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Cervical cancer screening; awareness, acceptance and barriers to access among sexually active women of Hail region of Saudi Arabia

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ABSTRACT

Early diagnosis and management of cervical carcinoma can prevent the morbidity associated with cervical carcinoma and deaths. The study aimed to assess cervical cancer screening awareness, its acceptance and barriers to access among sexually active women of the Hail region of Saudi Arabia. *Methods:* This cross-sectional, community-based survey-study was performed on 18-70 years old women from January to March 2023. *Results:* The mean awareness scores were significantly higher among Non-Saudi than Saudi participants (P = 0.009) with access to social media and higher educational level (secondary school and above (P = 0.014) were significantly more aware of cervical cancer screening. While the area of residence, age, number of children, occupation and family history were not significant factors (P > 0.05). Mean acceptance scores were significantly higher among participants who had access to social media and family history (P=0.040) and (P=0.027) respectively. Similarly, nulliparous women (M=19.8, SD=26.8) and grand multipara were significantly lower than participants with 1-2 and 3-5 children. The participants' area of residence, nationality, education and occupation were not significantly associated with variations in the mean scores of cervical cancer screening acceptance (P > 0.05). Differences between the mean scores of barriers to accessing cervical cancer screening with respect to any demographic characteristics were statistically insignificant. *Conclusion:* Health education about HPV-related infections, cervical cancer screening, vaccination and providing information through health professionals and media can help to reduce the new emerging cases.

Keywords: Cancer prevention, cervical cancer screening, Hail, Saudi Arabia, Pap smear

1. INTRODUCTION

Cancer of the cervix is globally the fourth most common cancer among

women. Singh et al., (2023) reported that 604 000 new cases emerged and 342 000 deaths occurred during 2020. Most of these were seen in low and middle-income countries due to a lack of organized prevention programs. Zahid et al., (2022) mentioned cervical cancer incidence in Saudi Arabia as 2.4/100000 for 2020. Many factors are attributed to this potential increase in the incidence of cervical cancer in Saudi Arabia. These include a lack of information about national screening programs, social and behavioral issues and increasing prevalence of the human papillomavirus (HPV). It has been long established by Burd, (2003) & Ali et al., (2022), that certain types of the Human Papillomavirus (16, 18) have been found to be associated with more than 75% of cervical cancers.

Vaccination against these strains can prevent infection and most cases of cancer cervix (Almutairi et al., 2022; Elnashar et al., 2022). There is a wide variation in the incidence of HPV infections across countries due to different sexual and cultural norms. Data on HPV-related infections is limited for Saudi Arabia. The cervical cancer preventive vaccine is recently added to the National vaccination program. Alsalmi and Othman, (2022) mentioned its relatively low uptake in Saudi Arabia. Recommendations by health providers can be the most effective in providing information to parents. Still, there is a need to update their knowledge, attitudes and practices in this area. Lack of knowledge among parents about the vaccine is one of the common barriers preventing its acquisition in Saudi Arabia.

Stephens et al., (2016) reported many factors contributing to barriers in prevention (vaccination, testing), like fear of side effects and lack of encouragement. There is a need to initiate extensive awareness campaigns to provide knowledge of prevention strategies and safe behaviors. The current study will fill some of the data gaps in awareness of cervical cancer prevention with special emphasis on vaccination, early identification and treatment.

2. MATERIALS AND METHODS

To assess the cervical cancer screening awareness, its acceptance and barriers to access among sexually active women of Hail region. This cross-sectional, community-based study was performed in reproductive-aged sexually active women of the Hail region from January to March 2023. The study proposal was submitted to the Research Ethics Committee of the University of Hail and approval was received on 12th December 2022 vide letter number (H-2022-419).

The study questionnaire was completed by a sample of 299 Saudi/non-Saudi married women, aged 18-70 years. The study questionnaire contained four main sections, the first one comprising demographic characteristics in terms of nationality, residence, age and number of children, education level, occupation, social media access and relatives' history of cervical cancer. The participants' awareness, acceptance and barriers to accessing the screening were measured through sections two to four. The awareness section was composed of seven (Yes/No) questions to measure the level of cervical cancer screening awareness and additional questions to explore the source of this awareness among participants. The acceptance section was composed of seven (Yes/No) questions to measure the level of cervical cancer screening acceptance among participants.

Finally, in the last section, the participants were asked to choose from six different barriers to access cervical cancer screening. The level of awareness, acceptance and barriers to access cervical cancer screening was calculated by coding participant responses with 1=Yes and 0=No, then calculating the average of participant responses on each section and multiplying it by 100. The range of awareness, acceptance and barriers to accessing cancer screening scores is 0 to 100. A higher score indicates a higher level of awareness, acceptance and barriers to access cervical cancer screening.

Statistical data was analyzed using Statistical Packages for Social Sciences version 25 (IBM Corp, USA). The statistical analysis of the study was performed by descriptive and inferential statistical analyses. The descriptive statistics calculated the frequency and percentage of participants' responses for each item of the questionnaire and the mean and standard deviation of awareness, acceptance and barriers scores. The inferential statistics included the independent samples t-test and analysis of variance (ANOVA) to explore the impact of participants' demographic on their awareness, acceptance and barriers to access screening for cervical cancer. A P-value of 0.05 was considered statistical significance.

3. RESEARCH RESULTS

The research results are divided into three main parts: The first part presents the demographic characteristics of the participants, second part describes participants' responses on awareness, acceptance and barriers to access sections in study questionnaire and the last part includes inferential statistics, whereby independent sample t-test and ANOVA test were utilized to explore the differences in awareness, acceptance and barriers to accessing cervical cancer screening according to participants' demographic characteristics.

Participants' demographic characteristics

Most participants were Saudi citizens (94.3%). The majority (70.9%) lived in Hail City, while 29.1% in the periphery. The results indicated that participants' age range from 18 to 65 years with a mean (±SD) of 38 ± 11.2 years. Young participants (26 to 35 years) contributed the highest 32% of the data. The analysis indicated that 44.1% of the participants have 3 to 5 children, while 24.1% of them have one or two children. Others had either no children or more than 5 children representing 16.7% and 15.1% respectively.

Bachelor's level was (59.9%) and 15.1% of the participants were postgraduate degree holders (Diploma or Master's degree). Secondary and high school level represents 20.4% of the study sample. Below primary was only 4.7%. More than half of the responders were employed in the government sector (38.1%), private sector (11.0%) or freelancing (11.0%) while 44.5% were unemployed. Social media access was available to 94%.

Awareness, acceptance and barriers to access screening

Awareness of cervical cancer screening

A moderate level of cervical cancer screening awareness was seen among study participants with an overall awareness score (out of 100) ranging from 0 to 100 and a mean (± SD) score of 53.5 ± 29.0. Table 1 presents the frequency distribution of participants' responses to awareness items.

Table 1 Participants' Awareness of cervical cancer

Awareness items (N=299)	Yes		No	
	n	%	n	%
Are you aware of cervical cancer?	204	68.2%	95	31.8%
If it has a relationship with vaginal/cervical infections?	141	47.2%	158	52.8%
Do you know about its screening/ prevention tests?	126	42.1%	173	57.9%
Have you heard about Pap smear?	207	69.2%	92	30.8%
Have you ever heard of preventive vaccine for cervical Cancer?	123	41.1%	176	58.9%
Is the cervical cancer prevention vaccine included in the National vaccination program?	95	31.8%	204	68.2%
If available, will you get your daughter immunized?	224	74.9%	75	25.1%
Overall awareness level: Mean ± SD (Range)	53.5 ± 29.0 (0 - 100)			

The results showed that the majority of participants (62.5%) get their information regarding cervical cancer from social media, followed by family and friends (39.5%), gynecologists (26.4%) and TV (24.1%).

Acceptance of cervical cancer screening

The results of the participant's responses in the acceptance section showed a low level of cervical cancer screening acceptance among study participants with an overall acceptance score (out of 100) ranging from 0 to 100 and a mean (± SD) score of 29.9 ± 32.2. Table 2 presents the frequency distribution of participants' responses to acceptance items.

Table 2 Participants' Acceptance of cervical cancer screening

Acceptance items (N=299)	Yes		No	
	n	%	n	%
Have you ever gone for a gynecological pelvic check-up?	123	41.1%	176	58.9%
Have you ever been advised to have Pap smear?	91	30.4%	208	69.6%
Did you ever get testing (Pap-smear)?	86	28.8%	213	71.2%
If you got testing in last 5 years?	51	17.1%	248	82.9%
If any of your relatives got testing?	80	26.8%	219	73.2%
If your/their experience was pleasant? (N = 121)	91	74.6%	31	25.4%
Overall acceptance level: Mean ± SD (Range)	29.9 ± 32.2 (0 - 100)			

Barriers to cervical cancer screening

The results of the participant's responses in the barriers section showed a low level of barriers to access cervical cancer screening among study participants with an overall barriers score (out of 100) ranging from 16.7 to 83.3 and a mean (± SD) score of 23.0 ± 11.7. Figure 1 presents the frequency distribution of participants' responses to barrier items.

Figure 1 Barriers to getting cervical cancer screening

Factors affecting awareness, acceptance and barriers to accessing cervical cancer screening

Factors affecting awareness of screening (cervical cancer)

Table 3 presents the mean and standard deviation of awareness scores for study sample according to demographic characteristics, along with the results of independent samples t-test and one-way analysis of variance (ANOVA) to test the differences in awareness scores with respect to the demographic characteristics.

Table 3 Participants' awareness score of cervical cancer screening by demographic characteristics

Characteristics		Mean	SD	Test Statistic	P-value
Area of residence [a]	Hail City	51.8	28.9	-1.58	0.115
	Outside Hail	57.6	28.9		
Age [b]	18 - 25 years	50.0	31.9	1.92	0.127
	26 - 35 years	52.0	26.5		
	36 - 45 years	59.6	30.7		
	46 years and older	50.2	27.8		
Children [b]	None	50.3	28.6	1.17	0.320
	1 - 2 Childs	50.8	27.3		
	3 - 5 Childs	57.0	29.1		
	More than 5 Childs	51.1	31.1		
Nationality [a]	Saudi	52.6	29.1	-2.89 *	0.009
	Non-Saudi	68.9	22.2		
Education [b]	Uneducated / Primary	34.7	33.5	3.62 *	0.014
	Secondary / High School	54.3	31.1		
	Bachelor	52.4	27.6		
	Diploma / MSc	62.5	27.5		
Occupation [a]	Not working	50.4	28.9	-1.68	0.094
	Working	56.0	28.8		
Social media access [a]	Yes	55.3	28.6	5.71 *	< 0.001
	No	26.2	20.4		
Relatives'	Yes	56.0	30.3	0.59	0.559

history of cervical cancer [a]	No	53.1	28.8		

[a] P-value has been calculated using independent sample t-test.
[b] P-value has been calculated using ANOVA test.
* Significant at 0.05 level.

When measuring the differences in the awareness scores according to the demographic characteristics of the study participants (Table 3), the results demonstrated that the mean awareness scores were significantly higher among Non-Saudi (M=68.9, SD=22.2) than Saudi (M=52.6, SD=29.1) (P = 0.009). The results indicated that participants who have access to social media were significantly more aware (M=55.3, SD=28.6) compared to participants who reported no social media access (M=26.2, SD=20.4) (P < 0.001).

In addition, the results revealed a significant influence of educational level on participants awareness of cervical cancer screening (P = 0.014). The results indicated that the participants with lower educational levels (Uneducated / Primary education) have significantly lower awareness scores (M=34.7, SD=33.5) compared to other education levels, secondary or high school (M=54.3, SD=31.1), bachelor (M=52.4, SD=27.6) and diploma or M.Sc. (M=62.5, SD=27.5). Each of participants' area of residence, age and number of children, occupation and relatives' history were not significantly associated with variations in the mean scores of cervical cancer screening awareness (P > 0.05).

Factors affecting acceptance of cervical cancer screening

Table 4 presents the mean and standard deviation of acceptance scores for study sample according to demographic characteristics, along with the results of independent samples t-test and one-way ANOVA (analysis of variance) to test the differences in acceptance scores with respect to the demographic characteristics.

Table 4 Participants' acceptance score for screening by demographic characteristics

Characteristics		Mean	SD	Test Statistic	P-value
Area of residence [a]	Hail City	28.0	31.4	-1.65	0.100
	Outside Hail	34.7	33.7		
Age [b]	18 - 25 years	18.1	25.8	3.96 *	0.009
	26 - 35 years	37.8	34.8		
	36 - 45 years	28.2	31.0		
	46 years and older	28.4	31.2		
Children [b]	None	19.8	26.8	3.59 *	0.014
	1 - 2 Childs	38.5	36.2		
	3 - 5 Childs	30.3	29.6		
	More than 5 Childs	26.5	35.1		
Nationality [a]	Saudi	29.0	31.5	-1.67	0.113
	Non-Saudi	45.5	40.0		
Education [b]	Uneducated / Primary	19.8	29.8	0.87	0.459
	Secondary / High School	28.3	33.4		
	Bachelor	32.0	33.5		
	Diploma / MSc	27.2	24.8		
Occupation [a]	Not working	30.4	32.8	0.24	0.813
	Working	29.5	31.8		
Social media access [a]	Yes	30.8	32.5	2.19 *	0.040
	No	17.2	25.0		
Relatives' history of cervical cancer [a]	Yes	40.5	33.5	2.22 *	0.027
	No	28.4	31.7		

[a] P-value has been calculated using an independent sample t-test.
[b] P-value has been calculated using ANOVA test.
* Significant at 0.05 level.

When measuring the differences in the acceptance scores according to the demographic characteristics of the study participants (Table 4), the results demonstrated that the mean acceptance scores were significantly higher among participants who have access to social media (M=30.8, SD=32.5) and participants with relatives' history of cervical cancer (M=40.5, SD=33.5) compared to participants with no social media access (M=17.2, SD=25.0), (P=0.040) and participants who reported that none of their relatives diagnosed with cervical cancer previously (M=28.4, SD=21.7) (P=0.027).

In addition, the results revealed a significant influence of age on participants' acceptance of cervical cancer screening (P = 0.009). The results indicated that the acceptance score was significantly lower among participants aged 18 to 25 years (M=18.1, SD=25.8) compared to other age groups. The highest acceptance scores were corresponding to participants aged 26 to 35 years (M=37.8, SD=34.8), followed by participants aged 36 to 45 years (M=28.2, SD=31.0) and 46 years and older participants (M=28.4, SD=31.2).

It was also found that number of children significantly impact acceptance of cervical cancer screening (P = 0.014). The results demonstrated that the acceptance level among participants with no children (M=19.8, SD=26.8), and with more than five children (M=26.5, SD=35.1) is significantly lower compared to participants with 1-2 children (M=38.5, SD=36.2) and participants with 3-5 children (M=30.3, SD=29.6). On the other hand, the results indicated that each of participants' area of residence, nationality, education and occupation were not significantly associated with variations in the mean scores of cervical cancer screening acceptance (P > 0.05).

Factors affecting barriers to screening of cervical cancer

Table 5 presents the mean and standard deviation of barrier scores for the study sample according to demographic characteristics, along with the results of independent samples t-test and one-way analysis of variance (ANOVA) to test the differences in barriers scores with respect to the demographic characteristics.

Table 5 Participants' barriers score by demographic characteristics

Characteristics		Mean	SD	Test Statistic	P-value
Area of residence [a]	Hail City	23.7	12.1	1.73	0.086
	Outside Hail	21.3	10.4		
Age [b]	18 - 25 years	22.5	11.0	0.85	0.469
	26 - 35 years	22.1	11.0		
	36 - 45 years	24.6	13.4		
	46 years and older	22.4	10.7		
Children [b]	None	23.0	11.1	0.45	0.716
	1 - 2 Childs	24.3	14.3		
	3 - 5 Childs	22.4	10.3		
	More than 5 Childs	22.6	11.9		
Nationality [a]	Saudi	22.8	11.6	-0.92	0.360
	Non-Saudi	25.5	13.3		
Education [b]	Uneducated / Primary	27.4	19.2	1.52	0.210
	Secondary / High School	24.3	12.0		
	Bachelor	22.7	11.3		
	Diploma / MSc	20.7	9.5		
Occupation [a]	Not working	22.9	11.4	-0.04	0.965
	Working	23.0	12.0		
Social media access [a]	Yes	23.0	11.6	-0.07	0.946
	No	23.2	13.0		
Relatives' history of cervical cancer [a]	Yes	23.1	11.9	0.06	0.949
	No	23.0	11.7		

[a] P-value has been calculated using independent sample t-test.

[b] P-value has been calculated using the ANOVA test.

* Significant at 0.05 level.

When measuring the differences in the barriers scores according to the demographic characteristics of the study participants (Table 5), the results demonstrated no significant differences in the mean scores of barriers to screening with respect to any of the participant's demographic characteristics (area of residence, age, number of children, nationality, education, occupation, social media access and relatives' history of cervical cancer).

4. DISCUSSION

Level of awareness, acceptance and barriers to accessing screening for cervical cancer

The outcomes of the current study demonstrated a moderate level of awareness of cervical cancer screening among study participants, which is comparable to a several recent studies in Saudi Arabia (Al-Nafisah et al., 2019; Akkour et al., 2021; Al-Ghamdi, 2022; Algabr et al., 2022). However, the results of this study indicated a higher level of cervical cancer awareness among Saudi females compared to other studies in Saudi Arabia Arabia (Dhaher, 2019; Alshammiri, 2022; Zahid et al., 2022).

The variations of these results may be due to the differences in the demographic characteristics and study designs. Exploring the source of participants' awareness showed that the majority of participants get their information from social media; these results are in accordance with similar recent studies conducted in Saudi Arabia (Akkour et al., 2021; Al-Ghamdi, 2022). Strong efforts should be considered to increase cervical cancer screening awareness levels among sexually active women in Hail region of Saudi Arabia. In addition, the Ministry of Health and non-government organizations concerned with women's health in Saudi Arabia are advised to start social media campaigns to increase awareness of cervical cancer and demonstrate the importance of cervical cancer screening among sexually active women in Saudi Arabia.

Despite this moderate level of awareness, the current study demonstrated a low level of cervical cancer screening acceptance. Only a quarter of the participants had undergone a smear at some point in their lives. Similar screening rates were reported by Al-Khudairi et al., (2017), Salem et al., (2017), Dhaher, (2019), Aldohaian et al., (2019), Al-Nafisah et al., (2019), Alsalmi and Othman, (2022), Al-Ghamdi, (2022) and Alshammiri, (2022). Strong efforts should be considered to increase cervical cancer screening acceptance levels among sexually active women in Hail region of Saudi Arabia. Also, more research studies should be conducted to explore the factors corresponding to cervical cancer screening acceptance among sexually active women in Hail region of Saudi Arabia.

There were low barriers in accessing cervical cancer screening acceptance among sexually active women in the Hail region of Saudi Arabia. The most important was the lack of knowledge about the importance of screening and fear of screening procedures and the fear of getting abnormal results. Previous studies concerned with barriers to accessing cervical cancer screening showed similar barriers among women of Saudi Arabia (Salem et al., 2017; Dhaher, 2019; Aldohaian et al., 2019; Alreshidi et al., 2020). According to the results of the current study, working on removing these barriers should be achieved by improving the awareness and knowledge among sexually active women in the Hail region of Saudi Arabia.

The Impact of demographic characteristics on cervical cancer screening awareness, acceptance and barriers

The outcomes of the current study revealed a significant impact of participants' nationality, education and access to social media on cervical cancer screening awareness levels among participants. The results indicated a lower awareness level among Saudi women, uneducated/primary educated and women with no access to social media. Similar results regarding the impact of women's age, education and source of information were reported in several studies in Saudi Arabia (Ravichandran et al., 2011; Algabr et al., 2022).

Additionally, the study showed a significant association between participants' age, number of children, social media access and family history and acceptance of screening in sexually active women. The results indicated a lower acceptance level among younger women (18-25 years), with no children, no access to social media and no previous history of cervical cancer among their relatives. Similar results were reported in studies in Saudi Arabia (Alsalmi and Othman, 2022; Algabr et al., 2022; Zahid et al., 2022).

Finally, the results showed that none of the demographic characteristics were significantly associated with barriers to accessing cervical cancer screening among study participants, which is the same results reported by Aldohaian et al., (2019). This result is supposed to encourage further studies to explore the factors affecting the barriers to accessing cancer screening among sexually active women in the Hail region of Saudi Arabia

5. CONCLUSION

Healthcare needs are transforming with transformations in cultural and social factors. Creating awareness regarding causative factors and HPV infections can reduce infection acquisition. While providing knowledge on its vaccine, can reduce the burden of

cervical cancers. The health care professionals (nurses, paramedics, general physicians and pediatricians) and social media platforms can spread information and encourage parents and guardians to help their children get vaccinated can help to reduce the new emerging cases.

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Author Contributions

Conceptualization: Nuzhat Parveen; methodology: Nuzhat Parveen; software: Jumana Al-Huwaymil; validation: Jumana Al Huwaymil, Noura Alhoty and Nuzhat Parveen; formal analysis: Jumana Al-Huwaymil; data curation: Jumana Al-Huwaymil and Noura Alhoty; writing—original draft preparation: Jumana Al-Huwaymil and Noura Alhoty; writing—review and editing: Nuzhat Parveen; supervision: Nuzhat Parveen. All authors have read and agreed to the published version of the manuscript.

Institutional Ethical Review Statement

The study proposal was reviewed by Research Ethics Committee of the University of Hail and approved on December 12, 2022 by the committee reference letter number (H-2022-419).

Informed Consent Statement

Participants were informed about the background, rationale of the study and anonymity of the data before collecting their responses. They were assured that neither any content of their personal identification nor any source which can reach their identity is required for this. Consent from the patients was verbal only as the data required was anonymous in every aspect.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

The data presented in this study is available on request from the corresponding author. Authors can get approval from the Deanship of scientific research and college of the Medicine/ University of Hail for access. The data are not publicly available due to the Medical Research Ethics Committee (MREC).

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