



Awareness and Knowledge of Cervical Cancer Among Female Students and Graduates of Public Health Faculty: Opportunities for Prevention and Early Detection in Developing Countries

Mohamed M. B. Elfallah,¹ Butheina K. Gerriw,² Nour Elhuda Gneiber,³ Monia. A. Elzunni,⁴ Retaj A. Belnour,⁵ Sondos E. Elseleny,⁶ Younes S. Elorfi,⁷

¹Faculty of Public Health, University of Benghazi, Libya

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Corresponding Author
bouthinagreiw@gmail.com

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ABSTRACT

Background: Cervical cancer (CC) is a preventable gynecological disease. While preventive medicine reduces CC morbidity and mortality, healthcare workers in developing countries often lack sufficient knowledge of its prevention and early detection.

Objective: This study assesses awareness of CC, its risk factors, Human Papilloma Virus (HPV), and Pap smear screening among female students and graduates of the Faculty of Public Health, University of Benghazi, Libya.

Methods: A cross-sectional study conducted in July 2024 involved 360 participants. A questionnaire evaluated socio-demographics, knowledge of CC causes, HPV, vaccination, and screening practices. Data were analyzed using SPSS.

Results: Awareness of CC and HPV was limited. While 73.3% recognized Pap smears, only 36.4% knew the recommended schedule. HPV vaccination awareness was moderate (48.3%), with just 21.9% knowing boys could also be vaccinated. Advanced-year students showed better knowledge.

Conclusion: Findings reveal gaps in CC prevention knowledge, emphasizing the need for targeted educational programs.

Introduction

Cervical cancer (CC) is the second most common gynaecological cancer and is one of the leading causes of morbidity and mortality amongst women especially in developing countries. It is one of the most preventable and treatable types of cancer (Hwaid,2013). The World Health Organization (WHO) continuously advises comprehensive CC prevention including extensive education Human Papilloma Virus (HPV) vaccination and cervical screening. (WHO, 2014). Public health faculty, and healthcare providers play a vital role in raising awareness about CC through education,

advocacy, research, and community engagement. The public health community seeks to lower the prevalence, morbidity, and mortality linked to this preventable disease by integrating primary prevention by means of vaccination against the HPV, secondary prevention using screening and early identification. A multifaceted strategy constitutes a component of the public health educational strategy for eradicating and managing CC. (Jallah, 2023). Educational interventions refer to health education activities that aim to positively improve people's health-related knowledge and awareness and thus change the relevant behaviour. (WHO,2014).

Access to, and provision of, educational and screening programs largely depends on the presence of robust health systems, with a trained workforce. (O'Donovan, 2019). The principal aetiology of CC is the chronic infection by the HPV, it is a prevalent virus transferred via skin-to-skin sexual contact. The infection may induce lesions on the cervix, which, if undetected and untreated over time, might progress to cancer. The lesions are asymptomatic, imperceptible, and unnoticeable, which underscores the necessity for women to undergo screening. More than 100 HPV varieties exist, although types 16 and 18 account for 70% of cancer cases. The majority of individuals will contract an HPV infection at some point in their lives, and many may exhibit no signs or symptoms (Lin et al., 2022). Individuals at risk for developing CC typically include women over the age of 30 who have a persistent infection with high-risk HPV types. Additional risk factors for CC include multiple sexual partners, early age at first childbirth, having three or more children, HIV-positive status, and tobacco smoking. Men can also contract HPV, which is associated with anal, penile, and oral cancers, though these are less prevalent than CC in women. In certain countries, HPV vaccines are provided to boys to mitigate the risk of these cancers (Cibula et al., 2023). In addition to being nearly 100% effective in preventing most HPV infections by vaccination, pre-cancerous lesions can be readily identified through screening prior to their progression to malignancy. Screening identifies pre-cancerous lesions, which can be treated to prevent cancer. Screening can identify cancer at an early stage when therapy is most likely to be curative (Martin, 2023). Regardless of prior HPV vaccination, it is crucial for women aged 30-49 to have CC screening. (Okunade, 2019). Women possess the right to safeguard themselves from this disease. The broader implementation of the HPV vaccine, alongside cervical screening, could significantly reduce

mortality, especially in younger women. Public health specialists are crucial in educating and inspiring girls and women to receive HPV vaccinations, pursue screening and treatment programs, and ensure access to these services. Several previous studies have addressed the topic of CC, screening and HPV vaccination, and reached several results. Among these studies is a multi-centric study by Joy et al. (2010), it was conducted on 1268 female university students in Delhi and Mangalore (India), Pokhara (Nepal) and Kandy (Sri Lanka). The results indicated an urgent need for a renewed and customized approach to CC prevention among educated youth in India, Nepal and Sri Lanka. Prevention efforts should focus on improving social awareness, implementing educational strategies to reduce risk factors and improving the strength and quality of counselling. Among medical profession a study by Dönmez et al. (2018) on Knowledge and perception of female nursing students about HPV, CC, and attitudes toward HPV vaccination, showed that more than half of the students (65.1%) answered the questions incorrectly with a mean HPV knowledge score of 3.38. Most of the students (82.6%) had not heard about the HPV vaccine. Only 2.8% of students were vaccinated. Khan et al. (2021) study showed that awareness of HPV vaccine was more prevalent among medical students. A large proportion of female students had limited knowledge about HPV as a cause of CC and HPV vaccine as a means of protection against it. Similarly, very few people were reported to have been vaccinated against the virus. Usman et al. study (2023) reported that respondents aged 25+ and those working in the medical profession had more knowledge. More medical students had better attitudes and favourable practices compared to their non-medical counterparts. More efforts are needed in combating CC and encouraging positive attitude and practice towards CC screening and vaccination uptake.

The study by Al-Meer et al. (2011), conducted interviews in 2008 among 500 women in Qatar. Knowledge of CC was significantly higher among women aged 30–49 years, who were employed, married for more than 15 years, had a university degree, or had 4 births or 3 miscarriages. Nearly 40% had had at least one Pap test. Knowledge and practice were inadequate among those under 30 years of age, newly married, and those with less education. Haesebaert et al. (2012) conducted a study which showed that only 16.9% mentioned HPV as a cause of carcinoma, and although 76.2% were aware of the vaccine only 14% women had daughters aged 14–18 years vaccinated. In the Koseet et al. (2014) study on Mothers' awareness and practice about HPV Vaccination to prevent CCs, in Sakarya, Turkey, the results of the study showed that 88.1% of mothers had no information about HPV, 73.7% did not know how the infection is transmitted and 83.5% had no information about HPV vaccination. This study indicated that mothers had very little information about HPV and HPV vaccination. A study by Dhendup et al. (2014) indicated inadequate knowledge of CC and substandard screening practices among Bhutan graduates, 94% reported that they had never had a Pap test. The study uncovered inadequate knowledge and screening behaviours among female university graduates in Bhutan, suggesting a lack of awareness and screening practices among young women. The study also indicated low knowledge and awareness about HPV, CC and HPV vaccine among first-year nursing students. Singh et al. (2020) study showed that knowledge regarding CC and HPV vaccine was 2.38 times higher among third-year students than second-year students. The study suggests that overall awareness and knowledge about CC, HPV and HPV vaccination were high among university students and were associated with gender, education and family background as well. This study concluded that the vast majority of the

respondents were well-informed about CC, but knowledge about risk factors and prevention techniques was lacking. Siddig et al. (2020), their study showed that out of 716 Sudanese female participants, 580 (81.0%) and 229 (32.0%) had heard about CC and Pap test respectively. This study revealed that the participants' knowledge and attitude levels were mainly driven by their occupation, and education level. In Libya, Ben Khaial et al. (2014) study stated that out of 4090 female cancer cases during the study period, 1.8% were CC patients (n = 74). The mean age was 53 years, and most cases (60%) were premenopausal. Approximately 65% of CC patients are diagnosed at later stages (i.e. stages III and IV). The main problem of CC in Libya is delay in treatment, therefore, all recommendations focus on raising awareness by implementing a national cancer control plan and a national screening program. Eljamay & Elqatani study (2022) entitled CC in Eastern Part of Libya, concluded that the number of basal cell carcinomas observed in the current cohort was considered low; and that implementation of screening measures including Pap smears could lead to better case detection, early diagnosis and prevention of basal cell carcinoma. Abudabbus et al. study (2023) entitled Types of CC of patients attending Misrata National Cancer Institute Hospital, Libya. The results showed a decrease in the incidence of squamous CC but an increase in adenocarcinoma of the cervix. Also, the disease is more common among young women of reproductive age, so CC is a major problem in the community.

Given the importance of this subject and its seriousness at the same time, and the existence of means that can contribute to preventing it and reducing its danger, and the importance of knowledge about it by women in general and young women in particular, this subject was chosen as the study problem to learn about the awareness, knowledge, and practices of female

students and graduates at the Faculty of Public Health.

Aim of the study:

- To Assess the awareness, knowledge, and practices of Cervical Cancer causes, prevention, Screening and HPV Vaccine amongst Female Students and Graduates at the Faculty of Public Health.
- Identifying the practices of Female Students and Graduates at the Faculty of Public Health regarding Cervical Cancer.

Methodology

A cross-sectional descriptive study design was conducted; in Benghazi- Libya. Data collection took place between 14th and 25th of July, 2024. The targeted population consists of all female public health students during the study period and all female graduates at the Faculty of Public Health, in the University of Benghazi, Libya. From the total number of 3,539 female subject. The sample size of the current study was calculated, we choose the p=0.5 for maximum variability at confidence level 95%, with Acceptable error, commonly 5%. The Richard J. Geiger formula was used to decide sample size:

$$n = \frac{N}{N(e^2) + 1}$$

The adjusted sample size and for a 10% non-response rate the sample size was 359. Electronic questionnaires were used for collecting data from the targeted population. A total of 360 questionnaires were completed and collected from Google Docs platform, Explanation of the study aim and objectives and the need for signed consents were explained. We received 360 complete responses, 65 first year students (18.1%),60 second year students (16.7%), 75 students of each third and fourth years (20.8% each year), 85 graduates representing (23.6%) of the sample.

The questionnaire was adapted from previous studies (Al-Meer et al., 2011; Haesebaert, et al., 2012; Jaglarz et al., 2014; Dhendup & Tshering, 2014; Singh & Baliga, 2017). The validity and

reliability of the questionnaire used in these studies were determined by the researchers who designed them. The questionnaire was adapted to the Libyan environment and the subject of study. Other self-developed items in the questionnaire were based on a review of the literature and input from experts in the field. The face and content validity of the questionnaire was tested by presenting it to a group of experts and specialists. The reliability of the questionnaire was also tested using Cronbach’s alpha test, and the reliability rate extracted was 0.902 (90.2%).

The questionnaire consisted of two parts: socio-demographic characteristics, including the age, the enrolment year of female students in public health faculty, (students or graduates). The second part consisted of knowledge about CC causes, main risk factors, role and types of HPV as a sexually transmitted infection, and which types are associated with CC. Knowledge of HPV Vaccine and the importance of pap smear as screening test for early detection of cervical changes. Attitudes and practice through asking about recommending HPV vaccination, enumerating the common barriers in accessing barriers in accessing CC prevention programs, the questionnaire items were evaluated using a scoring method. Correct answer was scored 2, close to correct answer 1 and incorrect or don't know answer 0. The Statistical Package for the Social Sciences (SPSS), version 27 for Windows, was used to conduct the analysis.

Results

The studied population was divided nearly equally between the studied years with higher percentages in the graduates (23%). Nearly three-quarters of the sample (73%) were 23 years and above age group. Three-quarters of the sample (78.3%) were not sexually active (unmarried, widows or divorced) while one-fifth of the sample (21.7%) were married. **Table 1**

Table I: Socio-demographic characteristics of the sample:

Variables	Frequencies	%
Year of study in Faculty of Public Health		
First year	65	18.1%
Second year	60	16.7%
Third year	75	20.8%
Fourth year	75	20.8%
Graduate (bachelor's degree in public health)	85	23.6%
Age		
Younger than 20 years	16	4.4%
20-22 years	81	22.5%
23-25 years	152	42.2%
Older than 25 years	111	30.8%
Marital status		
single	270	75.0%
married	78	21.7%

Divorced or widow	12	3.3%
Family history of cancer		
- Yes	107	29.7%
- No	253	70.3%

Almost all students heard about CC (90%). In nearly all awareness questions less than half of them answered correctly about causes of CC, including the role of sexually transmitted HPV infection in causing CC, the risk factors and the importance of vaccination and screening tests in the prevention of CC. Except when asked about role of diet and the long term use of hormonal contraceptives as risk factors for CC more than half of them answered correctly, (54.5%. 68.6%, respectively). Table 2

Table II: Awareness of female students and graduates regarding CC causes, role of HPV infection and risk factors:

Questions	Yes	No	Don't know
Have you ever heard about Cervical Cancer?	323 (89.7%)	19 (5.3%)	18 (5%)
Do you know that CC ranks as the 7th most frequent cancer among women in Libya?	115 (31.9%)	128 (35.6%)	117 (32.5%)
Human papilloma virus (HPV) is the underlying cause of CC.	142 (39.4%)	32 (8.9%)	186 (51.7)
Are you aware of the different strains of HPV?	66 (18.3%)	173 (48.1)	121 (33.6%)
Precancerous lesions take long time to progress to CC.	172 (47.8%)	34 (9.4%)	154 (42.8%)
Can CC be associated with an infection?	177 (49.2%)	72 (29%)	111 (30.8%)
HPV is a common sexually-transmitted infection.	171 (47.5%)	41 (11.4%)	148 (41.1%)
Being sexually active from early age increases the risk of CC.	129 (35.8%)	56 (15.6%)	175 (48.6%)
The predominant route of CC transmission is via sexual contact.	168 (46.7%)	70 (19.4%)	122 (33.9%)
Long term use of hormonal contraceptives is a risk factor for CC.	247 (68.6%)	27 (7.5%)	86 (23.9%)
Smoking or exposure to tobacco smoke increases risk of CC.	158 (43.9%)	72 (20%)	130 (36.1%)
Poverty is a risk factor for CC.	143 (39.7%)	93 (25.8%)	124 (34.4%)

Unhealthy diet is a risk factor for CC.	196 (54.4%)	56 (15.6%)	108 (30%)
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Regarding **knowledge and practicing the information in their real life**, less than half of the sample (43.6%) stated that they had been vaccinated against HPV. Regular gynaecological

examinations and follow-up, experienced only by half of the students and graduates (56.4%). The screening tests and pap smear was reported by only 9.7%. Table 3

Table III: Self- of practicing of health-related information by the students and graduates:

Variables	Frequencies	%
Frequency of gynaecologic follow-up		
Always	38	10.6%
Occasionally	47	13.1%
Whenever needed	118	32.8%
Never	157	43.6%
previously Pap examination		
Yes	35	9.7%
No	325	90.3%
vaccination against HPV		
Yes	157	43.6%
No	203	56.4%

Knowledge about the availability and importance of screening tests (Pap smear, blood culture, and PCR) the highest correct answers was about pap smear (73.3%), but it was low for the knowledge about screening intervals, only one -third of them answered correctly (36.7%). The lowest correct answers were

(36.4%) of the use of blood culture as a screening test. Less than half of the sample answered correctly about HPV vaccination availability in Libya, age of administration n number of doses, boys should be vaccinated and the protection rate of the vaccine in preventing CC. Table 4.

Table IV: Knowledge of female students and graduates about CC screening and the vaccination:

Questions	Yes	No	Don't know
Have you ever heard about the Pap smear?	245 (68.1%)	70 (19.4%)	45 (12.5%)
Pap smear is a screening technique for CC.	264 (73.3%)	19 (5.3%)	77 (21.4%)
The role of the Pap test is to prevent CC.	245 (68.1%)	39 (10.8%)	76 (21.1%)
Blood Culture is a screening technique for CC.	131 (36.4%)	50 (13.9%)	179 (49.7%)
PCR is a screening technique for CC.	147	41	172

	(40.8%)	(11.4%)	(47.8%)
Screening interval should be once in 3 years	132 (36.7%)	58 (16.1%)	170 (47.2%)
The vaccine is available in Libya.	173 (48.1%)	18 (5%)	169 (46.9%)
The vaccine can be given to a sexually active woman.	170 (47.2%)	28 (7.8%)	162 (45%)
Screening is not required before vaccination.	99 (27.5%)	138 (38.3%)	123 (34.2%)
Vaccine can be administered to those infected with HPV.	115 (31.9%)	88 (24.4%)	157 (43.6%)
Testing for CC is necessary even for those who received HPV vaccination.	227 (63.1%)	36 (10%)	97 (26.9%)
The age that is recommended for vaccination is 9-26 years.	174 (48.3%)	34 (9.4%)	152 (42.2%)
The number of doses required for age 12 years and older is 3 doses.	144 (40%)	16 (4.4%)	200 (55.6%)
HPV vaccine guarantee almost 100% protection from CC.	129 (35.8%)	70 (19.4%)	161 (44.7%)
Boys can be vaccinated.	79 (21.9%)	164 (45.6%)	117 (32.5%)

The attitudes and practice of the participants towards CC reduction of risk factors, use of scheduled screening methods and their vaccination against HPV infection, three-quarters (284) participants (78.4%) stated that CC is a preventable disease, and but only (66.7%) and they think there is an effective method that significantly reduces the risk of this

CC disease. Although 88.3% think that early detection through screening programs of CC is good for treatment outcome, only 53.1% of them agreed to undertaker the full screening program themselves. 81.1% of participants agreed that HPV vaccination is safe and effective but only 63.6% of them agreed to be vaccinated. 87.2% stated that they will recommend the vaccine for others. Table 5.

Table V: Practice of female students and graduates regarding CC, screening, vaccination programs.

Questions	Yes	No	Don't know
Do you think you are at risk of getting CC?	92 (25.6%)	141 (39.2%)	127 (35.3%)
If you have a close blood relative with CC, do you think that your chance of getting CC increases?	192 (53.3%)	62 (17.2%)	106 (29.4%)
Do you think CC is preventable?	284 (78.9%)	15 (4.2%)	61 (16.9%)
Do you think there is an effective method that significantly reduces the risk of this CC disease?	240 (66.7%)	17 (4.7%)	103 (28.6%)
Do you think that early detection of precancerous lesion can help in the prevention and treatment of CC?	312 (86.7%)	15 (4.2%)	33 (9.2%)
Do you think that early detection of CC good for treatment outcome?	318 (88.3%)	9 (2.5%)	33 (9.2%)
Do you feel young women should screen for HPV early?	314 (87.2%)	23 (6.4%)	23 (6.4%)

Do you think all eligible women for CC screening should undergo for it?	261 (72.5%)	41 (11.4%)	58 (16.1%)
Do you think that CC screening can help in the early detection of precancerous lesion?	306 (85%)	12 (3.3%)	42 (11.7%)
Do you recommend regular screen for early detection of precancerous lesions?	320 (88.9%)	19 (5.3%)	21 (5.8%)
Do you think that you should undergo screening for CC?	191 (53.1%)	102 (28.3%)	67 (18.6%)
If you were told that a Pap smear is painless and good for early detection of CC, would you like to have one?	253 (70.3%)	47 (13.1%)	60 (16.7%)
Do you think that woman should have a Pap test during her whole adult life?	188 (52.2%)	68 (18.9%)	104 (28.9%)
You prefer to conduct your Pap smear test by Female physicians.	292 (81.1%)	15 (4.2%)	53 (14.7%)
Do you feel young women should be vaccinated for HPV?	292 (81.1%)	18 (5%)	50 (13.9%)
Do you think that HPV vaccine is safe & effective?	229 (63.6%)	9 (2.5%)	122 (33.9%)
You will recommend vaccine to others.	314 (87.2%)	15 (4.2)	31 (8.6%)

The study showed that there are differences between participants regarding their knowledge of CC . There are differences between the Means of the answers of the sample members in favour of female students in the advanced years of study and graduates, and these differences were highly statistically significant, at the significance level of .000. Table 6.

Table VI: ONE WAY Anova results of the study sample regarding their knowledge of CC by the Year of study

The Year of study	N	Mean	Std. Deviation	Std. Error
First year	65	9.9077	6.00449	.74476
Second year	60	12.6667	4.82461	.62285
Third year	75	10.4800	5.23853	.60489
Fourth year	75	13.6000	5.80773	.67062
Graduate (Bachelor's degree in Public Health)	85	14.1647	6.93653	.75237
Total	360	12.2611	6.08653	.32079

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1050.262	4	262.565	7.610	.000
Within Groups	12249.194	355	34.505		
Total	13299.456	359			

There were no statistically significant differences between the Means of the answers of the sample members regarding their knowledge about CC due to the variables of Age and Marital status Table 7

Table VII: The ONE WAY Anova results of the study sample regarding their knowledge of CC by Educational status (student/graduate)

Educational status	N	Mean	Std. Deviation	Std. Error	
Students	275	11.6727	5.68470	.34280	
Graduate (Bachelor's degree in Public Health)	85	14.1647	6.93653	.75237	
Total	360	12.2611	6.08653	.32079	
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	403.216	1	403.216	11.193	.001
Within Groups	12896.240	358	36.023		
Total	13299.456	359			

There were differences between the Means of the answers of the sample members in favour of female students in the advanced years of study and female regarding their Knowledge of CC. There were differences between the Means of the answers of the sample members in favour of female students in the advanced years of study and female regarding their Knowledge of CC. Screening and HPV Vaccine according to the variable of years of study in Faculty of Public Health, and these differences were highly statistically significant, at a significance level of .008. Table 8

Table VIII: Difference of knowledge of CC Screening and HPV Vaccine by the Year of study

The Year of study	N	Mean	Std. Deviation	Std. Error	
First year	65	12.1846	6.80738	.84435	
Second year	60	15.1667	5.74358	.74149	
Third year	75	13.0400	6.49624	.75012	
Fourth year	75	12.4800	7.25475	.83771	
Graduate (Bachelor's degree in Public Health)	85	15.6706	9.12269	.98949	
Total	360	13.7444	7.40257	.39015	
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	751.994	4	187.999	3.527	.008
Within Groups	18920.494	355	53.297		
Total	19672.489	359			

Knowledge of CC Screening and HPV Vaccine according to the educational grade (female students and graduates), the results showed that there was statistically significant difference at level of 0.006 in favour of graduate from female students. Table 9.

Table IX: knowledge of CC Screening and HPV Vaccine by Educational status (student/graduate)

Educational status	N	Mean	Std. Deviation	Std. Error
Students	275	13.1491	6.69156	.40352

Graduate (Bachelor's degree in Public Health)	85	15.6706	9.12269	.98949
Total	360	13.7444	7.40257	.39015
	Sum of Squares	df	Mean Square	F
Between Groups	412.825	1	412.825	7.674
Within Groups	19259.664	358	53.798	
Total	19672.489	359		

Personal practices of CC prevention programs (Screening and HPV Vaccine) according to the years of study in Faculty of Public Health. The table shows that there are differences between the Means of the answers of the sample members in favour of female students in the advanced years, and these differences were statistically significant, at a significance level of .027. Table10

Table X: Practices of CC, its Screening and HPV Vaccine by the Year of study.

The Year of study	N	Mean	Std. Deviation	Std. Error
First year	65	23.2923	7.58643	.94098
Second year	60	23.9000	6.82394	.88097
Third year	75	24.4267	7.36165	.85005
Fourth year	75	23.3067	8.98343	1.03732
Graduate (Bachelor's degree in Public Health)	85	26.6824	6.63004	.71913
Total	360	24.4333	7.59937	.40052
	Sum of Squares	df	Mean Square	F
Between Groups	626.837	4	156.709	2.767
Within Groups	20105.563	355	56.635	
Total	20732.400	359		

There were also differences between the Means of the sample members' answers about their Practices of CC prevention programs, its Screening and HPV Vaccine. These differences were in favour of female graduates in the Faculty of Public Health, and these differences were highly statistically significant at the significance level of .002 Table 11

Table XI: Practices of CC, its Screening and HPV Vaccine by Educational status (student/graduate)

Educational status	N	Mean	Std. Deviation	Std. Error
Students	275	23.7382	7.75471	.46763
Graduate (Bachelor's degree in Public Health)	85	26.6824	6.63004	.71913
Total	360	24.4333	7.59937	.40052
	Sum of Squares	df	Mean Square	F
Between Groups	562.827	1	562.827	9.990
				Sig.
				.002

Within Groups	20169.573	358	56.340		
Total	20732.400	359			

Discussion

The findings of the present study revealed significant gaps in the awareness, knowledge and practices amongst students and graduates of the Public Health Faculty. This is consistent with the findings of similar previous studies conducted in many developing countries where there was limited understanding of CC, and much less than the expected and required level of its causes, role of vaccination in the prevention, and the importance of screening in the early detection and treatment. These studies conducted by Al- Meer et al., 2011; Dhendupet al., 2014; Joy et al., 2010; Kose et al., 2014; Ben Khaial et al., 2014; Dönmez et al., 2018; Singh et al., 2020; Khan et al., 2021 documented all of them recorded that although basic awareness exists, comprehensive understanding does not exist. The results also revealed varying levels of knowledge among participants regarding CC and HPV, risk factors, and preventive measures among women regarding CC It also revealed varying levels of awareness about CC and HPV among women.

The gap between knowledge and practice needs to be addressed through enhanced educational programs, especially since comprehensive knowledge is crucial for effective prevention and early detection of CC. The risk of persistent infection with high-risk HPV types as the main cause of CC was poorly recognized by participants. In Libya, the HPV vaccination program was initiated in 2013. The targeted population consists of only adolescent females, at the age of 15 years. However, this age has

been lowered to 12 years, targeting students in the seventh grade of formal Libyan education. The vaccination program is implemented through a coordinated effort between public and private schools, by 25 health teams to administer the vaccinations. HPV vaccination series requires 3 doses, which are supplied through the National Centre for Disease Control (NCDC). The indicated vaccine is mandated by the Ministry of Health (MOH), and it's included in the national immunization schedule. This lack of knowledge may contribute to low rates of preventive behaviours such as vaccinations against HPV and regular screening. According to Jerbi et al. (2018), they explained that CC continues to be a significant public health challenge in Libya. The most frequent problem for vaccination programs was delay in the supply of vaccine doses. They also highlighted the critical need for a coordinated, country-wide effort to improve the general population's knowledge and awareness about CC prevention strategies within Libya. They also stated that there is a lack of a comprehensive, nationwide CC screening program. They added that a nationwide initiative is necessary to address the gaps in the population's understanding of CC prevention, which is a key factor contributing to the persistence of this major public health problem in the country (Jerbi et al., 2018). Many studies highlighted the importance of positive attitudes in promoting vaccine acceptance (Haesebaertet al., 2012; Usman et al., 2023). In the present study many participants expressed their willingness to undergo testing and receive

the HPV vaccine and encourage others to get tested and receive the vaccination but only half of them received the vaccination, which emphasizes the urgent need to reduce the gap between knowledge and practice.

Despite general awareness of the importance of screening, a significant number of sexually active participants had never undergone a Pap test and are not aware of its importance in the early detection of CC. This can be attributed to various factors, including the lack of a perceived need, fear of this procedure, and social and cultural barriers. These findings highlight the gap between knowledge, attitudes and actual health practices. These findings were also reported by studies conducted in many developing countries explained that knowledge is not always translated into practice. Common barriers to practice knowledge included fear, embarrassment, and lack of a clear need for screening. (Dhendup et al., 2014; Kose et al., 2014; and Singh et al., 2020).

The same findings were observed by many studies conducted by Joy et al., 2010; Al-Meer et al., 2011; Ben Khaial et al., 2014 in many developing countries who explained that despite positive attitudes, there were still barriers, such as concerns about vaccines complications and efficiency and the need of Pap smearing for the early detection of the disease. These challenges need to be addressed to increase vaccination and Pap smear rates. Public health professionals play a critical role in providing accurate information to alleviate these concerns.

Conclusion

This study highlighted and addressed the

awareness deficiency, the knowledge gaps and lack of correct practices amongst female students and graduates of the Faculty of Public Health at the University of Benghazi, towards CC, causes and prevention. There is an urgent need to improve education and take proactive measures to enhance knowledge, attitudes and practices. Public Health initiatives can be more effective in addressing, identifying gaps and barriers, in order to reduce CC incidence and mortality rates. It is possible to foster an informed and health-conscious workforce of future Public Health professionals who can play a crucial role in effectively combating CC and other Public Health challenges, through effective prevention and early detection strategies and programs.

Recommendations

Low levels of knowledge and gaps between attitudes and practices indicate the need for targeted interventions. Public health programs should focus on:

1. **Improving the curricula** and Public Health Education: The results confirm the need to strengthen Public Health education programs within the university.
2. **Public Health Campaigns:** Develop and implement targeted Public Health campaigns to raise awareness and correct misconceptions about CC and HPV vaccination among students and the general population, **and to overcome barriers, conducting** regular workshops and seminars with healthcare professionals to provide practical insights and first-hand information about CC screening and vaccination
3. **Conducting research to explore and address misconceptions** and

emphasizing the importance of preventive measures is crucial.

- 4. **Implementation of national vaccination and Regular Screening programs:** Public Health faculty should help in the implementation of national Screening Programs especially to outreach population to promote regular access to screening for CC among students and women, especially in the age group at risk, through campaigns and easy access to inspection services.
- 5. **Conducting Behavioural Interventions Programs:** As the gap between positive attitudes and actual practices indicates the need for behavioural interventions. Strategies such as reminder systems, peer education, and accessible screening services can encourage more proactive health behaviours among students and graduates.
- 6. **Policy and Advocacy:** Findings call for stronger policy and advocacy efforts to promote HPV vaccination and regular CC screening. Collaborating with healthcare providers to make these services more accessible and affordable can also lead to increased uptake.
- 7. **Peer-led initiatives:** Encourage peer-led initiatives where trained students can educate their peers about the importance of CC prevention and screening. Peer influence can be a powerful tool in changing health behaviours.
- 8. **Continuous monitoring and evaluation:** Implementing a system for continuous monitoring and evaluation of knowledge, attitudes, and practices related to CC among female students. Regular evaluations can help understand

the impact of educational interventions and make necessary adjustments

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