ORIGINAL ARTICLE

Oman Medical Journal [2022], Vol. 37, No. 3: e374

Cervical Cancer-related Knowledge and Practice among Omani Women Attending a Family Medicine and Public Health Clinic

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ARTICLE INFO

Article history:
Received: 19 August 2021
Accepted: 31 October 2021

Online:
DOI 10.5001/omj.2022.56

Keywords:
Cervical Cancer; Papanicolaou Test; Cancer Screening; Health Knowledge, Attitudes, Practice; Human Papilloma Virus; Oman.

ABSTRACT

Objectives: This study aimed to assess knowledge, attitudes, and screening practices related to cervical cancer and Papanicolaou (Pap) smear testing among Omani women who were visitors to a family medicine and public health (FMPH) clinic. A secondary aim was to correlate the above with the subjects' sociodemographic characteristics. ***Methods***: This cross-sectional study was carried out from February 2020 to April 2021 at the FMPH Clinic of Sultan Qaboos University Hospital, Muscat. A self-administered questionnaire assessed the participants' sociodemographic characteristics, cervical cancer-related risk factors, and their knowledge, attitudes, and practices related to cervical cancer, cervical cancer screening, and Pap smear testing. ***Results:*** The participants were 285 Omani women. The vast majority (256/285; 89.8%) had heard about cervical cancer and 208/285 (73.0%) about Pap smear testing. Only 32/285 (11.2%) and 179/285 (62.8%) demonstrated high levels of knowledge in the respective topics. Cervical cancer knowledge scores were associated with education level (p = 0.039), whether the qualification was related to healthcare (p < 0.001), and the nature of employment (p = 0.033). Pap smear knowledge scores were also associated with age (p = 0.001), education level (p < 0.001), whether the qualification was related to healthcare (p < 0.001), the nature of employment (p = 0.001), and number of children (p = 0.001). Most women were aware of the availability of Pap smear testing in Oman (206/285; 72.3%) and 114/285 (40.0%) had previously undergone this test. Among those who had never undertaken Pap smear testing (171/285; 60.0%), many were willing to do so in the future (103/171; 60.2%). ***Conclusions:*** Our results provide an increased understanding of Omani women's level of perceptions, attitudes, and screening practices related to cervical cancer. These findings will help develop strategies to improve Omani women's knowledge of cervical cancer symptoms and screening facilities and promote optimum utilization of the available screening services.

Worldwide, cervical cancer was the fourth most common type of cancer among females in 2018, with 570 000 new diagnoses that year.[1] As per the Global Cancer Observatory, cervical cancer resulted in approximately 311 000 deaths globally in the same year, with an estimated age-standardized incidence of 13.1 per 100 000 women.[2] The disease appears to be more prevalent in resource-stressed countries. The highest age-standardized rates in 2018 were reported in Swaziland (75.3 per 100 000 women), Malawi (72.9 per 100 000), and Zambia (66.4 per 100 000).[3] Overall, cervical cancer was reported to be the leading cause of cancer-related deaths among women in most regions of Africa.[2,3]

According to the World Health Organization, cervical cancer is one of the most easily preventable forms of cancer among women with early detection and effective management.[4] Many cervical cancer screening guidelines recommend that screening be initiated for all sexually active women from the age of 21–25 years and continue until the age of 65–70 years.[5–7] Most screening measures focus on early screening with Papanicolaou (Pap) smear testing alone every three years, or in combination with human papillomavirus (HPV) screening every five years. There is strong evidence that HPV vaccination is safe and effective against the main carcinogenic HPV subtypes.[8] The prevalence of late-stage diagnosis of cervical cancer cases suggests a lack of

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public awareness of HPV, cervical cancer, and the availability of diagnostic facilities.[4,9]

In Oman, cervical cancer is the fourth most common cancer in women of all ages, as well as the third most common in women aged 15–44 years.[10,11] Every year, approximately 88 new cases are diagnosed with an estimated 50 deaths in 2020.[11] While the incidence of cervical cancer in Oman is relatively low, the mortality rate is high suggesting late-stage presentations and diagnoses. One reason may be the lack of a national screening program for early detection and the absence of an HPV vaccination program.[11] Previous studies from Oman have shown that knowledge regarding cervical cancer, its risk factors, and screening methods and facilities are generally poor among Omani women.[12–15]

In 2017, a Women's Health Clinic was launched by the Family Medicine and Public Health (FMPH) Clinic of the Sultan Qaboos University Hospital (SQUH), a tertiary care teaching hospital in Muscat, Oman. FMPH clinic provides primary care services exclusively to employees of SQUH and SQU and their immediate dependents. The main aim of the new Women's Health Clinic is to guide and encourage all women attending the clinic for regular health check-ups including cervical cancer screening.

Although previous studies have reported low levels of knowledge and awareness of cervical cancer and its screening among Omani women, none have so far sought to assess awareness of such topics after opening the Women's Health Clinic at FMPH clinic. Therefore, the current study aimed to provide updated information regarding the knowledge, attitudes, and practices related to cervical cancer and its screening test among Omani women visiting the FMPH clinic and to establish a correlation with their sociodemographic characteristics. These findings are expected to provide information that can be used to improve the awareness and utilization of screening services in Oman and incorporate these findings in future health promotion programs on targeting women.

METHODS

A cross-sectional survey was conducted over a 14-month period from February 2020 to April 2021. The target population consisted of all ≥ 18-year-old Omani women who attended the FMPH clinic for various reasons during the study period. Those who did not speak Arabic or English, had learning difficulties, or were critically ill were excluded from the study. An online sample size calculator (Raosoft Inc., USA) was used to estimate the required sample size, based on the average number of Omani women attending the FMPH clinic per month. According to unpublished hospital data, approximately 800 Omani women attend the clinic per month; considering a 5% margin of error, 95% level of confidence, and 5% alpha error, the optimum sample size for the study was estimated as 328 women.

A structured, self-administered, Arabic-language questionnaire which had been previously used in a similar study in Oman was used to collect data from the participants.[15] The questionnaire was required to be filled out online, and given as a link to the participant's mobile phone to fill up, and consisted of three main parts. The average time required to complete the questionnaire was 8–10 minutes.

The first part assessed the participants' sociodemographic characteristics such as age, marital status, age upon first marriage, number of children, employment status, educational qualification, and whether the qualification was related to healthcare.

The second part assessed the participants' knowledge and awareness regarding cervical cancer and HPV. The participants were asked whether they had previously heard of cervical cancer, from which source(s), and whether they thought cervical cancer was a common cause of cancer-related deaths among women worldwide. The participants were also queried on their knowledge of the warning signs of cervical cancer, such as intermenstrual bleeding, persistent low back pain, persistent foul-smelling vaginal discharge, dyspareunia, menorrhagia, persistent diarrhea, postmenopausal bleeding, persistent pelvic pain, postcoital bleeding, blood in urine or stool, and unexplained weight loss. Also assessed was their knowledge on the risk factors of cervical cancer, such as a history of HPV infection, smoking, weakened immunity of self or spouse, long-term use of contraceptive pills, early marriage (< 16 years), having many children (≥ 3), and family history of cervical cancer. A few questions also assessed the women's knowledge of HPV and its vaccine, and whether they were accepting of the notion of providing the HPV vaccine to middle school-aged girls.

The third part of the questionnaire assessed the participants' knowledge, attitudes, and practices regarding cervical cancer screening including whether they had ever heard of such screening, their source of information, and whether they had ever been recommended to undergo screening by a healthcare professional. In addition, they were asked to specify the body part evaluated during a Pap smear, the ideal frequency and candidate for testing, and how they would interpret abnormal test results. The participants were asked if they believed that cervical cancer screening could successfully prevent and treat this cancer, and whether screening facility was available in Oman. Additional questions probed the perceived barriers to screening. Experience and reasons for undergoing screenings previously were also evaluated. Those who had never been screened before were asked why, and whether they would be willing to get themselves screened in the future.

All the items in the second and third sections of the questionnaire were compiled and scored as follows. The second section comprised four items assessing knowledge of cervical cancer (four questions on general knowledge, one on warning signs, and one on risk factors) followed by two questions listing 11 warning signs and eight risk factors of cervical cancer. Each correct answer received a score of 1, resulting in a maximum score of 23. Total scores of < 8, 8–15, and > 15 were respectively considered to indicate poor, acceptable, and high levels of knowledge. The third part consisted of seven items on cervical cancer screening. Each correct answer was assigned one point, with total scores out of 7, similarly categorized as indicative of poor (scores of < 3), acceptable (3–4), or high (> 4) levels of knowledge.

The final version of the questionnaire was published online using Google Forms (Google LLC, USA). A link to the online survey was provided to every woman who attended the clinic during the study period and who agreed to take part in the survey. However, due to the ongoing coronavirus pandemic and the initially low response rate, additional prompting became necessary. The eligible candidates were again invited via phone text and WhatsApp messages (Meta Platforms, Inc.) with an electronic link to the questionnaire.

Data analysis was performed using the Statistical Package for the Social Science (SPSS), Version 23.0 (IBM Corp., Armonk, N.Y., USA). Categorical data were presented as frequencies and percentages, whereas continuous variables were presented as means±SD. Pearson's Chi-squared (χ^2) test was used to determine correlations where required and Fisher's exact test was used for low cell frequencies in which the expected frequency was < 5 in any of the cells. A p-value of ≤ 0.050 was considered statistically significant.

Ethical approval for this study was obtained from the Medical Research and Ethics Committee of the College of Medicine and Health Sciences, Sultan Qaboos University (#SQU-EC/170/19). Participants were informed that completion of the questionnaire constituted their consent to take part in the study. The aims of the study were stated clearly at the beginning of the online questionnaire and all participants were informed that participation in the study was voluntary in nature and that they had the right to withdraw at any time. The participants were assured confidentiality of their data and that the survey questions should not be construed as offering any medical advice. Collected data was kept anonymous and the completed questionnaires were coded and stored in a secure database which was later used solely for data analysis.

RESULTS

A total of 285 Omani women participated in the study. The mean age was 35.9±6.8 years (range: 19–57 years). More than half were aged 31–40 years (152/285; 53.3%), followed by the age groups ≤ 30 years (n = 66; 23.2%) and > 40 years (n = 67; 23.5%). Regarding education, 64/285 (22.5%) participants were postgraduates; 171 (60.0%) had bachelor's degree or diploma; 45 (15.8%) had secondary schooling; while 3 (1.1%) had primary education. Two participants (0.7%) had no formal education. Almost one-third of the participants (n = 107; 37.5%) held healthcare-related degrees. More than half (n = 191; 67.0%) were employed. The vast majority were currently married (n = 280; 98.2%). The average age at first marriage was 24.0±3.83 years, and 200 (70.2%) women were married at ≤ 25 years. The total number of children ranged from 1–10, with an average of 2.8±1.8 children.

Most participants (256/285; 89.8%) had heard of cervical cancer, mostly from the Internet or social media (135/285; 47.4%), followed by healthcare providers (n = 123; 43.2%), schools or universities

(n = 73; 25.6%), printed media such as magazines or newspapers (n = 60; 21.1%), television programs or advertisements (n = 52; 18.2%), and family or friends (n = 42; 14.7%). Nearly one-third of participants (n = 88; 30.9%) believed that cervical cancer was among the top five leading causes of death in women worldwide. Most (n = 204; 71.6%) had never heard of HPV or its vaccine. Nevertheless, 125 women (43.9%) agreed that it should be offered to middle school-aged girls.

The participants identified warning signs of cervical cancer in the following frequency: dyspareunia (204/285; 71.6%), postmenopausal bleeding (n = 196; 68.8%), spotting between periods (n = 194; 68.1%), persistent pelvic pain (n = 192; 67.4%), postcoital bleeding (n = 181; 63.5%), vaginal discharge (n = 172, 60.4%), menorrhagia (n = 147; 51.6%), persistent low back pain (n = 138; 48.4%), weight loss (n = 134; 47.0%), blood in stool and urine (n = 70; 24.6%), and diarrhea (n = 27; 9.5%). The risk factors of cervical cancer were perceived to be: family history of cervical cancer (n = 140; 49.1%), immunosuppression (n = 138; 48.4%), long-term use of combined oral contraceptives (n = 105; 36.8%), HPV infection (n = 101; 35.4%), low immunity from the husband (n = 95; 33.3%), smoking (n = 80; 28.1%), having three or more children (51; 17.9%), and early marriage (n = 39; 13.7%).

With regards to knowledge of cervical cancer screening, 208/285 women (73.0%) had previously heard of this, mainly from sources in healthcare services (n = 145; 50.9%), followed by the Internet or social media (n = 71; 24.9%), school or universities (n = 41; 14.4%), family or friends (n = 31; 10.9%), written media (n = 20; 7.0%), and television programs or advertisements (n = 16; 5.6%). Most participants (n = 244; 85.6%) agreed that cervical cancer screening involved the collection of a sample from the cervix, although some thought the sample was collected from the vagina (n = 41; 14.4%). The majority of the participants did not know the ideal frequency of cervical cancer screening

Table 1: Associations between sociodemographic characteristics and cervical cancer-related knowledge among Omani women attending a family medicine and public health clinic (N = 285).

Characteristics	Knowledge level*, n (%)			*p*-value
	Poor	Acceptable	High	
Age, years				
≤ 40	48 (16.8)	146 (51.2)	24 (8.4)	0.914
> 40	16 (5.6)	43 (15.1)	8 (2.8)	
Education level				
None/primary/secondary	18 (6.3)	29 (10.2)	3 (1.1)	0.039†
Undergraduate	37 (13.0)	116 (40.7)	18 (6.3)	
Postgraduate	9 (3.2)	44 (15.4)	11 (3.9)	
Healthcare-related degree				
No	54 (18.9)	115 (40.4)	9 (3.2)	<0.001†
Yes	10 (3.5)	74 (26.0)	23 (8.1)	
Employment status				
Employed	36 (12.6)	128 (44.9)	27 (9.5)	0.033†
Unemployed	20 (7.0)	49 (17.2)	2 (0.7)	
Retired	8 (2.8)	12 (4.2)	3 (1.1)	
Marital status				
Currently married	62 (21.8)	187 (65.6)	31 (10.9)	0.454
Ever been married	2 (0.7)	2 (0.7)	1 (0.4)	
Number of children				
≤ 3	48 (16.8)	123 (43.2)	21 (7.4)	0.334
> 3	16 (5.6)	66 (23.2)	11 (3.9)	
Age at first marriage, years				
≤ 25	46 (16.1)	126 (44.2)	28 (9.8)	0.055
> 25	18 (6.3)	63 (22.1)	4 (1.4)	

**Assessed using a previously described, self-administered, Arabic-language questionnaire.[13] Total scores of < 8, 8–15, and > 15 were considered to indicate poor, acceptable, and high levels of knowledge, respectively. †Statistically significant at p ≤ 0.050.*

(n = 200; 70.2%) or the interpretation of an abnormal screening result (n = 157; 55.1%).

Most participants were aware of the availability of cervical cancer screening in Oman (206/285; 72.3%) and 114 (40.0%) had previously undergone it for various reasons, including being reminded by their doctors (92/114; 80.7%), understanding its importance (44/114; 38.6%), having reached the designated age for screening (42/114; 36.8%), having had multiple births (22/114; 19.3%), because the screening was offered free by the government (17/114; 14.9%), and having time to take the test (14/114; 12.3%). Among the women who had never undertaken cervical cancer screening (171/285; 60.0%), most were willing to do so in the future (103/171; 60.2%). Reasons for reluctance to undertake cervical cancer screening included a lack of familiarity with the test (113/171; 66.1%), having no time (50/171; 29.2%), having a healthy lifestyle (50/171; 29.2%), fear of the test itself (44/171; 25.7%), privacy concerns (35/171; 20.5%), fear of adverse results (34/171; 19.9%), having received normal Pap smear results previously (34/171; 19.9%), and being unmarried (26/171; 15.2%).

Overall, 64/285 (22.5%), 189 (66.3%), and 32 (11.2%) women, respectively demonstrated poor, acceptable, and high levels of knowledge related to cervical cancer, with a mean score of 10.3±4.4. Cervical cancer knowledge scores were significantly associated with education level (p = 0.039), whether the qualification was related to healthcare (p < 0.001), and employment status (p = 0.033) [Table 1]. Regarding cervical cancer screening, 31/285 (10.9%), 75/285 (26.3%), and 179/285 (62.8%) participants demonstrated poor, acceptable, and high levels of knowledge, respectively, with a mean score of 4.7±1.7. Cervical cancer screening knowledge scores were significantly associated with age (p = 0.001), education level (p < 0.001), whether the qualification was related to healthcare (p < 0.001), employment status (p = 0.001), and number of children (p = 0.001) [Table 2]. Significant

Table 2: Associations between sociodemographic characteristics and knowledge regarding Papanicolaou smear testing among Omani women attending a family medicine and public health clinic (N = 285).

Characteristics	Knowledge level*, n (%)			*p*-value
	Poor	Acceptable	High	
Age, years				
≤ 40	28 (9.8)	66 (23.2)	124 (43.5)	0.001†
> 40	3 (1.1)	9 (3.2)	55 (19.3)	
Education level				
None/primary/secondary	13 (4.6)	18 (6.3)	19 (6.7)	< 0.001†
Undergraduate	17 (6.0)	45 (15.8)	109 (38.2)	
Postgraduate	1 (0.4)	12 (4.2)	51 (17.9)	
Healthcare-related degree				
No	30 (10.5)	62 (21.8)	86 (30.2)	< 0.001†
Yes	1 (0.4)	13 (4.6)	93 (32.6)	
Employment status				
Employed	16 (5.6)	46 (16.1)	129 (45.3)	0.001†
Unemployed	15 (5.3)	25 (8.8)	31 (10.9)	
Retired	0 (0.0)	4 (1.4)	19 (6.7)	
Marital status				
Currently married	31 (10.9)	73 (25.6)	176 (61.8)	0.631
Ever been married	0 (0.0)	2 (0.7)	3 (1.1)	
Number of children				
≤ 3	24 (8.4)	62 (21.8)	106 (37.2)	0.001†
> 3	7 (2.5)	13 (4.6)	73 (25.6)	
Age at first marriage, years				
≤ 25	22 (7.7)	50 (17.5)	128 (44.9)	0.740
> 25	9 (3.2)	25 (8.8)	51 (17.9)	

**Assessed using a previously described, self-administered, Arabic-language questionnaire.[13] Total scores of < 3, 3–4, and > 4 were considered to indicate poor, acceptable, and high levels of knowledge, respectively. †Statistically significant at p ≤ 0.050.*

Table 3: Associations between sociodemographic characteristics and previous experience undergoing Papanicolaou smear testing among Omani women attending a family medicine and public health clinic (N = 285).

Characteristics	Previously undergone Papanicolaou smear testing, n (%)		*p*-value
	No	Yes	
Age, years			
≤ 40	157 (55.1)	61 (21.4)	< 0.001*
> 40	14 (4.9)	53 (18.6)	
Education level			
None/primary/ secondary	38 (13.3)	12 (4.2)	< 0.001*
Undergraduate	113 (39.6)	58 (20.4)	
Postgraduate	20 (7.0)	44 (15.4)	
Healthcare-related degree			
No	119 (41.8)	59 (20.7)	0.002*
Yes	52 (18.2)	55 (19.3)	
Employment status			
Employed	108 (37.9)	83 (29.1)	< 0.001*
Unemployed	55 (19.3)	16 (5.6)	
Retired	8 (2.8)	15 (5.3)	
Marital status			
Currently married	166 (58.2)	114 (40.0)	0.065
Ever been married	5 (1.8)	0 (0.0)	
Number of children			
≤ 3	139 (48.8)	53 (18.6)	< 0.001*
> 3	32 (11.2)	61 (21.4)	
Age at first marriage, years			
≤ 25	122 (42.8)	78 (27.4)	0.597
> 25	49 (17.2)	36 (12.6)	

**Statistically significant at p ≤ 0.050.*

Table 4: Associations between sociodemographic characteristics and willingness to undergo Papanicolaou smear testing among Omani women attending a family medicine and public health clinic (N = 285).

Characteristics	Willingness to undergo Papanicolaou smear testing, n (%)		*p*-value
	No	Yes	
Age, years			
≤ 40	141 (49.5)	77 (27.0)	0.604
> 40	41 (14.4)	26 (9.1)	
Education level			
None/primary/ secondary	29 (10.2)	21 (7.4)	0.624
Undergraduate	112 (39.3)	59 (20.7)	
Postgraduate	41 (14.4)	23 (8.1)	
Healthcare-related degree			
No	114 (40.0)	64 (22.5)	0.933
Yes	68 (23.9)	39 (13.7)	
Employment status			
Employed	125 (43.9)	66 (23.2)	0.431
Unemployed	41 (14.4)	30 (10.5)	
Retired	16 (5.6)	7 (2.5)	
Marital status			
Currently married	177 (62.1)	103 (36.1)	0.090
Ever been married	5 (1.8)	0 (0.0)	
Number of children			
≤ 3	126 (44.2)	66 (23.2)	0.373
> 3	56 (19.6)	37 (13.0)	
Age at first marriage, years			
≤ 25	125 (43.9)	75 (26.3)	0.464
> 25	57 (20.0)	28 (9.8)	

associations were observed between cervical cancer screening practices and age ($p < 0.001$), education level ($p < 0.001$), whether the qualification was related to healthcare ($p = 0.002$), employment status ($p < 0.001$), and number of children ($p < 0.001$) [Table 3]. However, no significant associations were noted between willingness to undertake cervical cancer screening in the future and any sociodemographic characteristics [Table 4].

DISCUSSION

Many studies across the world have evaluated the levels of awareness among women regarding cervical cancer risk factors, cervical screening tests, and preventive practices.[12–22] They collectively suggest that while most women have heard of cervical cancer, they have low knowledge of its specific symptoms and screening tests.[12–14,17] Other studies have indicated that the awareness of cervical cancer is greater among women than that of the availability of diagnostic tests.[23,24] The current study was conducted to determine levels of knowledge, attitudes, and screening practices related to cervical cancer and its screening among Omani women visiting a FMPH clinic.

The vast majority of our participants had heard of cervical cancer, and nearly three-quarters had heard of cervical cancer screening. The most common information source was the Internet/social media, followed by healthcare sources. The influence and scope of online social media have increased dramatically and they have become a very important

tool for spreading health awareness among the general public.[25] A previous study in Oman showed that social media was the most popular source of information on cervical cancer, while healthcare providers were the top source of information for the screening test.[12,13] Hence, it is important that policy-makers capitalize on the popularity of social media in order to promote public health awareness, education, and utilization of preventive screening measures.

The present study showed that more Omani women had acceptable-to-high levels of knowledge regarding cervical cancer screening (89.1%) than about cervical cancer itself (77.5%). Al Yahyai et al,[12] reported comparable findings among women attending primary healthcare centers in Oman. Variations in the education level of the participants and the availability of the test could be part of the reason for these findings, as cervical cancer screening is routinely provided by the clinic and the majority of women who attend the FMPH are usually highly educated, given that the clinic caters primarily to employees of the university and its affiliated hospital. Other studies conducted in Oman have highlighted that specific knowledge of cervical cancer, its risk factors, and cervical cancer screening is generally poor among Omani women.[12–15]

Our participants' relatively high knowledge and awareness of cervical cancer screening did not translate to high levels of service utilization. Although 72.3% of the women were aware of the availability of cervical cancer screening, only 40.0% had undergone the test. This is similar to rates of service utilization reports from Qatar (39.4%) and Bahrain (40.7%), although our participants scored higher than a group of female healthcare professionals at a large medical institution in Saudi Arabia (26.2%).[26–28] However, 60.2% of women in our study indicated their willingness to undergo cervical cancer screening. This is comparable to a report on Indian women, 43.64% of whom were positive and willing to undergo the screening, despite their low utilization rate (13.22%).[29]

The most frequently reported reason by women in the current study for having previously undertaken cervical cancer screening was being reminded by their doctors (80.7%). The corresponding percentage in a cohort of Gabonese women was 68.3%.[23] On the other hand, our participants' most reported reason for being reluctant to undergo screening, or not undergoing screening at recommended intervals (i.e., at least once every three years) was a lack of familiarity with the test (66.1%). Significant associations were noted in our participants between their cervical cancer screening practices and age, education level, employment status, and number of children. These associations have also been reported in other local and international studies.[21,30,31] These findings highlight the importance of implementing a well-structured national awareness program regarding cervical cancer and screening tests in order to promote screening uptake and improve public health by detecting early signs and symptoms of cervical cancer among Omani women.

More than two-thirds of our participants had never heard of HPV infection, despite it being a common sexually transmitted infection of which two subtypes, HPV-16 and HPV-18, are responsible for about 70% of all cervical cancer cases worldwide.[32] As a conservative Muslim country where extramarital sex is prohibited by both the local culture and laws, it might be argued that many cases of cervical cancer in Oman may be unrelated to HPV infection. Nevertheless, previous research from Saudi Arabia which has many sociocultural and religious similarities to Oman, found that 92% of cervical tumor cases were HPV-positive.[33] Despite this, no national vaccination program against HPV is currently available in either Oman or Saudi Arabia. This is likely because of the stigma in Arab culture related to any behavior that suggests a sexual activity, such as gynecological examinations, cervical cancer screening, or HPV vaccination.[34] Very few participants in the current study had heard of the HPV vaccine, suggesting a fundamental lack of knowledge regarding HPV infection and its link to risky sexual behaviors.[33,34] However, when asked about the desirability of vaccinating middle school-aged girls in Oman, nearly half of the participants gave positive responses.

The results of the current study should be considered in the light of certain limitations. As the study targeted women who were attending a single-FMPH clinic located within a university campus in a highly urbanized area, and catering exclusively to the university's employees and their relatives. In addition, 37.5% of our participants held healthcare degrees. Thus, the generalizability of our results to Omani women in the general community is limited. On the other hand, the exclusive demography of

women in our study may render our results valuable for comparison with similar demographics of women—those who visit primary facilities attached to large institutions in the Gulf Cooperation Council countries and elsewhere. Other limitations include the length of the questionnaire, and the fact that some of the questions sought information on the participant's past experiences. The self-administered nature of the data collection tool was another potential limitation. These could have led to recall or response bias.

CONCLUSION

Overall, there was suboptimal awareness among the Omani women who participated in this study on matters related to cervical cancer, such as the prevalence of HPV infection in the community, risk factors, and screening methods. Despite this, most participants were accepting of the idea of offering the HPV vaccine to middle school-aged girls. The Ministry of Health is urged to initiate a national screening program to reduce the incidence of cervical cancer in Oman. Also, recommended are enhanced community outreach programs to spread knowledge and correct misinformation and social stigma related to cervical cancer, HPV infection, Pap smear, and HPV vaccination among Omani public. We also recommend introducing the HPV vaccine in Oman.

Disclosure

The authors declare no conflicts of interest. No funding was received for this study.

Acknowledgements

The authors thank all the women who participated in this study. We are also grateful to the staff of the Family Medicine and Public Health Clinic for their cooperation.

REFERENCES

1. World Cancer Research Fund International. Worldwide cancer data. [cited 2021 August 7]. Available from: https://www.wcrf.org/dietandcancer/worldwide-cancer-data/.
2. Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. Lancet Glob Health 2020 Feb;8(2):e191-e203.
3. World Cancer Research Fund International. Cervical cancer statistics. [cited 2021 August 19]. Available from: https://www.wcrf.org/dietandcancer/cervical-cancer-statistics/.
4. World Health Organization. Cervical cancer. (cited 2021 August 19). Available from: https://www.who.int/news-room/fact-sheets/detail/cervical-cancer.
5. American Cancer Society. The American cancer society guidelines for the prevention and early detection of cervical cancer. (cited 2021 August 19). Available from: https://www.cancer.org/cancer/cervical-cancer/detection-diagnosis-staging/cervical-cancer-screening-guidelines.html.
6. Committee on Practice Bulletins. Gynecology. Practice bulletin no. 168: cervical cancer screening and prevention. Obstet Gynecol 2016 Oct;128(4):e111-e130.
7. Public Health England. NHS cervical screening programme: colposcopy and programme management. 2016 (cited 2020 April 12). Available from: www.bsccp.org.uk/assets/file/uploads/resources/285HSCSP_20_Colposcopy_and_Programme_Management_(3rd_Edition)_(2).pdf.
8. Arbyn M, Gultekin M, Morice P, Nieminen P, Cruickshank M, Poortmans P, et al. The European response to the WHO call to eliminate cervical cancer as a public health problem. Int J Cancer 2021 Jan;148(2):277-284.
9. Chidyaonga-Maseko F, Chirwa ML, Muula AS. Underutilization of cervical cancer prevention services in low and middle income countries: a review of contributing factors. Pan Afr Med J 2015 Jul;21:231.
10. International Agency for Research in Cancer, World Health Organization. Oman: source: Globocan 2020. (cited 2021 August 19). Available from: https://gco.iarc.fr/today/data/factsheets/populations/512-oman-fact-sheets.pdf.
11. Bruni L, Albero G, Serrano B, Mena M, Gómez D, Muñoz J, et al. Human papillomavirus and related diseases report: Oman. (cited 2021 August 28). Available from: https://hpvcentre.net/statistics/reports/OMN.pdf.
12. Al Yahyai T, Al Raisi M, Al Kindi R. Knowledge, attitudes, and practices regarding cervical cancer screening among Omani women attending primary healthcare centers in Oman: a cross-sectional survey. Asian Pac J Cancer Prev 2021 Mar;22(3):775-783.
13. Al Raisi M, Al Yahyai T, Al Kindi R. Knowledge and attitude regarding cervical cancer and human papilloma virus in Oman. Sultan Qaboos Univ Med J 2021;1(1).
14. Al-Azri MH, Al-Saidi M, Al-Mutairi E, Panchatcharam SM. Knowledge of risk factors, symptoms and barriers to seeking medical help for cervical cancer among Omani women attending Sultan Qaboos university hospital. Sultan Qaboos Univ Med J 2020 Aug;20(3):e301-e309.
15. Nasar A, Waad A, Atheer A, Nasra A. Awareness of cervical cancer and Pap smear testing among Omani women. Asian Pac J Cancer Prev 2016 Nov;17(11):4825-4830.
16. Dhendup T, Tshering P. Cervical cancer knowledge and screening behaviors among female university graduates of year 2012 attending national graduate orientation program, Bhutan. BMC Womens Health 2014 Mar;14(1):44.
17. Shrestha S, Dhakal P. Knowledge, attitude and practice regarding cervical cancer screening among women attending a teaching hospital, Bharatpur, Chitwan. J Family Reprod Health 2017 Mar;11(1):18-23.
18. Nyamambi E, Murendo C, Sibanda N, Mazinyane S. Knowledge, attitudes and barriers of cervical cancer screening among women in Chegutu rural district of Zimbabwe. Cogent Soc Sci 2020 May;6(1):1766784.
19. Omone O, Kozlovszky M. HPV and cervical cancer screening awareness: a case-control study in Nigeria (Conference Abstract). In: 2020 IEEE 24th International Conference on Intelligent Engineering Systems (INES), 8-10 July 2020. [cited 2021 August 19]. Available from: https://ieeexplore.ieee.org/document/9147177.
20. Lin W, Wang Y, Liu Z, Chen B, Yuan S, Wu B, et al. Inequalities in awareness and attitude towards HPV and its vaccine between local and migrant residents who participated in cervical cancer screening in Shenzhen, China. Cancer Res Treat 2020 Jan;52(1):207-217.
21. Alnafisah RA, Alsuhaibani R, Alharbi MA, Alsohaibani AA, Ismail AA. Saudi women's knowledge and

attitude toward cervical cancer screening, treatment, and prevention: a cross-sectional study in Qassim Region (2018-2019). Asian Pac J Cancer Prev 2019 Oct;20(10):2965-2969.

22. Thapa N, Maharjan M, Petrini MA, Shah R, Shah S, Maharjan N, et al. Knowledge, attitude, practice and barriers of cervical cancer screening among women living in mid-western rural, Nepal. J Gynecol Oncol 2018 Jul;29(4):e57.
23. Assoumou SZ, Mabika BM, Mbiguino AN, Mouallif M, Khattabi A, Ennaji MM. Awareness and knowledge regarding of cervical cancer, Pap smear screening and human papillomavirus infection in Gabonese women. BMC Womens Health 2015 Apr;15(1):37.
24. Hyacinth HI, Adekeye OA, Ibeh JN, Osoba T. Cervical cancer and pap smear awareness and utilization of pap smear test among Federal civil servants in North Central Nigeria. PLoS One 2012;7(10):e46583.
25. Stellefson M, Paige SR, Chaney BH, Chaney JD. Evolving role of social media in health promotion: updated responsibilities for health education specialists. Int J Environ Res Public Health 2020 Feb;17(4):1153.
26. Al-Meer FM, Aseel MT, Al-Khalaf J, Al-Kuwari MG, Ismail MF. Knowledge, attitude and practices regarding cervical cancer and screening among women visiting primary health care in Qatar. East Mediterr Health J 2011 Nov;17(11):855-861.
27. Jassim G, Obeid A, Al Nasheet HA. Knowledge, attitudes, and practices regarding cervical cancer and screening among women visiting primary health care Centres in Bahrain. BMC Public Health 2018 Jan;18(1):128.
28. Heena H, Durrani S, AlFayyad I, Riaz M, Tabasim R, Parvez G, et al. Knowledge, attitudes, and practices towards cervical cancer and screening amongst female healthcare professionals: a cross-sectional study. J Oncol 2019 Oct;2019:5423130.
29. Taneja N, Chawla B, Awasthi AA, Shrivastav KD, Jaggi VK, Janardhanan R. Knowledge, attitude, and practice on cervical cancer and screening among women in India: a review. Cancer Control 2021 Jan-Dec;28:10732748211010799.
30. Tsegay A, Araya T, Amare K, Tsadik FG. Knowledge, attitude, and practice on cervical cancer screening and associated factors among women aged 15-49 years in Adigrat Town, Northern Ethiopia, 2019: a community-based cross-sectional study. Int J Womens Health 2021;12:1283-1298.
31. Thapa N, Maharjan M, Xiong Y, Jiang D, Nguyen TP, Petrini MA, et al. Impact of cervical cancer on quality of life of women in Hubei, China. Sci Rep 2018 Aug;8(1):11993.
32. World Health Organization. Human papillomavirus (HPV) and cervical cancer. [cited 2021 August 19]. Available from: https://www.who.int/news-room/fact-sheets/detail/human-papillomavirus-(hpv)-and-cervical-cancer.
33. Alsbeih G. HPV infection in cervical and other cancers in Saudi Arabia: implication for prevention and vaccination. Front Oncol 2014 Mar;4:65.
34. Abboud S, De Penning E, Brawner BM, Menon U, Glanz K, Sommers MS. Cervical cancer screening among Arab women in the United States: an integrative review. Oncol Nurs Forum 2017 Jan;44(1):E20-E33.