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# Predicting cervical cancer screening participation using self-care behaviors among women in Iran

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**Abstract:**

**BACKGROUND:** Cervical cancer screening is an effective and accessible method for preventing this cancer. However, low participation rates among women have been reported. Self-care is one of the solutions to improve access to health services. This study was conducted to determine the prediction of cervical cancer screening participation using self-care behaviors among women in Iran.

**MATERIALS AND METHODS:** This cross-sectional study was conducted on 310 eligible women who were referred to comprehensive health centers and women's clinics in teaching hospitals in Isfahan, Iran, from November 2020 to April 2021. Participants were enrolled using convenience sampling. The data collection tool included researcher-made questionnaires on personal and fertility characteristics, participation in cervical cancer screening, and self-care behaviors related to cervical cancer and its screening. Descriptive and inferential statistical methods were used for data analysis using the Statistical Package for the Social Sciences (SPSS) version 22 software.

**RESULTS:** The results showed that the intention to undergo screening was low among individuals who had not undergone screening. Lack of awareness and not having enough time were the most common barriers to screening. The results of logistic regression analysis indicated that self-efficacy was the significant predictor of cervical cancer screening. With an increase in the self-care score, the 12% chance of doing a Pap smear increases significantly ($P = 0.002$). Furthermore, the results of multiple regression showed that with an increase in the self-care score, the chance of women who refer to screening every year, every 2–3 years, and every 4–5 years is increased to 25% ($P = 0.001$), 34% ($P < 0.001$), and 11% ($P = 0.032$), respectively, compared with non-referral.

**DISCUSSION:** According to the results, self-care was a predictor of performing a Pap smear, and it was related to its regular performance of Pap smear too. Therefore, designing and implementing necessary interventions to increase self-care behaviors can improve women's participation in cervical cancer screening and its regularity.

**Keywords:**

Cancer screening, self-care, uterine cervical neoplasms

## Introduction

Cervical cancer is the fourth most common cancer in women worldwide, following breast, colorectal, and lung cancers.[1] In Iran, it is the second most common cancer of the female reproductive system.[2] While the mortality rate due to cervical cancer has significantly decreased in developed countries in the past few decades, it remains higher in many developing countries.[3] In fact, 88% of all cervical cancer deaths worldwide have been reported in developing countries.[4]

There are various risk factors for cervical cancer, such as early age at first intercourse, having multiple sexual partners, smoking, race, high parity, low socioeconomic status, and chronic immune suppression. However, human papillomavirus (HPV) infection is



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the leading cause of cervical cancer.[5] Cervical cancer has a long preinvasive period, and if detected early by a Pap smear test, it is preventable and treatable.[6] The Pap smear test is one of the effective and accessible methods for preventing this cancer.[7] The Pap smear test is recommended for women aged 21 to 65 years who are sexually active at regular intervals of approximately every three years.[8]

Although the Pap smear test is a relatively reliable method for detecting premalignant changes in patients,[9] the level of women's participation in using this method as a screening tool has been reported to be low.[10,11] In the study by Farzaneh *et al*. (2017), only 28% of women participated in the cervical cancer screening program.[12]

The results of studies have shown that personal, social, and cultural factors are associated with cervical cancer screening.[13-16] Lack of awareness, embarrassment, lack of time, cost of screening, and fears of cancer have been reported as barriers to screening.[17-21] Countries with lower participation rates in screening programs have reported a higher prevalence of cervical cancer.[22] In developing countries, 60% of cervical cancer cases occur in women who have never had a Pap smear.[5] Given the importance of cervical cancer screening in prevention, it is necessary to adopt strategies to improve cervical cancer screening.[6,7] In 2018, the World Health Organization proposed a strategy to eliminate cervical cancer in the world. The elimination strategy of this organization is based on the three basic principles of prevention through vaccination, screening, and treatment of precancerous lesions and invasive cervical cancer.[23] In Iran, one of the goals of the noncommunicable disease prevention program includes prevention of cervical cancer, early diagnosis, and screening of cervical cancer.[24] The prevalence of chronic diseases has increased over the past decades,[25] and although medical science has made great progress compared to before, this scientific progress has had little effect on the health of the majority of the world's people.[26] Access to healthcare services through self-care is one of the solutions. The use of self-care in people's health planning has been suggested as a way to improve people's health and clinical care.[27] The best management approach for chronic diseases is self-care, which makes patients participate in prevention, diagnostic methods, and treatment.[28] Self-care means the ability of individuals, families, and communities to promote health, prevent disease, maintain health, and cope with illness.[29] Self-care can provide access to primary healthcare services by reducing costs and increasing the effectiveness of health interventions.[30] According to the vision of the International Center for Self-Care Research in 2019, self-care by individuals, families, and communities is a priority and is the first line of approach in any health care.[31]

Numerous studies have been conducted on the relationship between self-care and prevention of diseases such as heart disease,[32] reproductive infections,[33] and the control of diseases such as diabetes,[34] hypertension,[35] and heart disease.[36] However, limited studies have been conducted on the role of self-care behavior in preventing cervical cancer and its screening. Castro and colleagues (2015) showed that self-care behaviors in women with lower cervical neoplastic lesions were low.[37] The beneficial effects of self-care include improved well-being and reduced morbidity, mortality, and reduced healthcare costs.[31] Moreover, self-care is one of the important solutions in preventing some diseases and promoting the health of women, families, and communities.[38] As there has been no study on role of self-care in preventing cervical, the findings of the study can help identify predictor factors and improve interventions to prevent cervical cancer and promote its screening. Therefore, conducting a study on self-care behaviors to develop efficient and effective self-care interventions that prevent cervical cancer and promote its screening is necessary. This study was conducted to determine the prediction of cervical cancer screening participation using self-care behaviors among women in Iran.

## Materials and Methods

### Study design and setting

This cross-sectional study was conducted on women eligible for cervical cancer screening who were referred to comprehensive health centers and women's clinics in teaching hospitals in Isfahan City from November 2020 to April 2021. Six comprehensive health centers and one clinic were randomly selected from all comprehensive health centers in Isfahan City, as well as two women's clinics in teaching hospitals in Isfahan City, using a lottery method.

### Study participants and sampling

The sample size was calculated based on a pilot study, a 95% confidence level, a standard deviation of d = 2, and a margin of error of δ =15, using the sample size formula

$$N = \frac{(Z^2_{1-\frac{\alpha}{2}}) \times \delta^2}{d^2}$$

, and was determined to be at least 225. In this study, 310 eligible women for cervical cancer screening who met the inclusion criteria, including being Iranian, married, aged between 21 and 60 years, and willing to participate in the study, were recruited using convenience sampling with informed consent.

### Data collection tool and technique

To collect information from researcher-made questionnaires on demographic and fertility characteristics, participation in cervical cancer screening, and cervical cancer self-care, the participants were provided with the questionnaires to complete.

### Questionnaire on personal and fertility characteristics

The questionnaire on personal and fertility characteristics included age, number of pregnancies, age at first intercourse, and women's educational level.

### Questionnaire on participation in cervical cancer screening

The questionnaire on participation in cervical cancer screening included questions about the frequency and intention to undergo cervical cancer screening, reasons for not undergoing cervical cancer screening, and motivating factors for undergoing cervical cancer screening in research units.

Information related to undergoing cervical cancer screening was evaluated with the question "Have you ever had a Pap smear?" The frequency of cervical cancer screening in the past 10 years was evaluated with the question "How often have you had a Pap smear in the past 10 years?" The option of zero was considered for not undergoing screening, and options 1, 2, 3, and 4 were considered for every year, 2–3 years, 4–5 years, and 6–10 years, respectively.

In individuals who had not undergone cervical cancer screening, the intention to undergo cervical cancer screening was evaluated with the question "When do you intend to undergo a Pap smear?" Option 1 was considered for intending to undergo screening as soon as possible, and options 2, 3, 4, 5, and 6 were considered for intending to undergo screening next month, six months from now, one year from now, more than one year from now, and not intending to undergo screening, respectively.

Furthermore, the reasons for not undergoing cervical cancer screening were assessed with the question "What was the reason for not having a Pap smear?" Multiple options could be selected.

### Self-care questionnaire for cervical cancer prevention

This questionnaire comprises eight questions related to preventive behaviors against cervical cancer. The questions were designed based on preventive methods for cervical cancer and the symptoms of the risk of developing cervical cancer. The questions include four questions about self-care for preventing cervical cancer (such as not smoking, regularly performing Pap smear tests, and avoiding multiple sexual partners) and four questions about self-care for the symptoms of the risk of developing cervical cancer (such as seeking medical attention for irregular bleeding and genital warts in oneself or one's partner, and following up on abnormal Pap smear results). The questions were rated on a 4-point Likert scale (from never to always).

### Validity and reliability of the tool

To determine the validity of the questionnaire, formal and content validity were assessed by 13 experts, including members of the academic faculty of the midwifery, reproductive health, and health education departments. The content validity index (CVI) and content validity ratio (CVR) were used to assess the content validity of the self-care questionnaire for cervical cancer prevention.[39] If the CVR was less than 0.54 or the CVI was less than 0.7 for any question, the experts who evaluated that question were excluded.[40,41] The reliability of the questionnaire was confirmed with a Cronbach's alpha coefficient of 0.77.

### Statistical analysis

Descriptive statistics (frequency distribution and percentage) and correlation tests were performed using the Statistical Package for the Social Sciences (SPSS) version 22 software. Independent *t*-test and one-way analysis of variance (ANOVA) were used to examine the relationship between self-care and participation in cervical cancer screening and its frequency, respectively. Logistic regression analysis was used to investigate the relationship between demographic characteristics and women's fertility with self-care. A *P* value less than 0.05 was considered statistically significant.

### Ethical consideration

This study has been approved by the Ethics Committee of Isfahan University of Medical Sciences (IR.MUI.NUREMA.REC.1400.063). All participants' information was kept confidential. Written informed consent was obtained from the female participants to participate in the study. Participants were also free to withdraw from the study at any stage.

## Results

The findings of this study showed that the mean age of the women was 29.9 ± 91.37 years, and the mean age of first sexual intercourse was 18.21 ± 5.5 years. The average number of pregnancies was 1.05 ± 2.44. Most of the women (80.3% or 249 people) had undergone cervical cancer screening, while 19.7% (61 people) had not yet undergone cervical cancer screening. Of the women who had not yet undergone cervical cancer screening, 59% had no intention of undergoing screening, and only 13.1% of them intended to undergo a Pap smear as soon as possible. In the past 10 years, only 29% of the participants had regularly undergone Pap smears every 2–3 years.

Most women (34.3%) cited more than one reason for not undergoing a Pap smear, and the most common

reasons for nonparticipation in cervical cancer screening were lack of awareness (16.4%) and lack of time (16.4%). Most women (86.5%) identified health personnel's recommendation as the most motivating factor for undergoing cervical cancer screening [Table 1].

The mean self-care score was significantly higher in individuals who had participated in cervical cancer screening (28.8 ± 3.75) than in individuals who had never undergone cervical cancer screening (25.91 ± 5.03) ($P$ = 0.001). The results of the independent $t$-test showed a significant relationship between self-care and participation in cervical cancer screening ($P$ = 0.001). Based on one-way ANOVA, a significant relationship was found between self-care and the frequency of cervical cancer screening ($P$ < 0.001) [Table 2].

The results of logistic regression analysis indicated that self-efficacy was the significant predictor of cervical cancer screening. With an increase in the self-care score, the 12% chance of doing a Pap smear increases significantly (OR: 1.120, 95% CI: 1.042-1.042, $P$ = 0.002).

Furthermore, the results of multiple regression showed that with an increase in the self-care score, the chance of women who refer to screening every year, every 2–3 years, and every 4–5 years is increased to 25% (OR: 1.125, 95% CI: 1.100-1.425, $P$ = 0.001), 34% (OR: 1.34, 95% CI: 1.195-1.515, $P$ < 0.001), and 11% (OR: 1.11, 95% CI: 1.009-1.222, $P$ = 0.032), respectively, compared with non-referral [Table 3].

Logistic regression analysis was used to determine the relationship between age, education, the number of pregnancies, and self-care. The results revealed that education was a significant predictor of self-care [Table 4].

## Discussion

The aim of this study was to determine the prediction of cervical cancer screening participation using self-care behaviors among women in Iran. The results of this study showed that the intention to undergo cervical cancer screening was low among individuals who had not undergone Pap smears, and 59% of women who had not undergone screening did not intend to participate in Pap smears.

Lack of awareness (16.4%) and lack of time (16.4%) were the most important barriers to undergoing screening in these individuals.

Various studies have shown that lack of awareness and incorrect attitudes are the main reasons for not accepting preventive behaviors.[42,43] In the systematic review by Islam *et al*. (2017), the most important barrier to screening in low- and middle-income countries

**Table 1: Reasons women not participating in screening for cervical cancer and people recommending Pap smear to strengthen motivation**

| Variable | Frequency | Percentage |
|---|---|---|
| Reasons for not doing Pap smear | | |
| Shame and embarrassment | 5 | 2.8 |
| Pain | 4 | 6.6 |
| Fear of having cancer | 6 | 8.9 |
| It is not useful to do it | 3 | 9.4 |
| Not having time | 10 | 4.16 |
| Cost | 2 | 6.0 |
| Lack of knowledge | 10 | 4.16 |
| Other | 21 | 34.3 |
| Recommended people | | |
| Healthcare personnel | 268 | 86.5 |
| Family members | 23 | 4.7 |
| Radio and TV experts | 9 | 9.2 |
| A combination of the above | 10 | 3.3 |

**Table 2: Relationship between self-care and cervical cancer screening**

| Variable | Self-care Mean±SD | Result |
|---|---|---|
| Pap smear | | |
| Yes | 28.8±3.75 | $t$=3.76a |
| No | 25.91±5.03 | $P$=0.001 |
| Pap smear frequency | | |
| Not doing | 23.19±4.05 | $F$=9.36b |
| Every year | 25.74±3.23 | $P$<0.001 |
| Every 2–3 years | 26.21±2.60 | |
| Every 4–5 years | 24.77±3.14 | |
| Every 6–10 years | 23.24±4.08 | |

[a]$t$-test. [b]ANOVA

**Table 3: Regression analysis for self-care based on Pap smear done and Pap smear frequency**

| Independent variable | *B* | SE | Exp (*B*) | Sig | 95% CI | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Pap smear done | | | | | | |
| Yes | 0.114 | 0.037 | 1.120 | 0.002 | 1.042 | 1.204 |
| No (Reference) | NA | NA | NA | NA | NA | NA |
| Pap smear frequency | | | | | | |
| Every year | 0.225 | 0.066 | 1.252 | 0.001 | 1.100 | 1.425 |
| Every 2–3 years | 0.297 | 0.060 | 1.345 | >0.001 | 1.195 | 1.515 |
| Every 4–5 years | 0.105 | 0.049 | 1.111 | 0.032 | 1.009 | 1.222 |
| Every 6–10 years | 0.004 | 0.047 | 1.004 | 0.932 | 0.916 | 1.100 |
| Non-referral (Reference) | NA | NA | NA | NA | NA | NA |

**Table 4: Factors associated with self-care based on logistic regression**

| Variable | *B* | SE | Exp(*B*) | Sig | 95% CI | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Age | 0.38 | 0.25 | 0.97 | 0.127 | -0.11 | 0.87 |
| Number of pregnancies | -0.48 | 0.161 | -0.019 | 0.767 | -0.365 | 0.270 |
| Education | 0.655 | 0.200 | 0.197 | 0.001 | 0.262 | 1.049 |

was the lack of awareness of the role of screening in preventing cervical cancer,[44] which is consistent with the results of this study. Women's awareness and beliefs have been identified as important factors in promoting motivation for cervical cancer screening.[43] In the study by Shankar *et al*. (2015), an increase in women's awareness was associated with an increase in cervical cancer screening.[45] As early detection is the only way to reduce the complications and mortality of cervical cancer,[8] it is important to take necessary measures to increase women's awareness of cervical cancer screening.[46]

In this study, the recommendation of health personnel was the most important factor motivating women to undergo screening. In the study by Karim *et al*. (2012), the most common reason for undergoing Pap smear tests in 71% of cases was the recommendation of healthcare providers.[47] In the study by Abbadian and Darmohammadi (2013), the most important motivating factor for undergoing Pap smear tests was the recommendation of healthcare providers (31.5%), followed by the recommendation of physicians (19.8%).[48] In the study by Team *et al*. (2013), healthcare provider recommendation played a key role in women's participation in cervical cancer screening, according to women's perspectives,[49] which is consistent with the results of these studies. Findings from various studies have shown that social support can have positive effects on cervical cancer screening. This support can be received from various sources such as healthcare providers, spouses, family, and friends.[50,51] Healthcare providers can influence women's screening behaviors, and failure to recommend screening can be one of the barriers to women's participation in screening programs.[19,52] The results of this study showed that self-care was significantly higher in individuals who had undergone Pap smear screening compared to those who had not previously participated in screening. There was also a significant relationship between self-care and participation in cervical cancer screening. The results of this study showed that self-care was a predictor of performing a Pap smear, and it was related to its regular performance of Pap smear too. According to the results of studies, the prevalence of cervical cancer in Iran has increased in recent years.[5-7] However, in most cases, cervical cancer has been reported in advanced stages.[10,53] This cancer affects younger women and leads to an increase in lost years of life more than other cancers, especially among women in developing countries.[54]

Delay in diagnosis and treatment is the main obstacle to reduce mortality caused by this cancer.[55] However, regular participation in cervical cancer screening programs is not common among Iranian women.[56] Therefore, it is necessary that cost-effective and culturally acceptable interventions consider to reduce these cancers.[57] Typically, promoting healthy behaviors and disease prevention are cheaper and more effective methods than intervention after the disease has been contracted.[58] With the increase in the age of the population in the world, women's health needs have changed, and therefore, providing primary and preventive care to promote women's health has become more important.[22] In Iran, the purpose of the implementation of the prevention program is early diagnosis and screening of cervical cancer, identification and registration of people who are suspected or suffering from cervical cancer, and then providing appropriate services at different levels of the healthcare network and organizing the treatment and care of patients.[24]

Interventions based on promoting self-care are the most promising approaches to improve people's health and well-being. Also, policymaking in the field of promoting self-care is considered one of the ways to improve health and prevent diseases.[59]

In Aly Ibrahim *et al*.'s study (2022), there was a significant relationship between self-care and adolescent knowledge about preventing sexually transmitted infections.[33] In Shrivastava *et al*.'s study (2013), there was a significant relationship between self-care and the prevention of complications of diabetes and its management.[34] In this regard, Narasimhan and Kapila stated promoting self-care can reduce health inequalities in societies.[60] However, self-care can help individuals improve their health by having a healthy lifestyle (e.g., avoiding smoking), adhering to treatment regimens, effectively interacting with healthcare professionals, and utilizing social support networks.[61] Remme suggests that self-care can lead to increased use of preventive services and behaviors, improved treatment adherence, and reduced need for healthcare services.[30]

Additionally, the results of this study showed a relationship between women's education and self-care. In Bai *et al*.'s study (2009), there was a positive and significant relationship between education and self-care in individuals with diabetes[62]. Rockwell *et al*. also showed that education level was a predictor of self-care in individuals with heart disease.[63] Researchers suggest that individuals with higher education have better judgment and decision-making skills to perform self-care behaviors, so increasing education can facilitate self-care behaviors.[63,64]

This study is the first to investigate the prediction of cervical cancer screening participation using self-care behaviors among women in Iran.

## Limitation and recommendation

Although the results of this study showed predicting

cervical cancer screening participation using self-care behaviors among women in Iran, due to time and resource constraints it was not possible to investigate the role of self-care in predicting other preventive behaviors for cervical cancer, such as HPV vaccination. Therefore, further studies in this area are recommended.

## Conclusion

The findings of this study revealed that the intention to undergo cervical cancer screening is low among individuals who have not undergone screening. Lack of awareness and not having enough time were reported as the main reasons for not participating in cervical cancer screening, while healthcare personnel recommendation was identified as the most motivating factor for participation. Therefore, it is essential for healthcare providers to take necessary measures to increase awareness and motivation among women to participate in cervical cancer screening. Additionally, self-care was found to be significantly associated with participation in cervical cancer screening. Self-care was a predictor of performing a Pap smear, and it was related to its regular performance of Pap smear too. In recent years, self-care has been suggested as a way to improve health and overcome the obstacles to health care, and therefore, it is necessary to pay attention to self-care in policymaking and planning to improve cervical cancer screening and reduce mortality and complications caused by this cancer. Interventions aimed at increasing self-care practices could help improve women's participation in cervical cancer screening.

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### Conflicts of interest

There are no conflicts of interest.

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