, female medical staff and uni- versity graduate students	Cross-sec- tional study	494	I	I	Questionnaire & interview	I	Bivariate analyses & descriptive statistics	West Asia
[51]	Wafaa T. Elgzar	2022	Saudi Arabia	Urban & Rural	Women aged 20 to 60 years	Cross-sec- tional study	1085	37.79	I	Questionnaire	I	Descriptive statistics & Ordinal logistic regression	West Asia
[52]	Samina Hirani	2020	Pakistan	Urban	Women aged 15 to 50	Cross-sec- tional study	384	30	7.8	Face to face interviews, Questionnaire	I	Qualitative analysis	South Asia
[23]	Sophaphan Intahphuak	2021	Thailand	Rural	Lahu hill tribe women	Quantitative cross-sec- tional study	650	42.28	I	Interview	I	Descriptive sta- tistics, Chi-square test	Southeast Asia

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Analysis	Descriptive statistics, chi- square test or Fisher's exact test, univariate and multivariable logistic regression models, crude odds ratio (COR) and adjusted	Transcribed texts were translated by a person having workable knowledge	Conditional logis- tic regression	Descriptive statis- tics, conventional content analysis	Path analysis	Content analysis
Proportion of women ever screened (%)	1	I	I	1	I	66.7
Instrument	Questionnaire	An interview guide	Interview	Focus group interviews	A self-adminis- tered survey	semis- tructured in- depth interviews
Average age SD	10	I	9.4	1.26	I	7.6
Average age Mean	36.5	I	42.37	21.92	37.79	42.8
Sample size	1,189	49	360	26	776	36
Study design	Cross- sectional survey- based study	qualitative study Focus group discussions linterviews	A case-con- trol study	Mixed- methods design, a quantita- tive online, Qualitative method	A cross- sectional, exploratory correlational study	A qualita- tive content analysis
Population (patient or provider perspective)	women attend- ing gynaecologi- cal clinics	Tribal Women in Tea Gardens of Darjeeling aged 30–59 years	Women aged 25–60 years in Lao People's Democratic Republic	Female university students aged 20–29 years	South Asian women	married women aged 18–70
Urben/ Rural	Urban & Rural	Rural	Urban	Urban	Urban & Rural	Urban
Country	Kazakhstan	India	Lao	Korea	China	Iran
Year	2021	2022	2022	2021	2019	2024
First Author	Torgyn Issa	Shashi Kala	Jom Phaiphi- chit	Hye Young Shin	Dorothy N.S. Chan	Mansoore Shariati- Sarcheshme
Ref	[54]	[55]	[56]	[57]	[58]	[59]

Table 2 (continued)



Fig. 1 The PISMA 2020 flow diagram of the literature search

further contribute to health awareness, with smokers being more likely to seek screenings due to the increased risk of cervical cancer. Understanding how these factors influence pap-smear uptake is essential for developing targeted interventions that enhance awareness and accessibility, ultimately leading to better cervical cancer prevention outcomes among women in various populations.

Discussion

This study included a systematic review of the barriers, facilitators, and factors affecting Pap smear test uptake. A total of 18 countries were examined. 15 studies from South Asia, 12 studies from West Asia, 11 studies from

Southeast Asia, 4 studies from East Asia and one study from Central Asia were reviewed.

There were economic, social, awareness, test and provider characteristics, and lifestyle and health behaviors dimensions in both categories of barriers and facilitators. In addition, two religious and psychological dimensions were included in the barriers category. A total of 55 barrier components and 51 facilitator components were identified. In addition, demographic factors and medical history determinants that had a variable effect on the test uptake were also counted.

Table 3 Barriers to pap smear test uptake

Dimensions	Components
Economic	 Expensive pap smear test Transportation costs Low monthly income High monthly expenses Unemployment Lack of financial independence Lack of insurance Non-coverage of the test by insurance Low wealth index Absence or shortage of government providers
Social	 Low literacy level Gender roles and duties of women (motherhood, housekeeping, job, etc.) Lack of individual independence Low Women's Empowerment Index (WEI) Lack of family support Lack of support from friends Spouse's dissatisfaction or lack of support Social stigma of cancer Social stigma of doing the test Negative recommendations of the community regarding the test Fear of rejection
Belief	1. Religion 2. Superstitious beliefs 3. Thinking that cancer is destiny 4. Lack of belief in clinical medicine and avoiding it 5. Belief in immunity against diseases
Awareness	 A person's or spouse's lack of awareness of cervical cancer A person's or spouse's lack of awareness of the use and necessity of the Pap smear test Insufficient knowledge in the field of cervical cancer and screening Lack of knowledge about sexually transmitted diseases Lack of awareness of the symptoms and complications of cancer Underestimating your vulnerability to cancer Underestimating the consequences of cancer Thinking that cervical cancer is incurable Thinking that the cancer treatment process is so long
Psychological	1. Embarrassment 2. Fear and anxiety about the test process and result 3. Negligence
Related to the test and provider	 Fear and lack of interest in the process of the test Considering the test as a time-consuming process Male provider Fear of pain Fear of hygiene of the test Absence of symptoms and the feeling of not needing a test Lack of trust in the health system Lack of confidence in the effectiveness of the Pap smear test Lack of trust in the skill of doctors and staff Lack of trust in private providers Inappropriate behavior of personnel Unpleasant experience of yourself or others from previous tests Lack of access to health centers or long distances
Life style and health behaviors	1. Neglect of health 2. Few visits to health centers 3. Co-morbidities 4. Being busy

Economic dimension

Screening cost is a determining factor in the pap smear test uptake [47, 60]. Therefore, income and employment are influential in the pap smear test uptake [61]. Worrying about the costs of cancer testing and

treatment if the result is positive makes women not prioritize screening [43, 61, 62]. Therefore, the implementation of cost-effective programs should be on the agenda. Budget allocation, creation of national cancer screening programs, insurance coverage, allocation

Table 4 Facilitators of pap smear test uptake

Dimensions Economic

Social

ake	
	Components
	 Free pap smear test High monthly income Employment Women's financial independence Having insurance Test coverage by insurance High wealth index State provider adequacy Allocation of subsidy to screening National and universal test coverage
	 High level of literacy Gender roles and duties of women (motherhood, housekeeping, job, etc.) Individual independence High Women's Empowerment Index (WEI) Family support Support of friends

	 6. Support of friends 7. Spouse support 8. Positive recommendations from the community regarding the test 9. Adherence of the person and those around her to regular examinations and screenings 10. Awareness campaigns and promotion of screening 11. Using the media to promote the test's acceptance
Awareness	 AA person's or spouse's awareness of cervical cancer A person's or spouse's awareness of the use and necessity of the Pap smear test Sufficient knowledge in the field of cervical cancer and screening Awareness of sexually transmitted diseases Knowledge of the symptoms and complications of cancer Appropriate assessment of your vulnerability to cancer Appropriate assessment of the consequences of cancer Knowing that the test does not harm the health of the women Awareness of early cancer diagnosis through testing Awareness of the benefits of early cancer detection Using the media to increase awareness and information
Related to the test and provider	 Speed up the testing process Female provider Confidence in the hygiene of the test Trust in the health system Confidence in the effectiveness of the Pap smear test Trust in the skill of the doctor and staff Trust in private providers Confidence in confidentiality Confidence in privacy during testing Appropriate behavior of personnel Pleasant experience of yourself or others from previous tests Easy access to health centers Providing the possibility of online appointment Sending test reminders to qualified people Changing health policies toward screening and treatment Using tools that facilitate screening
Life style and health behaviors	1. Sufficient attention to health 2. Timely and regular visits to health centers

of government subsidies for screening, and appropriate use of the capacity of the private sector have a significant effect in persuading women and facilitating screening [27, 49]. In sum up, Financial constraints, such as the direct cost of screening, often deter women, especially those from low-income groups or without health insurance. Limited access to affordable healthcare facilities in rural or underserved areas further compounds the issue, along with opportunity costs like taking time off work or managing transportation expenses. However, initiatives like subsidized programs or free Pap smear campaigns by governments and NGOs can effectively address these challenges. Health insurance coverage that includes cervical cancer

Table 5 Demographic factors and medical history determinants affecting Pap smear test uptake

Demographic factors and medical history determinants

Age
Age at first sex
Age of first pregnancy
Number of children
Marital status or sexual activity
Nationality/ethnicity
Residence status
Menstrual status
Menopausal status
Number of sexual partners
Use of contraceptives
History of sexually transmitted diseases
History of IUD use
History of abortion
History of cancer in family or friends
Smoking
Physical activity

screening also encourages higher participation rates. Moreover, community-driven solutions, such as providing transportation vouchers or childcare support, help mitigate economic barriers, making it easier for women to access this crucial preventive healthcare service [59, 63, 64].

Social dimension

High health literacy and self-efficacy lead women to increase their knowledge in the field of cancer and participate more in screening [61, 65]. Lack of husband's consent and lack of support from the family causes women's willingness to take the test to decrease [66, 67]. Meanwhile, the encouragement of the husband and the support of friends and family had a significant effect on increasing the Pap smear test uptake [61]. Men's support in low- and middle-income countries has a greater impact on women's participation in screening [28, 65, 68]. By mobilizing volunteers to promote women's health, as well as employing health workers, we can take steps to empower women and facilitate testing [65]. Cultural norms and societal attitudes toward women's health can discourage women from seeking screening due to stigma or fear of judgment [63]. Similarly, a lack of awareness or misinformation about cervical cancer and the importance of Pap smears can limit participation, particularly in communities with low health literacy. On the other hand, social support from family, peers, or community networks can encourage women to prioritize their health and undergo screening [63]. Educational campaigns and advocacy by trusted figures, such as healthcare providers or community leaders, also help dispel myths and foster a positive attitude toward preventive healthcare. By addressing social barriers and leveraging supportive networks, Pap smear uptake can be significantly improved [69].

Awareness dimension

Studies show that knowledge about cervical cancer and screening in developing countries is insufficient [61, 70-72]. Meanwhile, awareness of cancer, prevention, and early diagnosis is very decisive [43]. At the same time, some women are not aware of their cancer risk [61]. Some think cancer is a fatal and incurable disease and consider screening useless [43, 47, 66, 72]. Therefore, a continuous awareness program and educational interventions are necessary [65]. A lack of knowledge about cervical cancer and the importance of early detection often prevents women from seeking screening, particularly in communities with low health literacy [63, 64]. Misconceptions and fears surrounding the procedure, such as concerns about pain or embarrassment, further discourage participation [59]. Conversely, educational initiatives and awareness campaigns can significantly enhance understanding and acceptance of Pap smear tests. When women are informed about the benefits of early detection and the simplicity of the procedure, they are more likely to undergo screening [63]. Additionally, healthcare providers who actively educate and encourage their patients can serve as powerful facilitators [59]. Addressing these awareness-related barriers through targeted education and outreach can lead to improved screening rates and better health outcomes.

Test and provider related dimension

In many conservative societies, traditional gender roles dictate that women may feel uncomfortable discussing reproductive health with male healthcare providers, leading to reluctance in seeking necessary screenings. This discomfort is often compounded by social stigma surrounding cervical cancer, which can be viewed as a taboo topic, resulting in shame or fear of judgment from the community. Asian women usually go for a Pap smear test when cancer symptoms appear [43, 61, 73]. Some believe that this test damages the uterus, it is painful and it is not effective [72]. The Pap smear test process is uncomfortable for most women, especially if the provider is male [61]. The lack of female providers, the long distance to health centers, and the overcrowding of health centers reduce screening participation [61, 74]. Testing in rural areas is less than in cities, which can be due to a lack of access [65]. On the other hand, positive and negative experiences in the process and results of previous tests also play a significant role in seeking screening [61, 66]. The solutions that can be used to facilitate this aspect include: using female health personnel, providing advice before screening by health workers, sending reminders to perform the test and screening at work or place of residence [63, 65]. The availability of well-trained and empathetic healthcare providers who can create a comfortable and supportive environment for patients. The use of advanced, less invasive screening technologies also helps to alleviate fears and improve participation. Furthermore, clear communication from providers about the importance of Pap smears and the procedure itself can build trust and encourage women to undergo screening. Addressing these factors through provider training and patient-centered care can significantly enhance Pap smear uptake [63, 75].

Lifestyle and health behavior dimension

Lifestyle and the amount of busyness due to work or having a child have a significant effect on pap smear test uptake [43, 66]. So that many women avoid the test because it is time-consuming [48]. Women who are of reproductive age or have children are less inclined to visit a doctor [48]. On the other hand, people who have more than one sexual partner or who have received the HPV vaccine are more likely to adhere to regular testing [61]. Lifestyle and health behavior factors play a significant role in influencing the uptake of Pap smear tests, acting as both barriers and facilitators. Unhealthy lifestyle choices, such as smoking and poor diet, are often associated with a lower likelihood of participating in preventive health measures, including cervical cancer screening. Additionally, women who do not prioritize regular health check-ups or lack a proactive approach to their health may be less inclined to undergo Pap smear tests. On the other hand, adopting a health-conscious lifestyle, including regular medical visits and preventive care, facilitates higher screening rates. Women who engage in healthpromoting behaviors, such as maintaining a balanced diet, exercising, and avoiding risky habits, are more likely to recognize the importance of early detection and participate in screening programs. Educational interventions that promote healthy behaviors and emphasize the benefits of preventive care can further enhance Pap smear uptake [75–77].

Belief dimension

Beliefs have a major impact on determining people's behavior [61]. Beliefs related to health, illness, spirituality, and religion have an impact on people's health decisions [61]. Some people consider themselves immune from cancer due to reasons such as a lack of history of cancer in the family, hygiene, lifestyle, and young age [61, 62, 74]. Sexual taboos about sexually transmitted diseases and genital organs have caused some women not to talk about it even with their husbands [61, 63, 78]. On the other hand, some people, especially the elderly, consider cancer to be a divine test or punishment, which causes them not to undergo screening [61]. The promotion of self-sampling methods may improve participation in screening, especially in rural areas [65, 79]. Negative beliefs, such as the perception that Pap smears are unnecessary without symptoms or the fear that the test might lead to a cancer diagnosis, can deter women from seeking screening. Cultural and religious beliefs may also contribute to hesitancy, particularly in communities where discussing reproductive health is considered taboo. Conversely, positive beliefs, such as understanding the importance of early detection and trusting the healthcare system, can encourage women to undergo screening. Educational interventions that address misconceptions and promote accurate information about the benefits of Pap smears are essential in shifting beliefs and improving participation rates [59, 64, 75].

Psychological dimension

Fear and anxiety are common psychological barriers, with many women worried about potential pain during the procedure or the possibility of a positive diagnosis. Feelings of embarrassment and vulnerability also deter participation, particularly when trust in healthcare providers is lacking. Additionally, previous negative healthcare experiences can create psychological resistance to screening. Shame is one of the most important barriers to Pap smear test uptake. Asian women consider this type of screening a violation of privacy and a cause for embarrassment and anxiety. Some also think that this test will have a negative effect on sexual relations and fertility. Also, fear of examination, fear of test results, and fear of cancer treatment are other psychological barriers.

On the other hand, a sense of empowerment and selfefficacy can serve as strong facilitators, encouraging women to take proactive steps for their health. Psychological support from family, friends, and healthcare professionals further reduces anxiety and fosters positive attitudes toward screening. Interventions such as counseling, patient education, and creating a welcoming clinical environment can address these psychological barriers and significantly enhance Pap smear uptake.

Limitations

In this systematic review several potential biases must be acknowledged. Firstly, publication bias may have influenced the findings, as studies with positive results are more likely to be published, potentially skewing the overall understanding of barriers and facilitators. Additionally, selection bias could arise from the inclusion criteria for studies, as those that are published may not represent the full spectrum of experiences or attitudes regarding pap-smear testing in diverse populations. Moreover, the reliance on self-reported data in many studies may introduce response bias, affecting the accuracy of the reported barriers and facilitators. Lastly, the heterogeneity of the included studies in terms of methodologies, sample sizes, and cultural contexts may limit the generalizability of the findings.

Conclusion

Barriers in the seven categories of economic, social, psychological, awareness, belief, test and provider, lifestyle, and health behavior prevent women from uptaking pap smear tests. On the other hand, there are five facilitator groups for screening, which include economic, social, awareness, test and provider, lifestyle, and health behavior. A combination of these factors, with a strong emphasis on awareness, beliefs, and provider-related aspects, appears to be most effective in influencing Pap smear uptake among Asian women [61, 64, 80].

Enhancing awareness through culturally tailored educational campaigns is essential to inform women about cervical cancer risks and the importance of early detection. Addressing psychological barriers, such as fear and misconceptions, can be achieved through counseling and sharing positive testimonials. Improving provider-related aspects is crucial; training healthcare providers in cultural sensitivity and ensuring the availability of female providers can make women feel more comfortable. Accessibility can be increased by offering mobile screening units, community-based clinics, and subsidized costs to make Pap smears more affordable. Social and cultural influences can also play a pivotal role; engaging community leaders and family members, as well as creating support groups, can encourage women to participate in screening programs. Lastly, promoting preventive health behaviors and integrating regular check-ups into community health initiatives or workplace wellness programs can further facilitate Pap smear uptake. By implementing these strategies, barriers can be reduced, leading to increased participation and better health outcomes.

Supplementary Information

The online version contains supplementary material available at https://doi. org/10.1186/s12889-025-22876-0.

Supplementary Material 1 Supplementary Material 2

Authors' contributions

OKh contributed to the concept and design of the study. BAh contributed to the analysis and interpretation of the data. AMa and AAI contributed to the critical revision of the article and the writing of the manuscript. All authors have read and approved the final manuscript.

Funding

This research didn't receive any funds.

Data availability

All data included in the systematic review are available in the main manuscript.

Declarations

Ethics approval and consent to participate

This study is a master's thesis that has been done by obtaining the necessary licenses from Qazvin University of Medical Sciences, the Vice Chancellor for Health of Qazvin University of Medical Sciences and Qazvin Health Center (ethics code IR.QUMS.REC.1402.002).

Consent for publication

Non-applicable.

Competing interests

The authors declare no competing interests.

Received: 23 September 2024 Accepted: 22 April 2025 Published online: 27 May 2025

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