

# Knowledge, attitudes and practices regarding cervical cancer screening among Female health care workers in primary healthcare in Qatar

Dr. Amal Alali (1)  
 Dr. Mohamed Salem (2)  
 Dr. Hisham Elmahdi (3)  
 Dr. Noora Alkubaisi (4)  
 Dr. Zeliakha Alwahedi (5)  
 Dr. Muna Taher (5)  
 Dr. Wafaa Yousuf (5)  
 Dr. Abeer Aljaber (5)  
 Dr. Ahmed Mostafa (3)

(1) Consultant Family Medicine, Associate Director of Family Medicine Residency program, Primary Health Care Corporation -Qatar, Assistant Professor of family medicine in clinical medicine, Weill Cornell Medical College Qatar (WCMC-Q).

(2) Assistant Professor Family Medicine, Faculty of Medicine - Suez Canal University - Egypt

(3) Specialist Family Medicine - Primary Health Care Corporation - Qatar

(4) Consultant Community Medicine- Primary Health Care Corporation - Qatar

(5) Consultant Family Medicine, Primary Health Care Corporation - Qatar

## Corresponding author:

Dr. Amal Alali

Consultant Family Medicine, Associate Director of Family Medicine Residency program, Primary Health Care Corporation -Qatar, Assistant Professor of family medicine in clinical medicine, Weill Cornell Medical College Qatar (WCMC-Q).

**Email:** aalali@phcc.gov.qa, dr.alali2013@gmail.com

## Abstract

**Background:** Cervical cancer is the third most common cancer among women worldwide. The female health care workers who provide reproductive health care are one of the most important health knowledge providers and promoters.

**Aim:** The aim was to identify the deficits in the Knowledge, attitudes, and practice of female health care workers in primary healthcare centers in order to improve and raise their awareness of cervical cancer screening to a level high enough to provide accurate information, good attitudes, and practice for cervical cancer screening.

### Objective(s):

(1) To assess the level of Knowledge, attitudes and practices (KAP) regarding cervical cancer screening among female healthcare workers (HCWs) in primary health care in Qatar.

(2) To examine factors influencing female health-care workers (HCWs) participation in the cervical cancer screening program.

(3) To determine where the female healthcare workers (HCWs) would prefer to do the test and by whom.

**Methods:** Descriptive cross sectional study was conducted to assess knowledge, attitudes and practices towards cervical cancer screening in 90 female health care workers working in Primary Health Care Centers in the state of Qatar. Data collection was done using a self-administered questionnaire designed to assess knowledge, attitude and practices toward cervical cancer screening as well as factors influencing female healthcare workers (HCWs) to participate in the cervical cancer screening program and where the female healthcare workers (HCWs) would prefer to do the test and by whom. Data were analyzed using Epi Info. software. Data analysis was applied to identify the statistical significant limit of  $P < 0.05$ .

**Results:** The total sample included 90 female health care workers revealing 43.3 % were in the age group 30-39 years, 91.1% were non Qatari, 81.1% were nurses. Among the participants 92.2 % had adequate Knowledge regarding cervical cancer risk factors (multiple partners, HPV, and family history), while less than 9 % knew the eligibility and screening interval for cervical cancer screening. Of the female participants, 57.8 % didn't feel they were at risk, 84.4% believed that they must be screened, 96.7 % were referred for cancer screening, and 42.2% had a pap smear before. There were significant test

results related to knowledge of (Smoking, and Family History) as risk factors mainly among residents which reaches 100% compared to physicians and nurses. The study results also showed that the most common factor influencing participation in the cervical cancer screening program are embarrassment (17.3%), inadequate training (14.8%) and exposed by colleagues (13.6%). Among the participants, 94.5% preferred to have a Pap smear test conducted by female physicians either in the Well women clinic in the primary health care centers (32.2%) or Gynecological clinic in hospital (27.8%).

**Conclusion:** Most of the participants group were nurses (81.1%). The present study shows inadequate levels of knowledge regarding the eligibility and screening interval (9%). They had a good attitude towards cervical cancer screening but a low practicing percentage. In addition, low percentage (32.2%) of them preferred to have a pap smear in well woman clinics in primary care and they preferred female doctors to do cervical cancer screening.

**Key words:** knowledge, Attitude and practice, cancer cervix, health care providers, screening, primary health care.

## Introduction

Cervical cancer is the third most common cancer among women worldwide, with an estimated 83,195 new cases and 35,673 deaths in 2012[1]. In the developing countries, it is the leading cause of gynecological cancer related morbidity and mortality [2].

In Qatar 371,015 women are at risk for cervical cancer (Female population aged >15 years). The current estimates indicate that every year 15 women are diagnosed with cervical cancer and 4 die from the disease. Cervical cancer ranks as the 5th most frequent cancer among women in Qatar and the 6th most frequent cancer among women between 15 and 44 years of age [3].

Cervical cancer has a long premalignant period that provides the opportunity to screen and treat before it becomes invasive cervical cancer [4]. Along with this, it is largely preventable by effective screening programs and considerable reduction in cervical cancer incidence and deaths has been achieved with systematic cytological smear screening programs [5,6].

Primary prevention of cervical cancer aims at reducing the incidence of cervical cancer by controlling the causes as well as risk factors. Human papilloma virus, a common sexually transmitted infection, is the primary underlying

cause of cervical cancer. The risk factors for cervical cancer are multiple sexual partners, early age of onset of sexual activity, increasing parity, use of hormonal contraceptives for 5 years or longer,[7,8] current or previous sexually-transmitted infection[9] and smoking[10].

Despite the active role of health care workers to prevent cervical cancer, there are many obstacles faced by health care workers to promote cervical cancer screening. Lack of knowledge about the risk factors, causes, symptoms [12, 13, 14], ways of transmission [15, 16], screening intervals, and HPV vaccine [15] are the main obstacles, as well as poor attitude and practice for cervical cancer screening [17, 18, 19].

An assessment of health care workers' knowledge and practice of cervical cancer screening particularly for female health care worker who provide reproductive health care is considered important. Two studies were conducted in the GCC to assess the knowledge, attitude, and practice of primary care physicians of cervical cancer screening. The studies found that physicians have poor knowledge and practice regarding cervical cancer screening and accordingly a training program is recommended to improve the physician's knowledge and practice [17, 18].

Another study confirmed the result of previous studies conducted in Zimbabwe that revealed that physicians and nurses had poor knowledge regarding the predisposing

factors of cervical cancer, as well as negative beliefs about the risk of developing cervical cancer and poor screening behaviors [19]. Comparatively, one study conducted in Ibadan found that the knowledge about cervical cancer was higher among physicians and inadequate among nurses [20]. On the other hand, one study conducted in Tanzania to assess the knowledge and practice of cervical cancer screening among nurses found that nurses had adequate knowledge regarding cervical cancer causes, and ways of transmission but poor knowledge regarding the risk factors, and symptoms of cervical cancer [15].

Despite knowledge of the gravity of cervical cancer and prevention among female medical workers by screening using a Pap smear; the attitudes and practices towards screening were negative [21]. A Study in the UK showed that some medical workers, including female physicians considered themselves, not to be at risk of developing cervical cancer. Moreover, they expressed feelings of embarrassment and/or pain. The receipt of an abnormal result and referral for colposcopy causes high levels of distress [22].

Among barriers for effective cervical cancer screening, lack of knowledge among medical workers [15, 17, 18] inadequate training of staff [16], not feeling at risk, lack of symptoms, carelessness, fear of vaginal examinations, lack of interest and test being unpleasant [12,13] is observed. It is unlikely that those medical workers would feel motivated to screen others or advise them accordingly. Furthermore, anxiety regarding physical privacy [23] and being busy [12] were considered as barriers.

The female health care workers who deliver reproductive health care are one of the most important health knowledge providers and promoters [11]. Therefore, if female physicians and nurses have unsatisfactory knowledge, inappropriate attitudes and practice toward cervical cancer screening, they would not distribute the knowledge to the community and cannot persuade the patient to perform a Pap smear [12]. Accordingly, improving the knowledge and attitudes about cervical cancer screening in such experts will encourage them to readily provide accurate information and motivate the general population to join screening programs and motivate themselves to be screened for cervical cancer.

In Qatar there is one study conducted to assess knowledge, attitude and practice of women attending the primary healthcare centers. The study showed that knowledge and practice were inadequate among those under 30 years old [24], but no previous study has assessed the knowledge, attitude and practices of cervical cancer screening among female health care workers in the primary health care setting.

Therefore, this study was conducted to assess knowledge, attitude and practice of female health care workers regarding cervical cancer screening. The aim of this study is to raise the awareness and importance of cervical cancer screening among female HCWs and use the results of

study to be a guideline for improvement of knowledge, practice and attitudes of primary healthcare providers to a level high enough to provide accurate information and good attitudes for cervical cancer screening to the people and patients. Also, early detection of cervical cancer provides better outcomes.

## Materials and Methods

**Study design :** Descriptive cross sectional study to assess knowledge, attitude and practices of cervical cancer screening among female health care workers in primary health care centers in Qatar.

**Study area:** This study was conducted at Primary Health Care Corporation in Qatar, where cervical cancer screening takes place in primary health care centers by specialists or consultants in family medicine through well women clinics. These clinics are scheduled to be one to two clinics in each health center arranged in the morning or evening duty according to each health center's situation; the capacity of each clinic reaches an average of 25 patients per clinic time.

**Study subjects:** It included all female health workers who fulfilled the inclusion criteria: Female health care workers working in health centers (in the central region) inside Doha city, including female physicians (consultants, specialists, residents) and staff nurses. Exclusion criteria included : Female health care workers working in healthcare centers outside the central region and Male staff in and out of Doha healthcare centers.

**Sample size and Sampling Technique:** The sample size was calculated according to expected prevalence of good knowledge in a previous study done in Saudi Arabia 2013 of 21.8% [25 ]. Assuming a margin of error of 5%, and 95% confidence level, the calculated sample size was 90; according to Daniel equation [26] it includes all who fulfilled the inclusion criteria. Selection was based on systematic random sampling technique of every 2nd patient until reaching the required number.

**Data collection:** All the participants were informed about the purpose of the study and informed oral and written consent was obtained. They were assured confidentiality of their personal identifiable information. The interviews were carried out between March 2016 and June 2016.

Participants answered a self-administered questionnaire containing both coded and open-ended questions. The first 6 questions gather demographic information about the participants, the next 6 questions assess the participants' awareness and knowledge. In this study, awareness is defined as having previously heard about cancer cervix screening. Moreover, 3 questions were asked to assess participants' attitudes; and 2 questions for the practices regarding cervical cancer screening, one question to understand the factors influencing female HCWs participation in the screening program, and 2 questions

related to the location preference to do the test and by whom.

We considered adequate knowledge if participants mentioned at least 3 of the known risk factors (early sexual intercourse, multiple sexual partners, multi parity, low social economic status, Human Papilloma Virus infection). The participants knew that cervical cancer ranks as the 5th most common cancer among woman in Qatar. The participants knew that the human papillomavirus is the etiological agent for cervical cancer, cervical cancer is a curable disease and the participants should correctly answer the screening eligibility and interval of the cervical cancer screening that should be performed.

Adequate Practice was assessed when the participants answered that they referred their patients to do Pap smear test and that they themselves are examined if applicable. Attitude toward screening was measured by answering yes to all of the following questions: Do you think you

are at risk of getting cervical cancer? Do you think that you should undergo screening for cervical cancer? Do you think all eligible women for cervical cancer screening should undergo it? The questionnaire contents validity was confirmed through an extensive literature review and experts specialized in gynecology.

**Ethical considerations :** Participation in the study was completely voluntary; the investigators explained the purpose of the research and every participant was able to withdraw at any time; confidentiality was maintained. Approval by Institutional Review Board from Research Section - Primary Health Care Corporation in Qatar was obtained before conducting the study PHCC/RC/14/07/2014 .

**Data Analysis :** Data collected was entered and analyzed by using Epi Info software and statistical significant tests suitable for different variables was used.

## Results

### Sociodemographic

A total of 90 female health care workers were interviewed, 43.3 % were in age group 30-39 years, 91.1% were non Qatari, 81.1% were nurses, 83.3% were married, 97.8 % were nonsmokers, and 86.5 % had no chronic medical condition. The sociodemographic details of the respondents are shown in Table 1.

**Table 1 : Socio-demographic Characteristics of Participants**

Characteristic	No.	%
<b>Age Groups (Years)</b>		
20 – 29	20	22.2
30 – 39	39	43.3
>= 40	31	34.5
<b>Nationality</b>		
Qatari	8	8.9
Non-Qatari	82	91.1
<b>Job title</b>		
Consultant	15	16.7
Resident	2	2.2
Nurse	73	81.1
<b>Marital status</b>		
Ever Married	75	83.3
Single	15	16.7
<b>Smoking status</b>		
Yes	2	2.2
No	88	97.8
<b>Previous medical illness</b>		
Yes	12	13.5
No	77	86.5

Abbreviations: Obs. & Gyne.: Obstetrics and Gynecology, MD: Medical Doctorate,

### Knowledge of Cervical Cancer and Risk Factors

Most of the female HCPs were aware of cervical cancer screening (97.8%). Knowledge on risk factors, screening eligibility and interval is shown in Table 2. The results revealed that 62.2% had fair knowledge about ranking cervical cancer in Qatar, 92.2% had good knowledge regarding (etiological factors, multiple partners, HPV, and family history), 9 % knew the eligibility and screening interval for cervical cancer screening and 73.3% stated curability of cervical cancer.

<b>Table 2 : Knowledge and beliefs of the women about cervical cancer risk and prevention</b>		
Knowledge/Belief item	No.	%
<b>Do you know that cervical cancer ranks as the 5th most frequent cancer among women in Qatar?</b>		
Yes	56	62.2
No	34	37.8
<b>Do you know that human papillomavirus is etiological agent for cancer cervix?</b>		
Yes	81	90.0
No	9	10.0
<b>Which of these factors can increase the risk of getting cervical cancer?</b>		
Adequate Knowledge	83	92.2
Not Adequate knowledge	7	7.8
<b>Do you know that cancer cervix is curable?</b>		
Yes	66	73.3
No	24	26.7
<b>Have you heard about cancer cervix screening (Pap smear)?</b>		
Yes	88	97.8
No	2	2.2
<b>Answer to eligibility criteria and interval?</b>		
Correct answer	8	8.9
Wrong answer	82	91.1
Abbreviations: PAP: Papanicolaou		

### Attitude and Practice Towards Cervical Cancer Screening

Table 3 shows the attitude and practice towards cervical cancer screening. 42.2% of the female HCWs perceived themselves as at risk of developing cervical cancer, 84.4% believed that they must be screened, 96.7 % were referred for cancer screening, and 42.2% had a pap smear before.

Table 4 shows the factor influencing participation in the cervical cancer screening program, where participants prefer to do the screening and by whom. The most influential factor affecting participation in cervical cancer screening was embarrassment (17.3%) inadequate training (14.8%), does not want to be exposed to colleagues (13.6%) and not feeling at risk (12.3%). Figure (1). Among them 32.2 % of the participants prefer to do pap smear in primary care clinics (Figure 2) while 94.5% preferred to have a pap smear by female physicians (Figure 3).

**Table 3 : Attitude and practice of women toward cervical cancer screening**

Characteristic	No.	%
<b>Do you think you are at risk of getting cervical cancer?</b>		
Yes	38	42.2
No	52	57.8
<b>Do you think that you should undergo screening for cervical cancer?</b>		
Yes	76	84.4
No	14	15.6
<b>Do you think all eligible women for cervical cancer screening should undergo for it?</b>		
Yes	87	96.7
No	3	3.3
<b>Do you screen or refer patient for Pap smear?</b>		
Yes	85	94.4
No	5	5.6
<b>Have you ever had Pap smear yourself? If applicable.</b>		
Yes	38	42.2
No	52	57.8

**Table 4 : Factors influencing to participation in the cervical cancer screening program, where participants prefer to do the screening and by whom**

What is the factor influence you to participate in the cervical cancer screening program?	No.	%
Lack of knowledge about cervical cancer screening	8	9.9
Inadequate training.	12	14.8
Not feeling at risk	10	12.3
Lack of symptoms	8	9.9
Lack of interest	5	6.2
Afraid of experiencing pain	4	4.9
Embarrassed	14	17.3
Does not want to be exposed by colleagues.	11	13.6
Afraid of the outcome of the screening test	9	11.1
<b>Where would you prefer to have Pap smear test?</b>		
Well women clinic in the primary health care centers	29	32.2
Gynecological clinic in hospital	25	27.8
Private clinic	19	21.1
No preference (It does not matter)	17	18.9
<b>By whom you prefer to conduct your Pap smear test?</b>		
Female physicians	85	94.5
Male physicians	0	0.0
Nurse practitioner	2	2.2
It does not matter	3	3.3

Figure 1

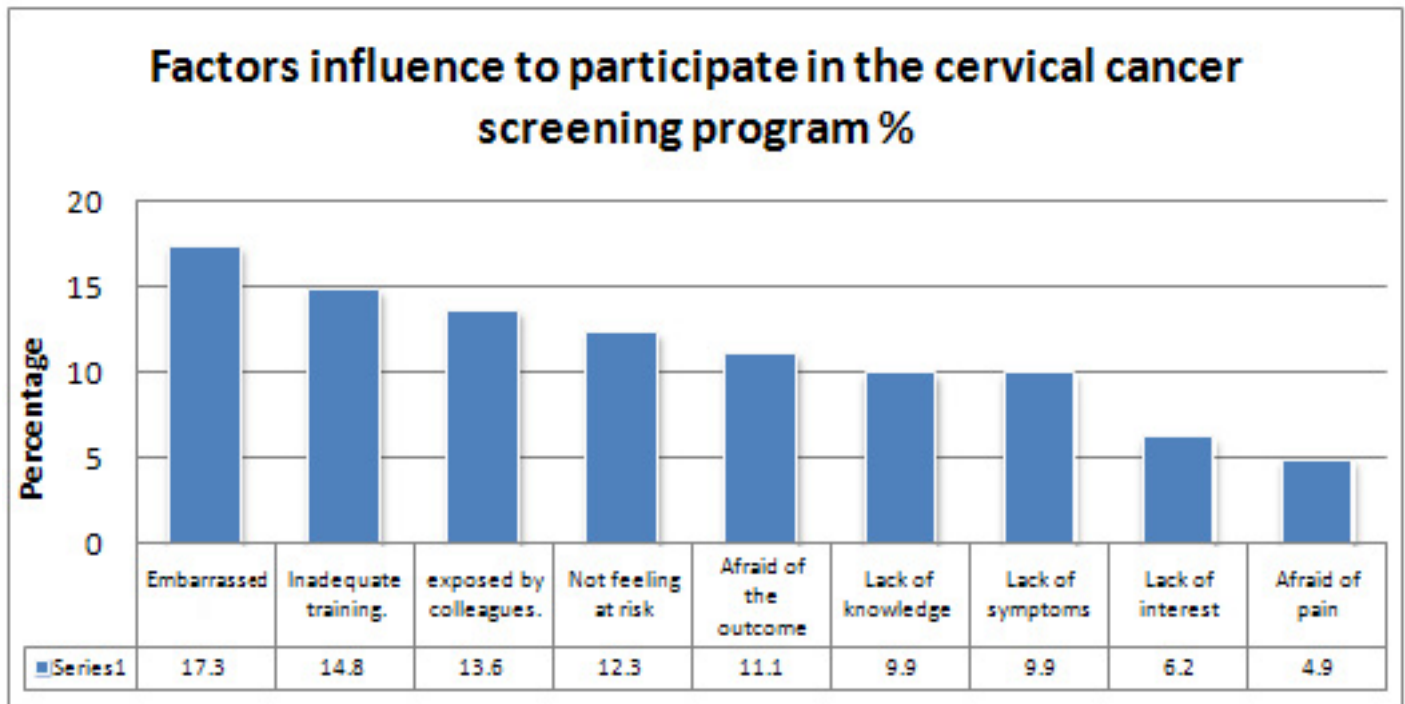


Figure 2

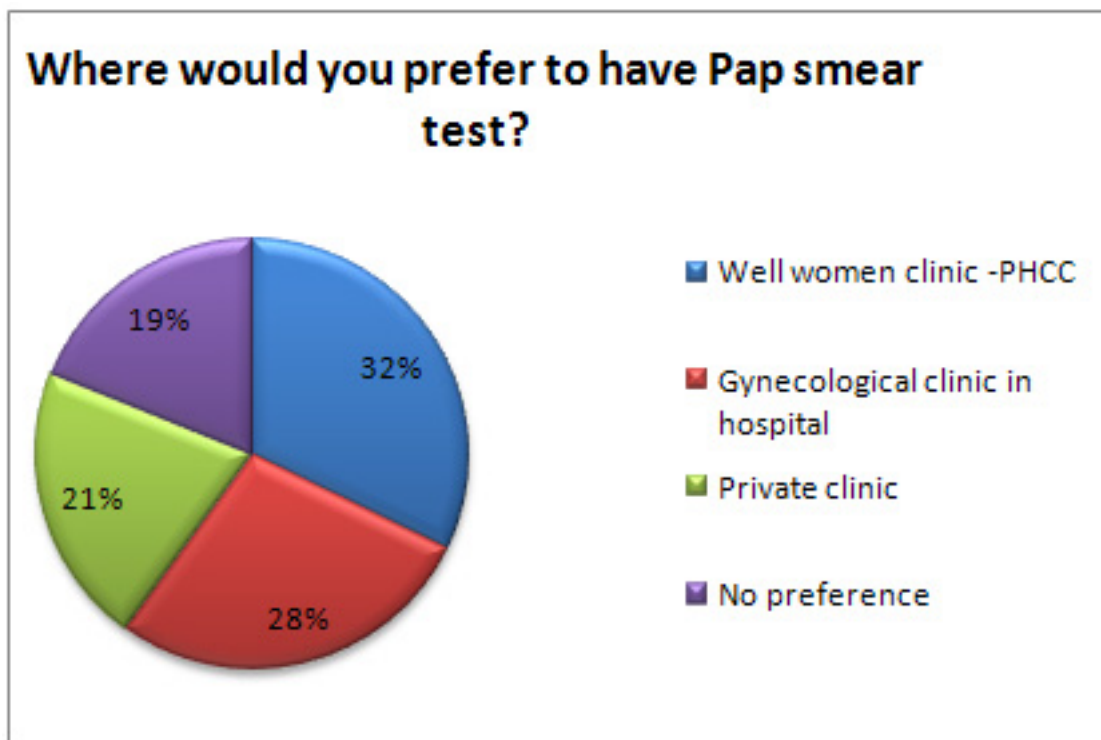


Figure 3

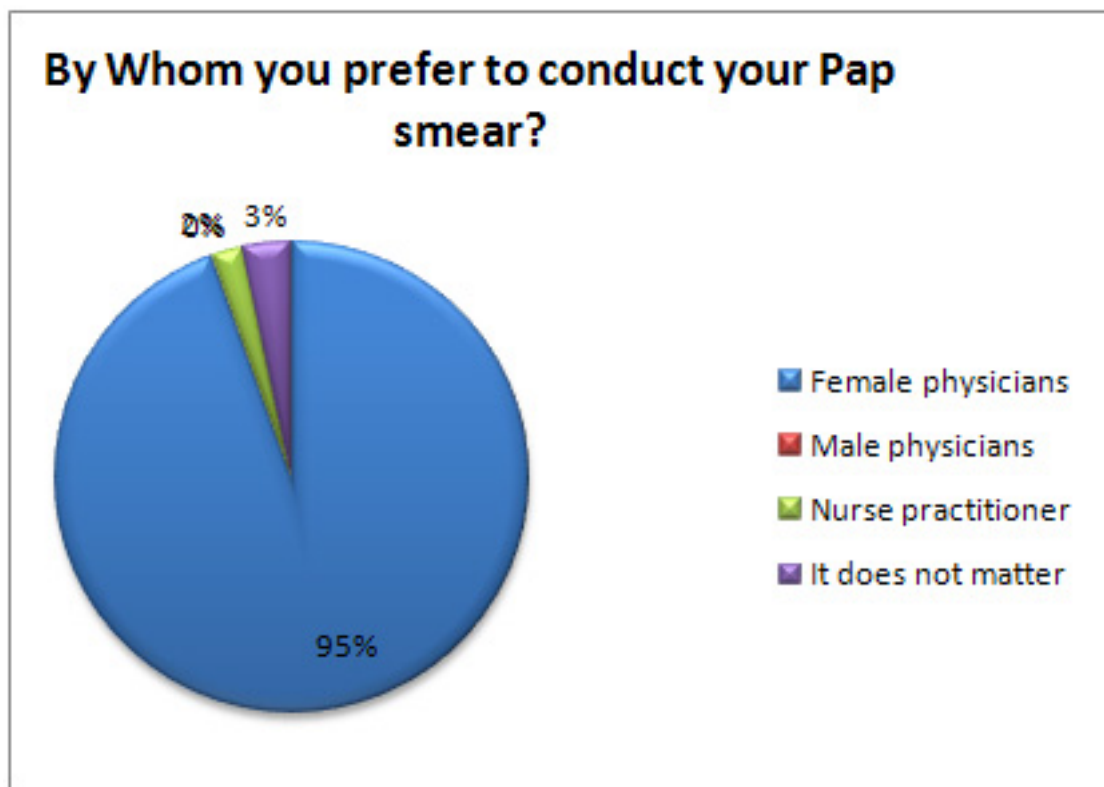


Table 5 shows the relation between knowledge score and sociodemographic factors revealing that no significant test results were found.

**Table 5 : knowledge scores of the women according to Socio-demographic characteristics**

Characteristic	Mean (SD)	P-Value
<b>Age Groups (Years)</b>		
20 – 29	7.9 (2.0)	0.887
30 – 39	7.7 (1.8)	
>= 40	7.6 (1.7)	
<b>Nationality</b>		
Qatari	7.6 (2.1)	0.860
Non-Qatari	7.7 (1.8)	
<b>Job title</b>		
Physician	8.1 (2.1)	0.134
Resident	10.0 (0.0)	
Nurse	7.6 (1.7)	
<b>Marital status</b>		
Ever Married	7.8 (1.8)	0.642
Single	7.5 (1.8)	
<b>Smoking status</b>		
Yes	6.5 (0.7)	0.333
No	7.8 (1.8)	
<b>Previous medical illness</b>		
Yes	8.3 (1.4)	0.266
No	7.6 (1.9)	

Abbreviations: Obs. & Gyne.: Obstetrics and Gynecology, MD: Medical Doctorate, SD: Standard Deviation. Note: (\*): P-value < 0.05



Table 6 shows the relation between individual knowledge items and participants' job revealing that there is significant test results related to (Smoking, and Family History) mainly among the residents which reaches 100% compared to physician and nurses, while eligibility criteria and screening interval was significant among physicians 27% compared to 5% among nurses.

<b>Table 6 : Relation between individual knowledge items and participants job</b>					
Question	Physicians (n=15)	Residents (n=2)	Nurses (n=73)	Total (90)	P- value
Do you know that cervical cancer ranks as the 5th most frequent cancer among women in Qatar?	11 (73)	2 (100)	43 (59)	56 (62)	0.404
Do you know that human papillomavirus is etiological agent for cancer cervix?	14 (93)	2 (100)	65 (89)	81 (90)	1.00
Marriage before age of 18 years can increase the risk of getting cervical cancer?	11 (73)	2 (100)	43 (59)	56 (62)	0.404
Having multi-sexual partners can increase the risk of getting cervical cancer?	14 (93)	2 (100)	65 (89)	81 (90)	1.00
HPV infection can increase the risk of getting cervical cancer?	14 (93)	2 (100)	70 (96)	86 (96)	0.574
Smoking can increase the risk of getting cervical cancer?	14 (93)	2 (100)	40 (55)	56 (62)	0.006*
Family History of cervical cancer can increase the risk of getting cervical cancer?	11 (73)	2 (100)	70 (96)	83 (92)	0.026*
Low socioeconomic status can increase the risk of getting cervical cancer?	8 (53)	2 (100)	33 (45)	43 (48)	0.319
Do you know that cancer cervix is curable?	10 (67)	2 (100)	54 (74)	66 (73)	0.754
Have you heard about cancer cervix screening (Pap smear)?	14 (93)	2 (100)	72 (99)	88 (98)	0.344
Answer to eligibility criteria and interval?	4 (27)	0 (0)	4 (5)	8 (9)	0.044*

Table 7 shows the participants' attitudes towards cervical cancer screening and job description revealing no significant test results found.

<b>Table 7 : Participant attitudes towards cervical cancer screening and job description</b>					
Question	Physicians (n=15)	Residents (n=2)	Nurses (n=73)	Total (90)	P- value
Do you think you are at risk of getting cervical cancer?	7 (47)	2 (100)	29 (40)	38 (42)	0.261
Do you think that you should undergo screening for cervical cancer?	15 (100)	2 (100)	59 (81)	76 (84)	0.164

## Discussion

Cancer of the cervix is the most common cancer among women and it can be prevented by applying the appropriate screening test, knowing the eligibility and screening interval. This study has tried to capture the awareness level, knowledge and practice toward cervical cancer screening among female HCWs.

In this study a total of 90 female health care workers participated. The results revealed that most of the female HCPs were aware of cervical cancer screening (97.8%). Among them 43.3 % were in the age group 30-39 years, 91.1% were non Qatari, 81.1% were nurses.

This study found that female health care workers had fair to good knowledge about cervical cancer screening. It ranged from 62.2% to 97.8% in different parameters assessed. It is matched with the study done in Saudi Arabia revealing that the knowledge about cervical cancer screening ranged between 60.5% to 90% [25]. This matching could be explained by that both studies were done among female health care workers in spite that the Saudi Arabia study included only physicians.

An important finding is that of most of the participants, mainly the nurses (91.1%) were not aware of the eligibility criteria and recommended screening interval for cervical cancer screening. Comparatively a larger percentage of Thai nurses correctly identified the recommended interval and the eligibility criteria for cervical cancer screening found by Nganwai et al [27]. This could be attributed to the training they have attended.

With regard to attitudes toward cervical cancer screening, 84.4% think that they must be screened, revealing positive attitudes towards screening, which matched with the study done in Qatar revealing 85.5% showed a positive attitude towards screening for cervical cancer [24], however that study was done among females from the general population, not health care workers. This explains increased awareness about cervical cancer screening among females in Qatar.

In regard to practices towards cervical cancer screening, 42.2% had pap smear before, which matched with the same study done in Qatar revealing 40% did have a Pap smear once before [24]. This also matched as female health care workers are part of the same female population so equal percentages were expected. In Saudi Arabia one study showed that [25] one third only did Pap smears in the physician group while 19 % among nurses. This difference from Qatar could be explained by that Saudi Arabia is still more conservative regarding discussion of cervical cancer screening and considered these issues as confidential matters, especially sexually transmitted diseases.

Among the eligible participants only 42.2% had a pap smear before. Our finding showed that the most common factor influencing participation in the cervical cancer screening program are embarrassment (17.3%), inadequate training (14.8%), they don't want to be exposed by colleagues

(13.6%), and not feeling at risk (12.3%). Comparatively a study conducted in the UK showed similar findings that some medical workers, including female physicians considered themselves, not to be at risk of developing cervical cancer. Additionally, they expressed feelings of embarrassment and/or pain[23]. It is unlikely that these staff will ever motivate others or advise them until their own doubts are cleared.

Whatever the factor influencing participation in the cervical cancer screening program, the present study showed that 94.5% of participants preferred to have the Pap smear test conducted by female physicians either in the Well women clinic in the primary health care centers (32.2%) or Gynecological clinic in hospital (27.8%).

Furthermore, this study found a relation between individual knowledge items and participants' job revealing that there is significant test results related to (Smoking, and Family History) mainly in the residents which reaches 100% compared to physicians and nurses, while eligibility criteria was significant among physicians 27% compared to 5% among nurses. Those findings make us think more of nurse education and training on the topic of cervical cancer screening.

Studies have shown it is possible to train nurses or other health care workers to screen for cervical cancer, and they play an important role in successful screening against cancer of the cervix [17,18]. There is an urgent need to integrate cervical cancer prevention topics in both physicians' and the nurses' training curriculum. The attitudes and beliefs that they are not at risk or they don't want to be exposed and feel embarrassed to do the screening needs to change.

## Conclusions

This study concludes that there are inadequate levels of knowledge regarding the eligibility and screening interval of cervical cancer, particularly among nurses. Female HCWs had a good attitude towards cervical cancer screening but uptake of screening for cervical cancer is minimal. All of these will affect their decision for cervical cancer early screening and referral.

## Recommendations

The findings of this study are descriptive. Qualitative studies should be done, to explain the understanding level of HCWs about cervical cancer screening importance and knowing the actual reasons for very low uptake of cancer screening, despite having direct access to screening facilities and clinical guidelines for cervical cancer screening in our corporation.

The finding also shows that the female health care workers, mainly nurses, have to be given a high focus. Our corporation needs to have more effectively educated and informed female HCWs about cervical cancer and screening. Moreover, it needs to initiate a monitoring

system e.g. audit to make sure that all female HCWs should be motivated to apply the best practice regarding cervical cancer screening to themselves and patients. Also, the perceived barriers towards screening need to be addressed.

## Limitations

The strength of the present study is that it is the first to assess knowledge, attitude and practice regarding cervical cancer screening among female healthcare worker where incidence of cervical cancer is high[3]. On the other hand, the study has some limitations. Firstly, this study is based on a self-reported measure that especially may affect reporting. The method used for estimating the practice of Pap smears were self-reported history, which may not give the actual picture due to inaccurate recall bias. Secondly, it is a descriptive cross sectional study which may not establish temporal relationships between exposure and outcome measures. Thirdly, the role of human papilloma virus vaccine was not addressed well.

## Acknowledgement

The data referred in the current report have been gathered with budget support from the research section in primary health care corporation (PHCC) in Qatar. Authors acknowledge participation in data collection of the following residents affiliated to Hamad medical Corporation in Qatar (Dr: Reem Kamal, Dr: Noura Alnachawi, Dr:Ehab Fadel, Dr:Mustaafa Mahmoud, Dr:Nahed Ragab, Dr:Ahmed Fayez, and Dr:Sara Hamad).

## References

1. Bruni L, Barrionuevo-Rosas L, Serrano B, Broton M, Cosano R, Muñoz J, Bosch FX, de Sanjosé S, Castellsagué X. ICO Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in world. Summary Report 2014-04-08.
2. Parkin D, Bray F, Devesa S. Cancer burden in the year 2000: the global picture. *The European Journal of Cancer* 2011; 37 (8): 4-66.
3. Bruni L, Barrionuevo-Rosas L, Serrano B, Brotons M, Cosano R, Muñoz J, Bosch FX, de Sanjosé S, Castellsagué X. ICO Information Centre on HPV and Cancer (HPV Information Centre). Human Papilloma virus and Related Diseases in Qatar. Summary Report 2014-03-17.
4. World Health Organization. (2002). Cervical cancer screening in developing countries. Report of a WHO consultation. Geneva, WHO Press.
5. Mahlck G, Jonsson H, Lenner P. Pap smear screening and changes in cervical cancer mortality in Sweden. *The International Journal of Gynecology & Obstetrics* 1994; 44 (3):267-272.
6. Elovainio L, Nieminen P, Miller B. Impact of cancer screening on women's health. *The International Journal of Gynecology & Obstetrics* 1997; 58 (1):137-147.
7. Chichareon S, Herrero R, Munoz N, Bosch F, Jacobs M, Deacon J, et al. Risk factors for cervical cancer in Thailand: a case control study. *Journal of the National Cancer Institute* 1998; 90 (1):50-7.
8. Thomas D, Oin O, Ray M, Kuypers J, Kiviat N, Ashley R. Human papillomavirus and cervical cancer in Bangkok. II. Risk factors for invasive cervical carcinomas with human papillomavirus type 16 and 18 DNA. *American Journal of Epidemiology* 2001; 153 (8):723-731.
9. Koskela P, Anttila T, Bjorge T, Brunsvig A, Dillner J, Hakama M, et al. Chlamydia trachomatis infection as a risk factor for invasive cervical cancer. *International Journal of Cancer* 2000;85 (1):35?39.
10. Louie K, Castellsague X, deSanjose S, Herrero R, Meijer C, Shah K, et al. Smoking and passive smoking in cervical cancer risk: Pooled analysis of couples from the IARC multicentric case-control studies. *Cancer Epidemiology Biomarkers and Prevention* 2011;20 (7):1379?90.
11. Nilaweera R, Perera S, Paranagama N, Anushyanthan A. Knowledge and Practices on Breast and Cervical Cancer Screening Methods among Female Health Care Workers: A Sri Lankan Experience. *Journal of Asian Pacific Journal of Cancer Prevention* 2012; 13 (4):1193-1196.
12. Oranratanaphan S, Amatyakul P, Iramaneerat K, Srithipayawan S. Knowledge, Attitudes and Practices about the Pap Smear among Medical Workers in Naresuan University Hospital. *Asian Pacific Journal of Cancer Prevention* 2010; 11(6): 1727-1730.
13. Mutyaba T, Mmiro A, Weiderpass E. Knowledge, attitudes and practices on cervical cancer screening among the medical workers of Mulago Hospital, Uganda. *BMC Medical Education* 2006; 6 (13):1-4.
14. Aniebue P, Aniebue U. Awareness and practice of cervical cancer screening among female undergraduate students in a Nigeria university. *Journal of Cancer Education* 2010; 25(1): 106-108.
15. Urasa M, Darj E. Knowledge of cervical cancer and screening practices of nurses at a regional hospital in Tanzania. *African health sciences* 2011; 11 (1): 48-57
16. Tran N, Choe S, Taylor R, Ko W, Pyo H, So H. Knowledge, Attitude and Practice (KAP) Concerning Cervical Cancer and Screening among Rural and Urban Women in Six Provinces of the Democratic People's Republic of Korea. *Asian Pacific Journal of Cancer Prevention* 2011; 12(11): 3029-3033.
17. Badrinath P, Aswad S, Osman N, Deemas E, McIlvenny S. A study of knowledge, attitude, and practice of cervical screening among female primary care physicians in the United Arab Emirates. *Health Care for Women International* 2004; 25(7):663-670.
18. Sait K. Knowledge, attitudes, and practices regarding cervical cancer screening among physicians in the Western Region of Saudi Arabia. *Saudi Medical Journal* 2011; 32 (11): 1155-1160.
19. Tarwireyi F, Chirenje M, & Rusakaniko S. Cancer of the cervix: knowledge, beliefs and screening behaviours of health workers in Mudzi District in Mashonaland East Province, Zimbabwe. *Central African Journal of Medicine* 2003; 49(7-8):83-86.
20. Ayinde O, Omigbodun A. Knowledge, attitude and practices related to prevention of cancer of the cervix among female health workers in Ibadan. *Journal of Obstetrics and Gynecology* 2003; 23 (1): 59-62.

21. Twaha M, Francis M, Elisabete W.. Knowledge, attitudes and practices on cervical cancer screening among the medical workers of Mulago Hospital, Uganda. *BMC Medical Education* 2006; 6(13): 1-4. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1413529/pdf/1472-6920-6-13.pdf> (accessed 4 July 2012).
22. Fylan F. Screening for cervical cancer: a review of women's attitudes, knowledge and behavior. *British Journal of General Practice* 1998; 48 (433):1509-1514.
23. Terefe Y, Gaym A. Knowledge attitude and practice of screening for carcinoma of the cervix among reproductive health clients at three teaching hospital, Addis Ababa, Ethiopia. *Ethiopian journal of reproductive health* 2008; 2 (1) : 14-24.
24. Al-Meer F., Aseel M., Al-Khalaf J, Al-Kuwari M, Ismail M. Knowledge, attitude and practices regarding cervical cancer and screening among women visiting primary health care in Qatar. *The Eastern Mediterranean Health Journal* 2011; 17 (11): 855-861
25. Khalid Sait., Knowledge, Attitudes and Practices regarding Cervical Cancer Screening in Western region of Saudi Arabia. *Saudia Med J* 2011;32(11):1155-1160.
26. Daniel WW *Biostatistics: A Foundation for Analysis in the Health Sciences* (7th edtn) John Wiley & Sons, New York (1999).
27. Nganwai P, Truadpon P, Inpa C, Sangpetngam B, Mekjarasnapa M, Apirakarn M, et al. Knowledge, attitudes and practices vis-a-vis cervical cancer among registered nurses at the Faculty of Medicine, Khon Kaen University, Thailand. *Asian Pac J Cancer Prev* 2008;9:15-8.