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Original Article

Factors associated with awareness of and undergoing Pap smear tests among Jordanian women

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Abstract

Several screening methods are used to detect cervical cancer, with Pap smear test is considered as one of the most reliable screening methods to diagnose cervical cancer. The aim of this study was to investigate the factors associated with awareness of undergoing Pap smear tests among Jordanian women. A cross-sectional study was conducted among 525 Jordanian women attending the outpatient maternity hospital consecutively from February to July 2023. Data encompassed demographic characteristics (age, occupation, and education), awareness of Pap smears, beliefs regarding their importance, sources of information, and the history of undergoing Pap smear tests were collected using a structured questionnaire. Of the total 525 Jordanian women, 87.6% were aware of Pap smears. The awareness varied significantly depending on age and education level. Women aged 41–50 (adjusted odds ratio (AOR): 6.0; 95%CI: 2.3–15.3) and with a university education (AOR: 2.6; 95%CI: 1.4–4.8) were associated with increased odds of being aware of Pap smears. Among the women who were aware of Pap smears, the majority (94.1%) expressed belief in the importance of undergoing Pap smear tests and 61.7% reported having undergone the procedure at least once in their lives. In the multivariate analysis, women aged 30–40 years (AOR: 1.7; 95%CI: 1.1–2.8), 41–50 years (AOR: 4.1; 95%CI: 2.3–7.3), and older than 50 years (AOR: 9.8; 95%CI: 4.2–23.0) had a higher likelihood of undergoing Pap smear tests than those of under 30 years old. Being a housewife (AOR: 1.7; 95%CI: 1.1–2.7) and those who believed in the importance of Pap smear testing (AOR: 2.6; 95%CI: 1.1–6.0) were also more likely to have a Pap smear test. Nearly half of the women who had undergone Pap smears reported doing so every 2–3 years, while 25.7% indicated annual screening. Importantly, the overwhelming majority (97.9%) preferred the procedure to be performed by a gynecologist. In conclusion, the majority of women were aware of Pap smears. Two-thirds of women reported having undergone the procedure at least once. Prevention programs targeting cervical cancer and Pap smear tests should be tailored to women with low education, younger than 30 years, and those employed to maximize screening uptake for cervical cancer.

Keywords: Pap smear, awareness, cervical cancer, screening methods, beliefs

Introduction

Cervical cancer is the fourth most frequent cancer among females worldwide, with an estimated 604,000 new cases and 342,000 mortalities in 2020 [1]. Globally, about 90% of the

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newly diagnosed cases and mortalities took place in low- and middle-income countries in 2020 [2]. Infection with the Human papillomavirus, transmitted by sexual contact, leads to cervical cancer [1]. The literature has shown that cervical cancer is a preventable illness due to various reasons, including the long precancerous condition, accessibility to prevention or screening strategies, and availability of effective treatment interventions [3].

Enhancing the survival of patients with cervical cancer depends on the disease stage at the time of diagnosis [4]. The five-year survival rate in patients whose cancer is recognized in early stages accounts for 92%, while in advanced stages is 13% [4,5]. Multiple screening methods for cervical cancer are available, with Pap smear test considered as one of the most reliable to detect cervical cancer, which may remain in its early stages for up to 20 years [6]. A study has indicated that Pap smear test is characterized by effectiveness, accuracy, simplicity, and economical method, with no adverse effects [4]. Increased use of Pap smear tests has been associated with a two-third reduction in cervical cancer incidence in various countries [4]. This test is performed every three years on women who were or are sexually active [7]. Insufficient use of Pap smear tests contributes to a sixfold increase in cervical cancer risk [8]. Approximately 70% of women dying due to cervical cancer have not performed the screening test regularly [9]. Despite the significant effectiveness of the Pap smear test, participation rate of women is lower in developing countries (5%) compared to high-income countries such as USA (nearly 90%) [10]. Additionally, access to preventive methods is limited and cervical cancer is mostly not detected until the cancer reaches advanced stages [1], leading to greater mortality rates.

The literature has explained various factors associated with the uptake of cervical cancer screening, including socio-demographic characteristics (such as income, age, gender, and level of education) and perceived benefits of the Pap smear test [11-13]. However, the factors associated with the uptake and awareness of the Pap smear test in the world may not reflect the current situation in Jordan [11]. In Jordan, about 3.63 million women aged 15 years and older are susceptible to cervical cancer [14]. Current estimates indicate that every year, 115 women are diagnosed with cervical cancer and 71 die from the disease. The age-standardized cervical cancer incidence in 2023 was 2.91 per 100,000 Jordanian women [14]. Surprisingly, the incidence of cervical cancer screening is still unsatisfactory in Jordan as there is no national program particularly designed for cervical cancer screening and studies targeting awareness and knowledge of smear tests in Jordanian women are scarce [11]. Therefore, raising awareness of women toward the Pap smear test and identifying the factors influencing the uptake of the test within the Jordan context is pivotal to minimize the potential complications related to cervical cancer and provide a holistic image of the barriers that impact the decision to undergo the cervical Pap smear procedure [11]. The aim of this study was to investigate the factors associated with awareness and participation in Pap smear tests among Jordanian women.

Methods

Study design and participants

A cross-sectional study was conducted consecutively among Jordanian women attending the outpatient department at Al-Ammal Maternity Hospital, Amman, Jordan. This study spanned from February to July 2023, encompassing a diverse sample of 525 women.

Data collection

A structured questionnaire was administered face-to-face by trained interviewers to collect comprehensive data. The questionnaires included the demographic characteristics of women, their awareness of Pap smears, their beliefs regarding the importance of Pap smears, sources of information, and the history of undergoing Pap smear tests. Demographic variables such as age, occupation, and education level were recorded. To assess awareness, women were asked if they had ever heard about the Pap smear test and the reasons why it was performed. Awareness of the Pap smear was defined as having heard about the test and correctly identifying its purpose. Beliefs concerning the significance of Pap smears were evaluated by participants' agreement or disagreement with the necessity of undergoing Pap smear tests by asking, “Do you think it is important to have a Pap smear test?”. Women were asked about where they received information

about the Pap smear test, allowing them to select one or more sources from the following options: gynecologist, Ministry of Health, friends, social media, TV and internet, and others. Participants were also queried about their preferences for additional information regarding the procedure with the question, "Do you need further information about the Pap smear?". The history of undergoing Pap smear tests was assessed through participants' self-reported experiences by asking, "Have you ever had a Pap smear test?". For those who had undergone a Pap smear test, they were asked about the timing of their last test (<1 year, 1–3 years, or >3 years), the frequency of their tests (every year, every 2–3 years, or occasionally), and their preferred person to perform the test (gynecologist, nurse, or general practitioner).

Data analysis

Descriptive statistics were employed to summarize the demographic characteristics, awareness levels, beliefs, sources of information, and Pap smear test histories among the participants. Chi-square tests were utilized to discern associations between categorical variables. Furthermore, multivariate logistic regression analysis was conducted to determine factors independently associated with awareness of Pap smears and the likelihood of undergoing Pap smear tests. To determine factors associated with awareness of the Pap smear test, the model included three independent variables: age, education, and occupation. The same factors, along with belief in the importance of undergoing Pap smear tests, were included in the model testing factors associated with undergoing the Pap smear test. Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) were calculated to quantify the associations. Statistical significance was defined as a *p*-value less than 0.05.

Results

A total of 525 Jordanian women were enrolled in this study. Of those, 60.6% were 40 years old or younger. The majority (56.8%) of women were housewives and 36.8% had a high school education or lower. Of the total participants, 460 women (87.6%) reported previous exposure to information about Pap smears. The awareness of Pap smears varied significantly depending on age and education level (**Table 1**). The lowest awareness rate was observed among women aged less than 30 years, while women with a university education exhibited a significantly higher awareness rate compared to those with a high school education or less (91.0% vs 81.9%). Multivariate analysis showed that women aged 30 years or older were significantly more likely to be aware of Pap smears compared to their younger counterparts. Women aged 41–50 had the highest odds of being aware of Pap smears (AOR: 6.0; 95%CI: 2.3–15.3) (**Table 1**). Additionally, women with a university education were 2.6 times more likely to be aware of Pap smears than those with lower educational levels after adjusting for age and occupation (AOR: 2.6; 95%CI: 1.4–4.8). Occupation was not significantly associated with awareness of Pap smear tests (AOR: 1.0; 95%CI; 0.5–1.9).

Table 1. Awareness of Pap smear tests according to women's characteristics (n=525)

Variable	Total	Awareness of Pap smear test		Adjusted odds ratio (AOR) (95%CI)*	*p*-value
		No, n (%)	Yes, n (%)		
Age in years					
<30	137	28 (20.4)	109 (79.6)	1.0	
30–40	181	20 (11.0)	161 (89.0)	2.0 (1.1–3.8)	0.028
41–50	124	6 (4.8)	118 (95.2)	6.0 (2.3–15.3)	<0.001
>50	83	11 (13.3)	72 (86.7)	2.3 (1.1–5.2)	0.037
Occupation					
Housewife	298	42 (14.1)	256 (85.9)	1.0	
Employed	227	23 (10.1)	204 (89.9)	1.0 (0.5–1.9)	0.994
Level of education					
High school or less	193	35 (18.1)	158 (81.9)	1.0	
University	332	30 (9.0)	302 (91.0)	2.6 (1.4–4.8)	0.002

*Analyzed using multiple logistic regression. The effect of each variable is adjusted for the effects of other variables in the model

Among the women who were aware of Pap smears, the majority (94.1%) expressed belief in the importance of undergoing Pap smear tests (**Table 2**). Approximately 75.7% of participants reported that the purpose of a Pap smear test is for screening and early detection. Gynecologists emerged as the primary source of information about Pap smears for women, with 59.1% citing them as their main information providers. Notably, 71.5% of participants expressed a desire for more information regarding Pap smears.

Table 2. Sources of information on Pap smear and the desire for information regarding Pap smear among women who were aware of Pap smear (n=460)

Variable	n	%
Belief in the importance of undergoing Pap smear tests	433	94.1
Self-reported purpose of Pap smear		
Screen/early detection	348	75.7
Others	112	24.3
Sources of information on Pap smear*		
Gynecologist	272	59.1
Ministry of health	27	5.9
Friends	71	15.4
Social media	42	9.1
TV and internet	38	8.3
Others	48	10.4
Desire for more information regarding Pap smears	329	71.5

*Allows multiple responses

Of the 460 women who had heard of Pap smears, 284 (61.7%) reported having undergone the procedure at least once in their lives. The likelihood of having a Pap smear increased with age (**Table 3**). Women aged 30–40 years (AOR: 1.7; 95%CI: 1.1–2.8), 41–50 years (AOR: 4.1; 95%CI: 2.3–7.3), and over 50 years (AOR: 9.8; 95%CI: 4.2–23.0) had a higher likelihood of undergoing Pap smear tests than those of under 30 years old. Housewives were more likely to have a Pap smear test compared to employed women (AOR: 1.7; 95%CI: 1.1–2.7) and women who believed in the importance of Pap smear testing were more likely to have undergone it (AOR: 2.6; 95%CI: 1.1–6.0). Education was not significantly associated with undergoing the procedure at least once in their lives (AOR: 1.3; 95%CI: 0.8–2.2).

Table 3. The proportion of women who underwent Pap smear tests according to women's characteristics and factors associated with undergoing Pap smear test (n=460)

Variable	Total	Underwent Pap smear test		Adjusted odds ratio (AOR) (95%CI)*	*p*-value
		No, n (%)	Yes, n (%)		
Age in years					
<30	109	63 (57.8)	46 (42.2)	1.0	
30–40	161	74 (46.0)	87 (54)	1.7 (1.1–2.8)	0.036
41–50	118	31 (26.3)	87 (73.7)	4.1 (2.3–7.3)	<0.001
>50	72	8 (11.1)	64 (88.9)	9.8 (4.2–23.0)	<0.001
Occupation					
Housewife	256	81 (31.6)	175 (68.4)	1.7 (1.1–2.7)	0.014
Employed	204	95 (46.6)	109 (53.4)	1.0	
Level of education					
High school or less	158	55 (34.8)	103 (65.2)	1.0	
University	302	121 (40.1)	181 (59.9)	1.3 (0.8–2.2)	0.225
Belief in the importance of undergoing Pap smear tests					
Yes	433	158 (36.5)	275 (63.5)	2.6 (1.1–6.0)	0.032
No	27	18 (66.7)	9 (33.3)	1.0	

*Analyzed using multiple logistic regression. The effect of each variable is adjusted for the effects of other variables in the model

Interestingly, nearly half of the women who had undergone Pap smears reported doing so every 2–3 years, while 25.7% indicated annual screening (**Table 4**). Importantly, the overwhelming majority (97.9%) preferred the procedure to be performed by a gynecologist.

Table 4. Characteristics of women who underwent Pap smear test (n=284)

Variable	n	%
The last time of had a Pap smear test		
<1 year	93	32.7
1–3 year	104	36.6
>3 year	87	30.6
Frequency of doing Pap smear test		
Every year	73	25.7
Every 2–3 years	128	45.1
Occasionally	83	29.2
Prefer a person for doing a Pap smear test for you		
Gynecologist	278	97.9
Nurse	2	0.7
General doctor	4	1.4

Discussion

Our study found that most participants reported previous exposure to information about Pap smears. However, only half of the women who had heard of Pap smears reported having undergone the procedure at least once in their lives. The suboptimal uptake of timely screening tests might be attributed to the lack of knowledge about Pap smear tests [15,16], which is confirmed by the findings of the present study indicating that a considerable portion of participants expressed a desire for more information regarding Pap smears. This finding is in line with the result of the study in Ethiopia, which reported that nearly 95.0% of women ever heard about cervical cancer screening, but only 46.8% of the women had sufficient knowledge regarding the Pap smear test [17]. Other studies from Saudi, Indonesia, and Tanzania found that the knowledge level about the Pap smear test was suboptimal [17-21]. Despite the increased awareness of communities toward cervical cancer and the importance of Pap smear tests in developing countries like Jordan, awareness and knowledge are still static and present on the low side of the curve [3]. Another study from Zimbabwe reported that most women (89%) had positive attitudes toward Pap smear tests, but the lack of knowledge was one of the most significant barriers to performing screening tests [22]. A study in China found that women with lower knowledge of screening tests were less likely to perform Pap smears [23]. This finding indicates that poor knowledge about Pap smear tests has a negative impact on screening behaviors among women [24].

Several factors could explain suboptimal screening rates, including fear of speculum examination, discomfort with male healthcare providers, and spousal disapproval [3,25]. Another possible explanation is that health screening in Jordan is not compulsory, and thus, whether or not screening is performed based on the instructions or advice provided by healthcare providers, personal beliefs, and attitudes of the women [3]. Obligatory screening leads to optimal outcomes and helps overcome the serious impacts of advanced cervical cancer subject to screening [3]. Thus, health education and collaborative efforts of healthcare providers are required to raise awareness and knowledge of Pap smear tests plus the potential health complications associated with cervical cancer [3].

Our study revealed that women aged 30 years or older were more likely to be aware of and have Pap smears compared to their younger counterparts. A study found that women aged 30 years or older were about two-fold more likely to undergo the Pap smear test compared to those in their 20s (AOR: 1.799; 95%CI: 1.182–2.739) [17]. The lower rates of screening tests among women younger than 30 years are not unique to Jordan, as a previous study has reported the same findings from developed countries and Africa [26]. According to this study, women aged between 35–39 years were three-fold more likely to perform Pap smear tests compared to women aged 20 years [26]. Another study in Australia found that women younger than 30 years or older than 39 years were less likely to undergo Pap smear tests compared to those aged 30–39 [27]. The explanation for this finding might include that cervical cancer has a bimodal distribution; the first mode is at the age of thirties and the second is at 60 [17]. The two age groups are known to develop symptoms associated with cervical lesions. Thus, women who perceive the risk of cervical cancer seek healthcare after identifying symptoms and recognizing susceptibility [17,28,29]. Finally,

literature has shown that women in their thirties have a higher willingness to perform gynecological examinations and screening tests compared to other age groups [17,28,29].

Our study found that women with higher education levels were more likely to be aware of and report having undergone Pap smears compared to those with lower educational levels. Women with higher education are more likely to have greater health information and access to healthcare services, and this could eventually improve their knowledge and awareness of smear tests [15]. One study found that 82.8% of women with secondary school or diplomas and 81.5% of women with university or postgraduate education recognized the importance of Pap smears, compared to 63.3% of women with less education (p=0.038) [30]. Previous studies also showed that the rates of Pap smear tests increase with educational level [31,32]. A possible explanation is that women with lower education are less likely to comprehend written educational material, resulting in reduced seeking for information [24]. This, in turn, may lead to a knowledge deficit regarding the Pap smear test in terms of its cost, effectiveness and benefits, side effects, and availability [33]. This barrier may potentially be addressed by tailoring appropriate literacy-educational materials and raising women's awareness of the importance of undergoing regular Pap smear tests [24,34-36].

Housewives were more likely to have had a Pap smear compared to employed women. A study indicated that women whose occupation status as housewives were more likely to be screened for Pap smear tests [37]. This finding is consistent with the results of other previous studies performed in Ethiopia and Iran [38,39]. The possible explanation could be that housewives have more free time to access health information regarding cervical cancer screening from social media, family, and maternal health services compared to employed women [37]. A study revealed that knowledge (AOR: 2.761; 95%CI: 1.561–4.883) about Pap smears is likely to be about three-fold higher among housewives compared to employed women [37].

The present study showed that women who believed in the importance of Pap smear testing were more likely to have undergone the test. According to the Health Belief Model, women are more likely to seek healthy behaviors if their susceptibility, beliefs, and seriousness relating to a particular health disease are high, the barriers to performing such behaviors can be reduced, and the benefits of using healthy behaviors are important [40]. The model is utilized for the prevention of a disease instead of controlling its symptoms and focuses on how people's perceptions impacting motivation and behavior [21,41]. For example, people need to perceive their susceptibility or sensitivity to an illness like cervical cancer, perceive its severe symptoms or serious complications like death, and ultimately find effective preventive behaviors such as Pap smear test uptake [21]. Additionally, awareness of the importance of undergoing the Pap smear test can help design culturally suitable interventions and educational materials to reduce barriers and increase the incidence of screening [24]. Awareness of the Pap smear test was found to be associated with greater intention to undergo it, while lower intention was found among women who had not heard about the screening test [21]. Women should also believe in their ability to perform a Pap smear test regularly (perceived self-efficacy) [4,42]. A study found that greater perceived risks and benefits of cervical cancer were associated with a higher intention to perform Pap smear testing [21].

Gynecologists emerged as the primary source of information about Pap smears for women, with 59.1% citing them as their main information providers. A Kuwaiti study reported that 77% of women received information about smear tests, and the most common source of information was a gynecologist (42%) [43]. Women who regularly visit gynecologists had greater rates of cervical cancer screening. This is in line with other studies, which found that women who visited a healthcare provider in the last year were more likely to perform Pap smear tests [29,44]. This is consistent with previous studies, concluding that encouragement, counseling, and education provided by the gynecologist have a significant influence on cervical cancer screening [11,44,45]. A study found that visiting a gynecologist was a significant predictor of Pap smear screening. The possible explanation is that Pap smear test is an important part of pelvic examination, which is routinely performed in gynecological clinics [44,45].

Our study has various implications. Given the awareness that screening tests are crucial to control cancer and that Jordanian women still need more education on Pap smears, developing an appropriate literacy-appropriate educational material, which tailored to the educational level,

could enhance awareness and knowledge of cervical cancer and increase screening rates [24]. The information delivered should be comprehensive, written, accessible, clear, simple, and easy to follow [3]. The topics might include risk factors, early symptoms, complications of cervical cancer, and benefits of Pap smear test [3]. Our study findings withdraw the attention of healthcare providers to educate women about the seriousness of cervical cancer symptoms and the importance of doing regular screening tests, such a role should be performed face-to-face in a hospital or healthcare setting. Furthermore, social media should be utilized to deliver health information to women under the supervision of health professionals [46]. Additionally, more emphasis should be placed on women's understanding of the holistic image to consider that cervical cancer is a national health problem exerting a high burden on the healthcare system. Further research and efforts are needed to assess the efficacy of varied strategies to enhance awareness and attitudes about cervical cancer in order to increase the utilization of screening services, especially among women with lower education, those aged younger than 30 years, and those who have an occupation.

The strengths of this study are that it addressed a significant public health problem in Jordan, where cervical cancer screening rates are low and there is no national screening program. The findings from this study could inform policy and program development to increase cervical cancer screening rates. The main limitation was that this study was conducted among women attending a specific hospital, which may not be representative of the broader population of Jordanian women. In addition, data on awareness, beliefs, and Pap smear history were self-reported, which can be subject to recall bias and social desirability bias.

Conclusion

The majority of women were aware of Pap smears. Two-thirds of women reported having undergone the procedure at least once. The likelihood of having had a Pap smear was greater among women aged 30 and older, housewives, and those who valued the test's importance. Prevention programs targeting cervical cancer and Pap smear tests should be tailored to women with low education, younger than 30 years, and those employed to maximize screening uptake for cervical cancer. Further research is needed to assess the effectiveness of different strategies that can be utilized to enhance awareness of cervical cancer and increase the utilization of screening services.

Ethics approval

Ethical clearance was granted by the Institutional Review Board of Al-Amal Maternity Hospital, Amman, Jordan, and the study adhered to the ethical principles outlined in the Declaration of Helsinki. Informed consent was obtained from all participants before the commencement of data collection, ensuring the strict confidentiality of all information gathered throughout the study.

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Competing interests

All the authors declare that there are no conflicts of interest.

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Underlying data

Derived data supporting the findings of this study are available from the corresponding author on request.

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