Research Article

Knowledge, Attitude, and Practice of Women towards Cervical Cancer and its Screening Tests in a Teaching Hospital, Khartoum-Sudan

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Abstract

Background: cervical cancer constitutes the second most common cancer affecting women globally. Most cases occur in developing countries, and the majority are due to Human papillomavirus (HPV). Precancerous lesions can be detected using Papanicolaou (Pap) smear and visual inspection by acetic acid (VIA). Utilization of these tests is limited in developing countries. This study aimed to assess the knowledge, attitude and practice of Sudanese women towards cervical cancer and its screening tests.

Materials and methods: A cross-sectional study design was conducted, where a convenient sample of 310 women was collected from Saad Abu El Ella teaching hospital in the period between 12 to 30 August 2020. Data was collected using an anonymous questionnaire. Analysis of variance and independent-samples T-test compared the statistical differences of knowledge, attitude and practice scores between groups. Spearman rho correlation assessed the relationship between the scores. Linear regression assessed the impact of predictors on the scores.

Results: Around 50.0% and 27.7% of the respondents heard about cervical cancer and Pap smear/VIA respectively. The highly-rated symptoms and risk factors: abnormal vaginal bleeding between periods, malodorous vaginal discharge, smoking and sexually transmitted infections. 21.3% rated HPV as a causative agent and 9.4% heard about its vaccine. 65.2% desired to perform Pap smear/VIA. 2.3% had ever undergone Pap smear/VIA and also 2.3% have ever received the vaccine against HPV. Awareness of cervical cancer was positively associated with attitude score (P-value 0.004) and practice score (P-value 0.016).

Conclusion: Most of the respondents had poor knowledge and practice towards cervical cancer and its screening tests. Health education and screening campaigns regarding cervical cancer should be established, as well as implementation of vaccination programs against HPV.

Keywords: Cervical Cancer; Pap Smear; VIA

Abbreviations: Pap smear: Papanicolaou smear; VIA: Visual inspection by acetic acid; FGM: Female genital mutilation; WHO: World health organization

1. Introduction

Globally, cervical cancer constitutes the second common type of cancer among women, with an annual 500,000 new cases and 274,000 deaths [1]. In developing countries, it constitutes the commonest cancer affecting women [1] with 85% of the total numbers of cases worldwide [2]. In Sudan, approximately 833 females get diagnosed annually with cervical cancer, with an annual incidence and deaths of 7.9 per 100,000 and 534 respectively [3]. Human Papilloma virus (HPV) constitutes a primary cause of cervical cancer, along with other sexually transmitted infections like Chlamydia Trachomatis [4]. Other risk factors include multiple sexual partners, early age of sexual activity, 5 years or more usage of hormonal contraceptive, smoking, alcohol consumption and specific diet [5-9].

Cervical cancer is a preventable disease that can be detected in early stages -as pre-cancerous lesions- by screening tests like Papanicolaou (Pap) smear and visual inspection by acetic acid (VIA) [10]. In developed countries, treatment of pre-cancerous lesions at the early stages of cervical cancer prevents 80% of cases [1]. In contrast, screening programs are less implementable in countries with low source settings, weak health systems with a lack of well-trained health professionals and a low level of awareness about the disease, which leads to an increased cervical cancer mortality rate in such developing countries [1, 11]. This study aimed to assess the knowledge, attitude and practice of Sudanese women towards cervical cancer and its screening tests "Pap smear and VIA" in Saad Abu El Ella teaching hospital, Khartoum-Sudan.

2. Materials and Methods

2.1 Study design

This is an observational cross-sectional hospital-based study.

2.2 Study setting

The study was conducted in Saad Abu El Ella teaching hospital which is a public hospital affiliated with Khartoum university and located in Khartoum city. Data were collected from 12 to 30 August 2020 using an anonymous self-administered questionnaire which was developed from previous studies [11, 12] and also by a senior obstetrician and gynaecologist. It was translated into Arabic and has items about demographics, obstetrics and gynaecological history, knowledge, attitude and practice towards cervical cancer and Pap smear/VIA.

2.3 Study participants

Inclusion criteria were: all women who attended the outpatient clinics and wards, aged between 18 to 65 years. Exclusion criteria were: women who were non-Arabic speakers, younger than 18 years or refused to participate. Women had been selected randomly from clinics and wards.

2.4 Variables

The outcomes in multiple linear regression were scores of knowledge, attitude and practice, and the predictors were items of demographics, obstetrics and gynaecological history and scores of knowledge, attitude and practice about cervical cancer and its screening tests. The potential confounders -not shown in the manuscript- were those variables with P values more than 0.1 in univariable unadjusted linear regression.

2.5 Data sources/measurement

The classification method of the predictors and outcome was based on a previous study [12] and also based on the instructions of the supervisor (senior obstetrician and gynaecologist).

2.6 Bias

To address information bias, each questionnaire had been revised immediately after being filled up to correct misunderstandings, i.e. to avoid socially acceptable answers rather than the truth. Linear regression was used to address confounding bias where variables in the univariable unadjusted linear regression with P values more than 0.1 were considered as confounding variables and then were removed from the final multivariable linear regression model. Since the sampling technique was convenient, no attempts had been done to address selection bias.

2.7 Study size

The sample size was 310 which was collected conveni-ently through total coverage of women who attended the clinics and wards in the period between 12 to 30 August 2020.

2.8 Quantitative variables

The continuous variables had been grouped based on the instructions of the supervisor. Participants' monthly income was categorized into low, moderate and high-income categories [13]. Knowledge score was calculated based on 12 items out of 15, while attitude and practice scores both had been calculated based on 2 items for each of them. The scores were calculated as follows: each correct answer had a score of 2, each incorrect answer had a score of zero and answers of "I do not know" had a score of one. The total knowledge score was 46 and classified as poor (0-15), moderate (16-25) and good (35-46), while the total attitude and practice scores were 4 of each of them and classified as poor (0-2) and good (3-4).

2.9 Statistical methods

Data were coded and analyzed using Statistical Package for the Social Sciences (SPSS) version 23, both descriptive and inferential statistics were performed. Analysis of variance (ANOVA) and independent-samples T-test was used to compare the statistical differences of scores between different groups. Spearman rho correlation was used to assess the relationship between the scores. Univariable unadjusted linear regression was performed between demographics, obstetrics and gynaecological history and scores of knowledge, attitude and practice, and the scores as outcomes.

Variables in the univariable unadjusted linear regression with P values less than 0.1 were considered as potential risk factors and then included in multivariable-adjusted linear regression. The missing data were excluded using the option "exclude cases pairwise" in SPSS. Data are

presented using frequency tables. The type of per cent that are mentioned in the text is the "actual Percent" not the "Valid per cent".

2.10 Ethical approval

The study was approved by the ethical committee of the department of community medicine-university of Khartoum. Also, permission was taken from the administration of Saad Abu El Ella teaching hospital. Informed verbal consents had been taken from all of the respondents.

3. Results

3.1 Demographics

A total of 310 women participated in this study. The mean age was 32 years (± 9SD "standard deviation"), and the majority belonged to the age group 20-30 years (45.5%, 141/310). 90.0% of the participants were Muslims (307/310) and most of them (44.8%, 139/310) had Bachelor degree. Furthermore, half of them worked as housewives (46.1%, 143/310) and 86.8% (269/310) of them were married (sexually active).The mean monthly income was 87.9U.S. dollars (± 159.3 SD), and the majority of the respondents had low income (37.4%, 116/310). Table1.

3.2 Obstetrics and gynecological history

About 35.8% (111/310) of the respondents used contraceptives and 43.5% (135/310) of them had health insurance. 27.7% (86/310) of the participants had undergone vaginal speculum examination and 20.3% (63/310) complained about it as a painful procedure. 80.0% (248/310) of the participants underwent FGM [1]. According to WHO [2], FGM has four types(World Health Organization, 2020). Most of the FGMs reported in this study were WHO type 3 (38.1%, 118/310) Table 1.

3.3 Knowledge about cervical cancer and its screening tests

Halfof the respondents (50.0%, 155/310) heard about cervical cancer. The most reported symptoms in this study were: abnormal vaginal bleeding between periods (35.8%, 111/310) and malodorous vaginal discharge (28.1%, 87/310). While the most frequently risk factors were: smoking (30.0%, 93/310), sexually transmitted infections (30.0%, 93/310), multiple partners (28.7%, 89/310) and poor personal hygiene (25.8%, 80/310). Other symptoms and risk factors are mentioned in table 2 and table 3 respectively. Around 21.3% (66/310) of women in this study knew that a virus (HPV: human Papilloma virus) can cause cervical cancer. Moreover, 14.5% (45/310) them knew that HPV virus is sexually transmitted. Likewise, only 9.4% (29/310) of them knew about the vaccine against that virus. About 27.7% (86/310) of the respondents heard about Pap smear and visual inspection of the cervix with acetic acid (VIA), mainly from media(television, radio and internet) (13.5%, 42/310). 9.7% (30/310) of the participants mentioned that these tests are performed using speculum and 7.7% (24/310) of them mentioned that postmenopausal women are recommended for Pap smear/VIA. The mean total knowledge score was 12.4 (± 13.1 SD). Most of the respondents had poor knowledge (54.5%, 169/310). Table 4 shows other information regarding knowledge about cervical cancer and its screening tests.

3.4 Attitude and practice towards Pap smear and VIA

Around 65.2% (202/310) of the respondents agreedto perform Pap smear and VIA. While 23.5% (73/310) of them refused to perform these screening tests due to the following reasons: "might be painful" (16.8%, 52/310), "not interested" (16.8%, 52/310) and "I am healthy, no need" (13.2%, 41/310). Other reasons of refusal to perform these screening tests are mentioned in table 5.

The majority of the participants 85.5% (265/310) agreed to participate in educational campaigns about cervical cancer and its screening tests. The mean total attitude score was 3 (± 1.3 SD). Most of the respondents had good attitude (61.3%, 190/310). Only 2.3% (7/310) of the respondents had ever undergone screening tests for cervical cancer (Pap smear/VIA). Also, only 2.3% (7/310) of them have ever received vaccine for human Papilloma virus. The mean total practice score was 0.09 (± 0.41 SD). All of the respondents had poor practice (100.0%, 310/310). One-way between-groups ANOVA was conducted to explore the impact of educational level and occupation on knowledge score. Post-hoc comparisons using the Tukey HSD test indicated that the mean knowledge score for postgraduates (mean 17.5, SD 14.2) was significantly different from secondary school students (mean 10.6, SD 12.6) and university students (mean 11.2, SD 12.4). Also, it indicated that the mean knowledge score for housewives (mean 9.3, SD 11.7) was significantly different from employees (mean 14.4, SD 13.2) freelancers (mean 22, SD 12.9).

An independent-samples t-test was conducted to compare practice score for women who had used contraceptives and those who had not. There was significant difference in practice scores for those who had used contraceptives (mean 0.14, SD 0.52) and those who had not (mean 0.05, SD 0.3). The relationship between knowledge score and attitude and practice scores was investigated using Spearman rho correlation. There were weak positive, correlations between knowledge and attitude scores, $r = 0.16$, $n = 310$, P value = 0.004, and also between knowledge and practice scores, $r = 0.17$, $n = 310$, P value = 0.002. With high levels of knowledge score associated with high levels of attitude and practice scores. A multiple linear regression was calculated to predict knowledge score based on: age, educational level, occupation, contraceptives usage and history of vaginal speculum examination. The full model was statistically significant, P value = 0.000, R^2 =0.15. Knowledge score decreases by 0.12 for each year of age, decreases by 0.15 for being housewife, and increased by 0.15 for using contraceptives Table 6.

A multiple linear regression was calculated to predict attitude score based on: educational level, occupation and knowledge score. The full model was statistically significant, P value = 0.000, $R^2 = 0.103$. Attitude score increases by 0.21 for being postgraduates, increases by 0.17 for each score of knowledge, and decreases by 0.19 for being a housewife Table 7. A multiple linear regression was calculated to predict practice score based on: educational level, contraceptives' usage and knowledge score. The full model was statistically significant, P value = 0.001, $R^2 = 0.082$. Practice score decreases by 0.77 for being university students and increases by 0.14 for each score of knowledge Table 8.

Demographics and obstetrics and gynecological history	Frequency	Percent	Valid percent	Cumulative percent
Educational level of the husband:				
Primary school	16	5.2	5.9	5.9
Secondary school	73	23.5	27.0	33.0
University(Bachelor)	102	32.9	37.8	70.7
Postgraduate	73	23.5	27.0	97.8
Others	6	1.9	2.2	100.0

Total	270	87.1	100.0	
Missing: not applicable	40	12.9		
Total	310	100.0		
Number of marriages of the respondents(women):				
Never been married	7	2.3	2.4	2.4
Once	264	85.2	90.7	93.1
More than once	20	6.4	6.8	100.0
Total	291	93.9	100.0	
Missing: not applicable	19	6.1		
Total	310	100.0		
Number of marriages of the husbands:				
I do not know	10	3.2	3.5	3.5
Once	234	75.5	82.1	85.6
More than once	41	13.2	14.4	100.0
Total	285	91.9	100.0	
Missing: not applicable	25	8.1		
Total	310	100.0		
Number of previous pregnancies:				
Never been pregnant	40	12.9	13.8	13.8
1-3	146	47.1	50.5	64.4
4-6	78	25.2	27.0	91.3
More than 6	25	8.1	8.7	100.0
Total	289	93.2	100.0	
Missing: not applicable	21	6.8		
Total	310	100.0		
Number of child birth:				
Never gave childbirth	78	25.2	26.9	26.9
1-3	140	45.2	48.3	75.2
4-6	55	17.7	19.0	94.1
More than 6	17	5.5	5.9	100.0
Total	290	93.5	100.0	
Missing: not applicable	20	6.5		
Total	310	100.0		

Table 1: Demographics and obstetrics/gynecological history (n 310).

Symptoms:	Frequency	Percent	Valid percent	Cumulative percent
Increased vaginal discharge:				
No	27	8.7	17.8	17.8
Yes	69	22.3	45.4	63.2
Do not know	56	18.1	36.8	100.0
Total	152	49.0	100.0	
Missing: not applicable	158	51.0		
Total	310	100.0		
Discomfort or pain during sexual intercourse:				
No	17	5.5	11.3	11.3
Yes	81	26.1	54.0	65.3
Do not know	52	16.8	34.7	100.0
Total	150	48.4	100.0	
Missing: not applicable	160	51.6		
Total	310	100.0		
Others:				
No	37	11.9	62.7	62.7
Yes	22	7.1	37.3	100.0
Do not know	59	19.0	100.0	
Total	251	81.0		
Missing: not applicable	310	100.0		
Total	37	11.9	62.7	62.7

Table 2: Symptoms of cervical cancer (n 310).

Risks factors:	Frequency	Percent	Valid percent	Cumulative percent
Early age at marriage:				
No	43	13.9	28.9	28.9
Yes	63	20.3	42.3	71.1
Do not know	43	13.9	28.9	100.0
Total	149	48.1	100.0	
Missing: not applicable	161	51.9		
Total	310	100.0		
Early age at first pregnancy:				
No	51	16.5	34.5	34.5
Yes	43	13.9	29.1	63.5
Do not know	54	17.4	36.5	100.0
Total	148	47.7	100.0	

Missing: not applicable	162	52.3		
Total	310	100.0		
Unhealthy diet:				
No	24	7.7	16.1	16.1
Yes	74	23.9	49.7	65.8
Do not know	51	16.5	34.2	100.0
Total	149	48.1	100.0	
Missing: not applicable	161	51.9		
Total	310	100.0		
Frequent childbirths:				
No	52	16.8	35.4	35.4
Yes	44	14.2	29.9	65.3
Do not know	51	16.5	34.7	100.0
Total	147	47.4	100.0	
Missing: not applicable	163	52.6		
Total	310	100.0		
Low socio-economic status:				
No	35	11.3	23.6	23.6
Yes	60	19.4	40.5	64.2
Do not know	53	17.1	35.8	100.0
Total	148	47.7	100.0	
Missing: not applicable	162	52.3		
Total	310	100.0		
Others:				
No	14	4.5	25.5	25.5
Yes	33	10.6	60.0	85.5
Do not know	8	2.6	14.5	100.0
Total	55	17.7	100.0	
Missing: not applicable	255	82.3		
Total	310	100.0		

Table 3: Risk factors of cervical cancer (n 310).

Variables:	Frequency	Percent	Valid percent	Cumulative percent
Do you know that cervical cancer is preventable?				
No	27	8.7	18.1	18.1
Yes	115	37.1	77.2	95.3
Do not know	7	2.3	4.7	100.0

Total	149	48.1	100.0	
Missing: not applicable	161	51.9		
Total	310	100.0		
Do you know that Pap smear/VIA can identify early precancerous lesions?				
No	18	5.8	11.8	11.8
Yes	103	33.2	67.3	79.1
Do not know	32	10.3	20.9	100.0
Total	153	49.4	100.0	
Missing: not applicable	157	50.6		
Total	310	100.0		
Do you know that early detection of cervical cancer has positive effect on treatment outcomes?				
No	9	2.9	5.9	5.9
Yes	128	41.3	83.7	89.5
Do not know	16	5.2	10.5	100.0
Total	153	49.4	100.0	
Missing: not applicable	157	50.6		
Total	310	100.0		
Who are recommended to do Pap smear/VIA?				
Premenopausal women	23	7.4	28.0	28.0
Postmenopausal women	24	7.7	29.3	57.3
Married women	15	4.8	18.3	75.6
Women who had sexual intercourse	15	4.8	18.3	93.9
Married women who had never been pregnant	3	1.0	3.7	97.6
Others	2	.6	2.4	100.0
Total	82	26.5	100.0	
Missing: not applicable	228	73.5		
Total	310	100.0		
Do you think Pap smear/VIA should be repeated?				
No	47	15.2	65.3	65.3
Yes	25	8.1	34.7	100.0
Total	72	23.2	100.0	
Missing: not applicable	238	76.8		
Total	310	100.0		
Can Pap smear/VIA be performed during pregnancy?				
No	47	15.2	64.4	64.4
Yes	26	8.4	35.6	100.0
Total	73	23.5	100.0	

| Missing: not applicable | 237 | 76.5 | | |
| Total | 310 | 100.0 | | |

Table 4: Items of knowledge about cervical cancer and its screening tests (n 310).

Reasons of refusal:	Frequency	Percent	Valid percent	Cumulative percent
I feel shy:				
No	33	10.6	46.5	46.5
Yes	38	12.3	53.5	100.0
Total	71	22.9	100.0	
Missing: not applicable	239	77.1		
Total	310	100.0		
My husband would not agree:				
No	51	16.5	73.9	73.9
Yes	18	5.8	26.1	100.0
Total	69	22.3	100.0	
Missing: not applicable	241	77.7		
Total	310	100.0		
The doctor did not request these tests for me:				
No	35	11.3	51.5	51.5
Yes	33	10.6	48.5	100.0
Total	68	21.9	100.0	
Missing: not applicable	242	78.1		
Total	310	100.0		
Unnecessary:				
No	37	11.9	53.6	53.6
Yes	32	10.3	46.4	100.0
Total	69	22.3	100.0	
Missing: not applicable	241	77.7		
Total	310	100.0		
Others:				
No	20	6.5	60.6	60.6
Yes	13	4.2	39.4	100.0
Total	33	10.6	100.0	
Missing: not applicable	277	89.4		
Total	310	100.0		

Table 5: Reasons of refusal to perform Pap smear/VIA (n 310).

Variable	B	95% CI*	Beta	t	P value
(Constant)	20.0	4.9-35.0		2.61	0.01
Age	-0.16	-0.32- -0.01	-0.12	-2.16	0.03
Educational level:					
Primary school	-2.31	-15.4- 10.8	-0.04	-0.34	0.73
Secondary school	-3.64	- 15.8-8.5	-0.11	-0.58	0.55
University (Bachelor degree)	-4.51	-16.4-7.4	-0.17	-0.74	0.45
Postgraduate	-2.76	-14.6-9.1	-0.08	-0.45	0.64
Occupation:					
Housewife	-4.12	-12.6-4.3	-0.15	-0.95	0.33
Freelancer	5.93	-3.5-15.3	0.14	1.23	0.21
History of contraceptives usage	4.18	1.1-7.2	0.15	2.67	0.008
History of vaginal speculum examination	3.86	0.5-7.2	0.13	2.28	0.02

* CI: confidence interval. R^2 adjusted = 0.15

Table 6: Multiple linear regression for predictors of knowledge score.

Variable	B	95% CI*	Beta	t	P value
(Constant)	2.9	4.9-35.0		4.0	0.000
Educational level:					
Primary school	-0.06	-1.4-1.2	-0.01	-0.09	0.92
Secondary school	-0.16	-1.4-1.0	-0.05	-0.26	0.79
University (Bachelor degree)	0.45	-0.7-1.6	0.16	0.73	0.46
Postgraduate	0.7	-0.5-1.9	0.21	1.13	0.25
Occupation:					
Housewife	-0.52	-1.3-0.3	-0.19	-1.18	0.23
Freelancer	-0.68	-1.6-0.2	-0.15	-1.4	0.16
Knowledge score	0.01	0.006-0.03	0.17	2.88	0.004

* CI: confidence interval. R^2 adjusted = 0.103

Table 7: Multiple linear regression for predictors of attitude score.

Variable	B	95% CI*	Beta	t	P value
(Constant)	0.64	0.2-1.0		3.31	0.001
Educational level:					
Primary school	-0.7	-1.1- -0.2	-0.43	-3.36	0.001
Secondary school	-0.61	-0.9- -0.2	-0.62	-3.12	0.002
University (Bachelor degree)	-0.64	-1.0- -0.2	-0.77	-3.37	0.001

Postgraduate	-0.66	-1.0- -0.2	-0.65	-3.4	0.001
Contraceptives' usage	0.06	-0.03-0.16	0.07	1.32	0.187
Knowledge score	0.005	0.001-0.008	0.14	2.42	0.016

* CI: confidence interval. R^2 adjusted = 0.082

Table 8: Multiple linear regression for predictors of practice score.

4. Discussion

Half of the respondents (50.0%, 155/310) in this study heard about cervical cancer and 27.7% (86/310) of them heard about Pap smear/VIA. The majority of the respondents (65.2%, 202/310) agreed to perform Pap smear and VIA, and 85.5% (265/310) of them agreed to participate in educational campaigns to teach other women about cervical cancer and its screening tests. Only the minorities of our participants had ever undergone Pap smear/VIA (2.3%, 7/310) and received the vaccine against the Human Papillomavirus (2.3%, 7/310). About 50.0% (155/310) and 27.7% (86/310) of women in our study heard about cervical cancer and Pap smear/VIA, respectively. In fact, most of those who mentioned that they "heard about cervical cancer" had limited knowledge as evidenced by the fact that considerable percentages of them -shown in table 2 and 3- *did not* rate the followings as symptoms and risk factors of cervical cancer: increased vaginal discharge (52.9%, 82/155), dyspareunia (43.4%, 67/155), sexually transmitted infections (34.2%, 53/155), smoking(34.2%, 53/155)and low socioeconomic status (55.5%, 86/310), as they were less likely to undergo cervical cancer screening tests. Also -out of those who heard about cervical cancer- 47.7% (74/310) did not rate HPV as a risk factor of cervical cancer. This finding is accordant with a Cameroonian study in which 76.6% of the respondents were ignorant about HPV as a risk factor for cervical cancer [14].

Out of those participants who mentioned that they "heard about Pap smear/VIA" in this study: 52.3%

(45/86) of them thought that it is unnecessary to repeat these tests during life. The previous findings reflected their poor awareness about cervical cancer and Pap smear/VIA, which is accordant with a study conducted in Malaysia which indicated that many of the respondents did not rate the following as symptoms and risk factors of cervical cancer: malodorous vaginal discharge, abnormal vaginal bleeding between menstruation, dyspareunia, HPV and HIV infections, multiple partners, early age at marriage and smoking [12]. Still high, the percentage of our participants who had *never* heard about cervical cancer (47.4%, 148/310) and Pap smear/VIA (70.3%, 218/310) as a study conducted in Ghana and indicated that: 68.4% and 97.7% of the respondents had never heard about cervical cancer and Pap smear respectively, and only5.9% of them knew about sexual transmission of HPV [15]. Unawareness about sexual transmission of HPV as a primary cause of cervical cancer can lead to disease multi-spread, especially with multiple partners as indicated in the study [15] that lacking knowledge about sexual transmission of HPV can lead women to be infected with the virus without being aware of the source of infection. Poor level of knowledge about cervical cancer and its screening tests could be explained by knowing that many of the respondents had limited education and low economic status that prevented them from having access to cervical cancer screening tests. Limited knowledge about cervical cancer constitutes a barrier against having periodic Pap smear/VIA tests, this may implicate on women being presented in advanced stages of the disease [15].

Previous studies indicated that well-educated women were more likely to be aware of cervical cancer and Pap smear [11, 16]. Likewise, low educational level was associated with low awareness of cervical cancer [16].

In this study, 65.2% (202/310) of the respondents had the desire to undergo Pap smear/VIA test, mainly represented by those who had good and moderate knowledge scores and had high education, which reflects the importance of education in the prevention of cervical cancer. This result is accordant with a Cambodian study that indicated 74.0% of the participants had the desire to undergo a Pap smear, despite their low level of knowledge about cervical cancer and its prevention [17]. Authorities should encourage Pap smear/VIA testing by providing them opportunistically -during clinics' visits- and voluntary. As shown in Table 4, the highly-rated reasons for refusal of Pap smear/VIA were: "painful", "unnecessary" and "I am healthy, no need". likewise, previous studies indicated pain and non-necessity as the major reasons for the refusal [11, 12]. While another previous study [12] indicated that religious factors can negatively affect the attitude towards Pap smear, as the respondents had to gain consent from their spouses. Furthermore, in this study 20.3% (63/310) of the respondents had a painful vaginal examination, and 80.0% (248/310) had had FGM, commonly WHO type 3 was (38.1%, 118/310). So painful experiences and embarrassment with genitalia have been shown to negatively affect cervical cancer screening tests [18]. Fortunately, most of the respondents (85.5%, 265/310) had the desire to educate other women about cervical cancer and its screening tests through participation in educational campaigns. Most of them had Bachelor degrees and had moderate and good knowledge scores, which could reflect the effect of education and awareness about cervical cancer in attitude level towards cervical cancer.

In this study, the rate of Pap smear/VIA testing was low (2.3%, 7/310), which represented mainly the respondents who: used contraceptives (85.7%, 6/7), underwent FGM (100.0%, 7/7) and had vaginal speculum examination (42.9%, 3/7). This result is accordant with a study conducted in Sudan which indicated that only 15.8% of women had ever undergone Pap smear/VIA, and that percentage has mainly represented those women with: Bachelor degrees, urban-living, age more than 30 years and a history of gynaecological examination [11]. This low testing rate can be explained by socio-demographics: the majority of our participants were relatively young and had low economic status. Young women find themselves healthy and less likely to seek medical care. Moreover, a considerable percentage of the participants had never been to university, and only 27.7% (86/310) heard about Pap smear/VIA. Since the developed countries have high-income status, so it is expected to have high percentages of cervical cancer screening tests there as a study conducted in the United States of America (USA) indicated that 93.0% of the American women had undergone at least one Pap smear in their lifetime [19]. There was a significant difference in practice scores-as reflected by having Pap smear/VIA and HPV vaccine- between those who had used contraceptives and those who had not. This can be explained by knowing that most contraceptives' users were well educated.

Only 2.3% (7/310) of the participants received the HPV vaccine and mainly represented by those with moderate and good knowledge of cervical cancer. A Cambodian study indicated that only 1.0% had received the HPV vaccine, and the major reasons for refusal of the HPV vaccine included poor knowledge about it and its high cost [17]. Therefore, to increase HPV vaccination coverage, it is crucial to decrease its cost by providing the women with health insurance and increase their

awareness about the importance of this vaccine through different channels (media, educational campaigns and opportunistic education during clinics' visits). We found that having contraceptives and higher knowledge score were positively associated with practice score, which is accordant with a study that indicated that women who used contraceptives were 3.97 times more likely to undergo Pap smear than those who did not use contraceptives, and women with higher knowledge score were 1.09 times more likely to undergo Pap smear than those without higher knowledge score [12]. The study has limitations. Since the study design is cross-sectional, it limits the establishment of cause and effect relationship between predictors and outcome. Unmeasured, residual and imprecisely measured confounders might affect the regression model. Since some women were non-Arabic speakers, the language barrier was an issue.

5. Conclusions

Although most of the respondents had heard about cervical cancer and its screening tests, most of the respondents had limited knowledge about cervical cancer and its screening tests, which reflects the importance of implementing health educational campaigns. Also, most of them had undergone neither Pap smear/VIA nor HPV vaccine before. As most of them had the desire to undergo Pap smear/VIA, these tests should be implemented through primary health care centres.

Recommendations

The results of the study should be reported to the health stakeholders in order to direct them into conducting health educational campaigns about cervical cancer and to implement feasible and cost-effective screening programs. Rural areas should be reached through mobile teams. Community participation in health education campaigns should be encouraged to increase the level of awareness, attitude and practice towards the disease. Also, vaccination programs against HPV should be implemented.

Competing Interest

None declared.

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