Factors Influencing Uptake of Cervical Cancer Screening among Women in Wenzhou, China

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Abstract

This study aimed to examine the uptake of cervical cancer screening and to determine if knowledge of cervical cancer, perceived threat of cervical cancer, perceived benefits of cervical cancer screening, perceived barriers to cervical cancer screening, and self-efficacy about the uptake of cervical cancer screening could predict the uptake of cervical cancer screening among women in Wenzhou, China. A simple random sampling technique was used to recruit 240 individuals, who came to check up on their health at two Physical Examination Centers of one hospital in Wenzhou, China. Research instruments included the demographic data questionnaire, the Chinese version of the cervical cancer prevention knowledge questionnaire with the KR 20 of .76, the Chinese version of the cervical cancer screening belief scale including perceived threat, perceived benefit, perceived barrier, and the Chinese version of the cervical cancer screening self-efficacy scale, with Cronbach's alpha values of .86, .72, .91, and .96 respectively. Descriptive statistics and binary logistic regression were used to analyze the data.

Results revealed that 63.3% of the participants had been screened for cervical cancer. The logistic regression model including all five independent variables explained approximately 27.2% of the variance in cervical cancer screening (Nagelkerke R^2 = .272). Perceived barriers (Odds Ratio [OR] = 0.885, 95% Confidence Interval [CI]: 0.807-0.971, p <.05) and self-efficacy (OR = 1.060, 95% CI: 1.038-1.083, p < .001) were the strongest contributors to this prediction.

The results indicate that perceived barriers and self-efficacy are significant factors influencing the decision to undergo cervical cancer screening. These findings can be applied to develop strategies promoting cervical cancer screening among women in the future.

Key words: Cervical cancer screening, Health belief, Perceived barriers, Self-efficacy, China

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Introduction

Cervical cancer is a major public health problem. It is the fourth most common cancer that affects women worldwide and causing over 300,000 annual deaths (Emereonye, Areloegbe, Oladele, Akpor, & Olaniyi, 2025). In 2022, globally, it was estimated that there were 662,044 cases (age-standardized incidence rate [ASIR]: 14.12/100,000) and 348,709 deaths (age-standardized mortality rate [ASMR]: 7.08/100,000) from cervical cancer (Emereonye et al., 2025). Based on the stable changes in population growth and aging across the country, the estimated cases of cervical cancer are expected to increase by 56.8% from 2022 to 2050, and an additional 1 million cases are expected in 2050. Meanwhile, a total of 630,000 deaths are projected by 2050, an increase of 80.7% (Emereonye et al., 2025). This predicts an increase in the global burden of cervical cancer in the future. In China, during 2006 and 2016, the ASIR for women aged 15 to 84 years in China increased by 3.7% (95% CI: 0.031-0.043) annually, from 11.01 to 16.41 cases per 100,000 women. From 2017 to 2030, ASIR in China is expected to increase from 17.13 to 23.22, with an annual increase of 2.5% ($p < .05$), and ASMR was predicted to increase continuously from 4.8 to 9.1, with an annual increase of 5.0% ($p < .05$) (Yuan, Zhao, Wang, Hu, & Zhao, 2023). It suggests that China still faces a huge burden of cervical cancer.

Cervical cancer (CC) is a preventable disease, and it is curable if diagnosed in the early stage. However, the majority of women who having cervical cancer are diagnosed in advanced stages. Locally advanced cervical cancer accounts for a median of 37% of all cervical cancer cases globally, reaching approximately 90% in resource-limited and socioeconomically disadvantaged countries (Monk et al., 2022). Compared with early-stage cervical cancer, the cure rate of locally advanced cervical cancer was significantly lower, the 5-year disease-free survival rate was 68%, and the 5-year overall survival rate was 74%; in addition, prognostic factors for worse outcomes included higher disease stage and lymph node involvement (Pötter et al., 2021). The widespread introduction of cervical cancer screening programs can significantly reduce morbidity and increase early diagnosis. Research found that adding twice screening was predicted to reduce the incidence to 0.7 cases per 100,000 women-years (96.7% reduction) and averted an extra 12.1 million cases (Brisson et al., 2020). The introduction of two lifetime screenings could advance the time to elimination of CC by 11 to 31 years (Brisson et al., 2020). Therefore, it is very important to increase the screening rate of cervical cancer among women to reduce the incidence and mortality of cervical cancer.

Cervical cancer screening (CCS) is a test used to diagnose CC. Also, it can prevent occurrence of CC or early detect abnormal cells at the cervix (Liu et al., 2025). The World Health Organization [WHO] has proposed a global strategic goal for the elimination of cervical cancer by 2030, which is 70% of women screened with a high-performance test by 35 years of age and again by 45 years of age (World Health Organization [WHO], 2024).

The annual incidence of CC in China ranks second in the world, with 110,000 cases and 59,000 deaths (Sung et al., 2021). As the country with the largest population and highest burden of CC in the world, China must play an important role in achieving the global goal of eliminating cervical cancer.

The State Council issued the "Healthy China Action Plan (2019-2030)" which clearly stated that CCS coverage needs to reach 80% by 2030. A nationally and provincial-representative cross-sectional survey found that 36.8% of women aged 20 years and above received at least one CCS in 2023-2024 (Zhang et al., 2025). This is still a long way from the target of 80%. Some studies have found significant differences in cervical cancer screening coverage in different regions. Wenzhou is an important regional center city along the southeast coast of China. The data from 2023 and 2024 Zhejiang Cancer Registration Annual Report showed that the incidences of cervical cancer were 18.1/100,000 and 17.71/100,000. This is still far from the threshold recommended by the WHO for global elimination of CC of 4/100,000 per year (WHO, 2024). In Wenzhou, from 2022 to 2024, the number of women aged 35-64 years receiving cervical cancer screening were 150 000, 130 000 and 100 000, respectively (Client, 2023; Wenzhou Maternal and Child Health Hospital, 2024; Ye & Yang, 2025). The number of women undergoing CCS in Wenzhou is decreasing year by year. Therefore, it is very important to find out the influencing factors and improve the screening rate of CC.

The uptake of cervical cancer screening (UOCCS) refers to whether women have been screened for cervical cancer in their lifetime (Woldetsadik et al., 2020). UOCCS is a preventive health behavior. In addition to a variety of well-documented demographic, socioeconomic and cultural factors, the importance of psychosocial factors such as personal beliefs, perceptions and emotions should also be noted to influence UOCCS (Dsouza, Broucke, Pattanshetty, & Dhoore, 2022). These psychosocial factors are often more modifiable than sociodemographic or cultural determinants such as education, socioeconomic status, or cultural habits, making them potential targets for intervention (Dsouza et al., 2022).

To help identify psychological factors that influence screening acceptance, the health belief model (HBM) can be used to validate psychosocial concepts and their interactions to explain human health behaviors (Dsouza et al., 2022). According to the HBM, changing factors such as disease knowledge, perceived threat, perceived benefits, barriers, and self-efficacy may affect specific health behaviors (Champion & Skinner, 2008). Therefore, this study examined the factors including cervical cancer knowledge, perceived threat, perceived benefit, perceived barrier, and self-efficacy predict the uptake of cervical cancer screening (UOCCS) among women in Wenzhou, China. The results of this study should provide a reference for healthcare personnel to develop targeted cervical cancer screening interventions in Wenzhou, support and guide women to effectively participate in cervical cancer screening and improve screening rates.

Research objectives

1. To describe rate of uptake of cervical cancer screening among women in Wenzhou, China.
2. To examine factors including knowledge of cervical cancer, perceived threat of cervical cancer, perceived benefits, perceived barriers, and self-efficacy influencing uptake of cervical cancer screening among women in Wenzhou, China.

Research hypotheses

Knowledge of cervical cancer, perceived threat, perceived benefits, perceived barriers, and self-efficacy can predict the UOCCS among women in Wenzhou, China.

Conceptual Framework

This study was guided by the health belief model (HBM) (Champion & Skinner, 2008). The HBM is a widely used framework in health education and disease prevention, which assumes that if individuals have disease-specific knowledge, believe that they are at risk of developing a specific disease or condition, and the consequences of the disease are severe or life-threatening (perceived threat), they can perform specific behaviors to prevent the disease, and the benefits outweigh any barriers. Moreover, adding certain dimensions to the basic HBM model, such as perceived self-efficacy (i.e., belief in one's ability to perform the behavior) and cues to action (i.e., the triggers that prompt behavior), can better explain and promote preventive health behaviors (Morowatisharifabad, Momayyezi, & Ghaneian, 2012).

According to the HBM, women's likelihood of obtaining cervical cancer screening is influenced by several key psychological factors. When women perceive themselves as susceptible to cervical cancer and recognize its potentially serious consequences (such as pain or mortality), they develop a perceived threat of the disease. If they believe that available screening methods would effectively reduce their susceptibility or the severity of potential outcomes, and if they perceive that the benefits of screening outweigh the barriers or costs associated with the procedure, they become more likely to participate in screening activities. Additionally, self-efficacy—the confidence in one's ability to successfully obtain screening—plays a crucial role in facilitating the transition from intention to action. This comprehensive cognitive assessment process ultimately determines women's decisions regarding cervical cancer screening uptake.

Therefore, if women have knowledge of cervical cancer, perceive it as a threat, believe that the benefits of screening outweigh the barriers, and have a high self-efficacy regarding screening uptake, they would be more likely to participate in cervical cancer screening. The researcher hypothesized that these variables together might be predict screening uptake.

Methods

Research design

The descriptive predictive correlational study was used to examine factors including knowledge of cervical cancer, perceived threat of cervical cancer, perceived benefits, perceived barriers, self-efficacy influencing UOCCS among women in Wenzhou, China.

Population and sample

The study participants were women who attended the two physical examination centers of one hospital located in Wenzhou, China.

The samples were women who attended the two physical examination centers of a hospital in Wenzhou, China. The inclusion criteria were: 1) aged 25 years or older; 2) good orientation to place and time and had no history of mental illness; 3) ability to understand, read, write, and speak Chinese. The exclusion criteria were women with a history of gynecological cancer or those who had undergone total hysterectomy.

The sample size was estimated based on the number of independent variables, with 40 participants required for each independent variable (Mertler, Vannatta, & LaVenia, 2021). This study consisted of five independent variables; therefore, the minimum required sample size was 200. Accounting for a 20% dropout rate (Yue, 2016), 40 participants were added. Therefore, 240 participants were recruited, with 120 participants recruited from each physical examination center.

Sample recruitment

240 women who met the inclusion criteria were selected for participation through simple random sampling. 120 participants were randomly selected from each physical examination center. Approximately, 10-12 women willing to participate in the study were recruited a day from each center.

Research instruments

The research instruments consisted of four questionnaires. All questionnaires were used in this study with permission from the original authors.

The demographic data questionnaire

The demographic data questionnaire was developed by the researcher. The questionnaire composed of 14 items including 1) the demographic characteristics such as age, education, marital status, etc. and 2) the health information such as number of sexual partners, contraceptive use, history of STD, and cervical cancer screening.

The uptake of cervical cancer screening

Cervical cancer screening uptake was measured by asking women if they had ever been screened for cervical cancer in their lifetime. A “yes” response indicated previous cervical cancer screening, and a “no” or “never” response indicated never having had cervical cancer screening. This question was included in the health information questionnaire.

The Chinese version of the cervical cancer prevention knowledge questionnaire

The Chinese version of the cervical cancer prevention knowledge questionnaire was used to measure the knowledge of cervical cancer in women. It was developed by the Ministry of Health of China (Li, Hongguang, Sulian, Xixi, & Chune, 2013). The questionnaire contains 10 items with one point awarded for each correct answer and zero points for each incorrect answer. Total scores ranged from 0 to 10, with higher scores indicating greater knowledge of cervical cancer. In this study the KR-20 (Kuder & Richardson, 1937) reliability coefficient of the scale was .760.

The Chinese version of the cervical cancer screening belief scale

The Chinese version of the cervical cancer screening belief scale was developed by Lei (2015) from the Health Belief Model Scale for Cervical Cancer and Pap Smear Test (Guvenc, Akyuz, & Açikel, 2011). This instrument includes 32 items with five dimensions including health behavior,

perceived susceptibility, perceived severity, perceived barriers, and perceived benefits. In this study, four dimensions including perceived threat (combined perceived susceptibility and perceived severity), perceived barriers, and perceived benefits were used. Therefore, the instrument used in this study included 23 items. The information on each dimension is presented as follows:

1) The perceived threat of cervical cancer

Perceived threat was measured using the perceived susceptibility and perceived severity subscale of the Chinese version of the cervical cancer screening belief scale (Lei, 2015). The scale contains 10 items, scored on a 5-point Likert scale, with 1 indicating "strongly disagree," 2 indicating "disagree," 3 indicating "uncertain," 4 indicating "agree," and 5 indicating "strongly agree." Total scores ranged from 10 to 50, with higher scores indicating greater perceived threat. The Cronbach's alpha of this scale was .867.

2) The perceived benefits of cervical cancer screening

The perceived benefits were measured using the perceived benefits subscale of the Chinese version of the cervical cancer screening belief scale (Lei, 2015). This subscale contains four items, scored on a 5-point Likert scale, with 1 indicating "strongly disagree," 2 indicating "disagree," 3 indicating "uncertain," 4 indicating "agree," and 5 indicating "strongly agree." Total scores ranged from 4 to 20 points, with higher scores indicating greater perceived benefits. The Cronbach's alpha of this subscale was .718.

3) The perceived barriers to cervical cancer screening

Perceived barriers were measured using the perceived barriers subscale of the Chinese version of the cervical cancer screening belief scale (Lei, 2015). This subscale contains 9 items scored on a 5-point Likert scale, with 1 indicating "strongly disagree," 2 indicating "disagree," 3 indicating "uncertain," 4 indicating "agree," and 5 indicating "strongly agree." Total scores ranged from 9 to 45 points, with higher scores indicating greater perceived barriers. The Cronbach's alpha of this subscale was .914.

4) The Chinese version of the cervical cancer screening self-efficacy scale

Self-efficacy was measured using the Chinese version of the cervical cancer screening self-efficacy scale (Liang et al., 2014). The instrument includes 16 items, each scored on a 5-point Likert scale ranging from 1 to 5 (1 = definitely not, 2 = unlikely, 3 = probably, 4 = very likely, 5 = definitely). Total scores ranged from 16 to 80, with higher scores indicating greater self-efficacy for cervical cancer screening uptake. The Cronbach's alpha of this scale was .962.

Protection of human rights

This study was approved by the Institutional Review Board of Burapha University (Protocol code G-HS023/2565) and the Ethics Committee of the First Affiliated Hospital of Wenzhou Medical University (Protocol code KY2022-096). Written and verbal informed consent was obtained from all participants, and their anonymity was preserved.

Data collection

Data were collected at a rate of 10-12 samples per day from June to December 2022. Written informed consents were obtained from participants who met the inclusion criteria and agreed to participate voluntarily. Self-administered questionnaires were then distributed. Each participant completed the full set of questionnaires in a private room, which took approximately 30 minutes.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 26.0. Descriptive statistics were used to describe the demographic characteristics of the participants. A binary logistics regression model was conducted to examine the relationship between cervical cancer screening uptake and knowledge of cervical cancer, perceived threat, perceived benefits, perceived barriers, and self-efficacy. Odds ratios (ORs) were calculated to assess the strength of associations between the independent variables and the dependent variable.

Results

The demographic characteristics of participants

A total of 240 women participated in the study. Participants ranged in age from 25 to 64 years, with a mean age of 37.5 years. The majority (61.7%) were between 30-49 years old. Regarding socioeconomic characteristics, 38.8% were unemployed, 43.3% had university-level education or higher, and 79.6% were married.

Several cervical cancer risk factors were assessed among the participants: 3.4% reported having three or more sexual partners, 4.2% had three or more children, and 1.3% reported first sexual intercourse before age 18. Additionally, 2.9% had used hormonal contraceptives for more than five years, 4.6% had a history of smoking, 4.6% reported a family history of cervical cancer, and 1.3% had a history of sexually transmitted disease.

Description of uptake of cervical cancer screening, knowledge of cervical cancer, perceived threat, perceived benefits, perceived barriers, and self-efficacy.

Uptake of cervical cancer screening

Table 1 presents the frequency distribution of cervical cancer screening uptake among the study participants (n = 240). The findings reveal that 152 (63.3%) of the participants had undergone cervical cancer screening at least once, while 88 (36.7%) had never been screened for cervical cancer.

Table 1. Frequency and percentage of the uptake of cervical cancer screening (n = 240)

Uptake of cervical cancer screening	Number (n)	Percentage (%)
Have been screened for cervical cancer		
Yes	152	63.3
Never done	88	36.7

Descriptive statistics of independent variables

Table 2 presents the descriptive statistics of the independent variables examined in this study (n = 240). Knowledge scores ranged from 0 to 10 (possible range: 0-10), with a mean of 6.18 (SD = 2.54). Perceived threat scores ranged from 10 to 48 (possible range: 10-50), with a mean of 32.02 (SD = 5.65). Perceived benefit scores ranged from 7 to 20 (possible range: 4-20), with a mean of 15.65 (SD = 2.08). Perceived barriers scores ranged from 9 to 27 (possible range: 9-45), with a mean of 17.47 (SD = 3.99). Self-efficacy scores ranged from 16 to 80 (possible range: 16-80), with a mean of 61.92 (SD = 16.08).

Table 2. Mean and standard deviation of the independent variables (n = 240)

Independent variables	Possible score	Actual score	Mean	Standard deviation
Knowledge	0 - 10	0 - 10	6.18	2.54
Perceived threat	10 - 50	10 - 48	32.02	5.65
Perceived benefits	4 - 20	7 - 20	15.65	2.08
Perceived barriers	9 - 45	9 - 27	17.47	3.99
Self-efficacy	16 - 80	16 - 80	61.92	16.08

Factors Associated with uptake of cervical cancer screening

Table 3 presents the results of the logistic regression analysis examining factors including knowledge of cervical cancer, perceived threat, perceived benefits, perceived barriers, and self-efficacy significantly associated with cervical cancer screening uptake (n = 240). The analysis revealed that all variables explained approximately 27.2% of the variance in cervical cancer screening uptake (Nagelkerke R^2 = .272). Notably, perceived barriers was a significant predictor of cervical cancer screening uptake (B = -0.122, SE = 0.047, p = .010, OR = 0.885, 95% CI: 0.807-0.971). This negative association indicates that for each unit increase in perceived barriers score, the odds of undergoing cervical cancer screening decreased by 11.5%.

Self-efficacy demonstrated a strong positive association with cervical cancer screening uptake (B = 0.059, SE = 0.011, p < .001, OR = 1.060, 95% CI: 1.038-1.083). This suggests that for each unit an increase in self-efficacy score, the odds of undergoing cervical cancer screening increased by 6.0%.

Perceived benefits approached statistical significance (B = -0.171, SE = 0.091, p = .059, OR = 0.842, 95% CI: 0.705-1.007), suggesting a potential negative relationship with screening uptake. Knowledge of cervical cancer (p = .559) and perceived threat (p = .370) were not significantly associated with cervical cancer screening uptake in this sample.

The results clearly showed that lower perceived barriers and higher self-efficacy were significantly associated with increased odds of cervical cancer screening uptake in the study population, while knowledge and perceived threat did not show significant associations.

Table 3. Logistic regression analysis of factors associated with cervical cancer screening uptake (n = 240)

	B	SE	Wald	df	Sig.	Exp(B)	95% CI for EXP(B)	
							Lower	Upper
Knowledge of cervical cancer	.038	.065	.341	1	.559	1.038	.915	1.178
Perceived threat	.025	.028	.804	1	.370	1.025	.971	1.082
Perceived benefits	-.171	.091	3.562	1	.059	.842	.705	1.007
Perceived barriers	-.122	.047	6.651	1	.010*	.885	.807	.971
Self-efficacy	.059	.011	30.162	1	<.001**	1.060	1.038	1.083
Constant	.834	2.002	.174	1	.677	2.302		

* $p < .05$, ** $p <. 001$

Nagelkerke R^2 = .272; Hosmer and Lemeshow Test: $\chi^2(8) = 6.341$, $p = .609$

Discussion

The findings of this study are discussed based on research objectives and hypothesis as follows.

Uptake of cervical cancer screening among women in Wenzhou, China

In this study, the uptake of cervical cancer screening (UOCCS) rate among the study participants was 63.3% which was higher than the previous screening rate in Wenzhou (Meteor, 2021; Zheng, 2019, 2020). The result of this study can be explained based on HBM, which posits that demographic characteristics (e.g., age, work, education level) are related to the UOCCS (Champion & Skinner, 2008).

In this study, 61.7% of the participants were 30-49 years old, 43.3% had a bachelor's degree or higher, and 61.2% were employed. A study found that women aged 30–49 years were more likely to undergo cervical cancer screening than women in other age groups (Bao et al., 2018). One study found that women with higher education were more likely to be screened for cervical cancer than women with no formal education (AORs = 9.85, 95% CI: 4.12-23.54), and women who were working were more likely to be screened than women who were unemployed (AORs = 1.49, 95% CI: 1.09-2.04) (Okyere, Ayebeng, & Dickson, 2024).

Our findings align with these previous studies, suggesting that the relatively high screening uptake observed in our sample may be attributed to the demographic composition of our participants, with a majority falling into age and socioeconomic categories associated with greater likelihood of screening. The higher proportion of women with university education and employment in our sample may partially explain the improved screening rates compared to previous studies in Wenzhou.

Factors Associated with uptake of cervical cancer screening

The results showed that perceived barriers and self-efficacy were significantly associated with increased odds of cervical cancer screening uptake in the study population, while knowledge and perceived threat did not show significant associations.

Perceived barriers and the uptake of cervical cancer screening

In this study, perceived barriers could significantly predict the UOCCS (OR = 0.885, 95% CI: 0.807-.971; p <.05). The finding indicated that participants with higher perceived barriers score were less likely to undergo cervical cancer screening (CCS), which is consistent with the result of previous study (Yirsaw et al., 2024). This indicates that by understanding women's barriers to CCS and helping them reduce these barriers could help to improve the cervical cancer screening uptake in the future. In this study, 3.8% of women never had a screening because they did not have time. HPV testing on self-collected vaginal samples can be recommended for such women (Parker et al., 2024).

The odds ratio of 0.885 suggests that for each unit increase in perceived barriers score, the odds of undergoing cervical cancer screening decreased by 11.5%. This finding underscores the importance of addressing women's perceived barriers as a strategy to enhance screening participation. Future interventions could focus on reducing logistical barriers, such as time constraints and access issues, as well as addressing psychological barriers like fear and embarrassment that may prevent women from seeking screening services.

Self-efficacy and the uptake of cervical cancer screening

Self-efficacy was referred to as confidence in one's ability to act in the Health Belief Model (HBM). In this study, the higher the self-efficacy in women, the more likely they were to undergo cervical cancer screening (OR = 1.060, 95% CI: 1.038-1.083; p < .001), which is consistent with the results of previous study (Yirsaw et al., 2024). The odds ratio of 1.060 indicates that for each unit increase in self-efficacy score, the odds of undergoing cervical cancer screening increased by 6.0%. This strong association (p < .001) highlights self-efficacy as one of the most significant predictors of screening behavior in our study. Interventions that focus on building women's confidence in their ability to navigate the screening process, communicate with healthcare providers, and understand screening results could be particularly effective. Tailored educational programs that address specific concerns and barriers while emphasizing the benefits and manageability of screening could help promote awareness and attitudes, enhance self-efficacy, and subsequently improve screening uptake rates among women.

Knowledge of cervical cancer and the uptake of cervical cancer screening

In this study, knowledge of cervical cancer was not significant for the uptake of cervical cancer screening (OR = 1.038, 95% CI: 0.915–1.178; p > .05). This is not consistent with the results of previous studies (Al-Ani et al., 2024; Yirsaw et al., 2024). The reason for the inconsistent results may be related to the data collection setting. A study showed that women who had health professionals as a source of information were 1.8 times more likely to have cervical cancer screening (AOR = 1.8, 95% CI: 1-3.2) than women who did not (Getachew et al., 2019).

The lack of significant association between knowledge and screening uptake in our study suggests that knowledge alone may be insufficient to drive screening behavior among women in Wenzhou. This finding highlights the complex nature of health decision-making, where factors beyond knowledge such as barriers and self-efficacy may play more critical roles in determining whether women undergo cervical cancer screening. Additionally, the quality and source of knowledge, rather than just its presence, may be more influential. As indicated by Getachew et al. (2019), the source of information (particularly from health professionals) appears to be an important factor in screening decisions, suggesting that how knowledge is conveyed may be as important as the knowledge itself.

Perceived threat and the uptake of cervical cancer screening

In this study, the perceived threat was not significant for cervical cancer screening uptake (OR = 1.025, 95% CI: 0.971-1.082; $p > .05$), which is inconsistent with the results of previous studies (Khoshnazar, Tarrahi, & Shahnazi, 2024; Yirsaw et al., 2024). The differences in the results of each study may be related to the different regions where each study was conducted. The perceived threat was also affected by women's age, education level, and knowledge of cervical cancer (Yadav, Dobe, Paul, & Taklikar, 2022). In this study, 11.7% of participants didn't know about cervical cancer screening, and 5% thought they were healthy and didn't know the threat of cervical cancer. This suggests that interventions to enhance education about the threat of cervical cancer may be an important lever to increase screening among women.

The non-significant association between perceived threat and screening uptake in our study population may reflect cultural or contextual factors specific to women in Wenzhou. Risk perception is shaped by sociocultural factors and may manifest differently across populations. Additionally, the relatively high education level of our sample (43.3% with university education or higher) might influence how threat is conceptualized and acted upon. The finding that some participants considered themselves too healthy to need screening points to a potential misconception about cervical cancer risk that could be addressed through targeted educational campaigns emphasizing that cervical cancer can develop without obvious symptoms and that screening is valuable for asymptomatic individuals.

Perceived benefits and the uptake of cervical cancer screening

In this study, the perceived benefits were not significant for the uptake of cervical cancer screening (OR = 0.842, 95% CI: 0.705-1.007; $p > .05$), which is inconsistent with the results of previous studies (Al-Ani et al., 2024; Khoshnazar et al., 2024; Yirsaw et al., 2024). This may be related to perceived benefits being affected by perceived barriers. According to the HBM, when perceived barriers outweigh benefits, women are less likely to undergo screening. This indicates that fully understanding the screening barriers faced by women, providing specific assistance to reduce these barriers, and enhancing education on the benefits of screening will be conducive to increasing the cervical cancer screening rate. It is worth nothing that while not statistically significant, the perceived benefits variable approached significance ($p = 0.059$) and showed an odds ratio of 0.842, suggesting a potential negative association with screening uptake. This contradictory (where higher perceived benefits scores were associated with lower screening likelihood) warrants further investigation. It may

reflect measurement issues, response biases, or complex interactions with other variables such as perceived barriers. Alternatively, it could indicate that women who perceive many benefits but have not been screened may be those who face substantial barriers that prevent them from acting on their positive beliefs about screening.

In conclusion, the findings partially support the Health Belief Model by highlighting the significant roles of perceived barriers and self-efficacy in prediction cervical cancer screening uptake. While other components such as perceived threat and knowledge were not significant, their influence might be mediated through more proximal like self-efficacy.

The results suggest that intervention aiming to reduce perceived barriers and enhance women's confidence in their ability to undergo screening may be particularly effective in promoting cervical cancer screening uptake.

Implication of the findings

This study provides helpful information about the uptake of cervical cancer screening (UOCCS) and its related factors among women in Wenzhou, China. This information provides a basis for the development of targeted interventions to reduce barriers and increase self-efficacy to promote better UOCCS among women. The findings highlight that interventions focused on reducing perceived barriers and enhancing self-efficacy may be most effective in improving screening rates. Healthcare providers and public health officials in Wenzhou could use these findings to design educational programs and services that specifically address common barriers to screening and build women's confidence in their ability to navigate the screening process.

Recommendations for future nursing research

The study enrolled participants from only one physical examination center in Wenzhou. Thus, the findings may not be representative for other women groups of the entire Wenzhou area of China. To generalize the results to women in Wenzhou, we recommend that this study should be replicated in multiple settings. Future research should also consider employing mixed methods approaches to gain deeper insights into how perceived barriers and self-efficacy influence screening decisions. Longitudinal studies could help determine the long-term effects of educational interventions designed to reduce barriers and enhance self-efficacy on cervical cancer screening rates. Additionally, investigating the seemingly counterintuitive relationship between perceived benefits and screening uptake observed in this study could provide valuable insights for developing more effective health promotion strategies.

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Conflict of Interests:

The authors have no conflict of interest to disclose.

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