RESEARCH

Knowledge of risk factors for gynecological cancers among medical and pharmacy students at the university of Lomé, Togo: a prospective cross-sectional study from 1 to 31 September 2021

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Abstract

Introduction Gynecological cancers are often diagnosed at a late stage in Togo, due to difficulty of access to means of screening and a lack of technical platform. The aim of our study was to assess the knowledge of medical and pharmacy students at the University of Lomé about the risk factors for gynaecological cancers.

Methodology This was a cross-sectional prospective study with a descriptive and analytical aim, carried out among undergraduate to doctoral students regularly enrolled at the Faculty of Health Sciences. The variables studied were as follows: the socio-demographic characteristics of the students, namely age, gender, field of study (medicine or pharmacy), study cycle (bachelor, master or doctorate), the fact of having completed an internship in the obstetrics gynecology department; the notion of education on gynecological cancers and sources of information and finally knowledge of the risk factors for gynecological cancers.

Results A total of 640 students correctly completed the form. The mean age was 24.66 ± 2.7 years. The sex ratio (M/F) was 2.5. The students had a good knowledge of the risk factors for cervical cancer. Indeed 56.6% (n = 362) knew the risk factors of the cervical cancer; but knowledge of risk factors of ovarian, endometrial, vaginal, and vulvar cancers was low. The main source of information was the courses at the Faculty of Health Sciences. Factors associated with knowledge of risk factors of cervical cancer were age (p-value = 0.0002), female gender (p-value = 0.0001; ORa = 2.46; 95% CI [1.31–3.36]) and the fact of having followed a course on cervical cancer (p-value = 0.0073; ORa = 1.68; 95% CI [1.25–32.08]). Having done an internship in the gynecology department was the only factor associated with knowing the risk factors for ovarian cancer (p-value = 0.0001; ORa = 2.29; 95% CI [1.64-2.72]) and endometrial cancer (p-value = 0.0045; RCa = 2.63; 95% CI [1.56–3.07]).

Conclusion The knowledge of risk factors of the gynecological cancer by the students of the Faculty of Health Sciences is relatively low, varying according to the type of cancer. More than half of the students knew the risk factors

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for cervical cancer. However, risk factors for ovarian, endometrial, vaginal and vulvar cancers were not sufficiently known by the students. It appears to promote self-learning for an improvement of this knowledge.

Trial registration Not applicable.

Keywords Knowledge, Risk factors, Gynecological cancers, Students, Lome (Togo)

Introduction

Gynecological cancers include cancers of the female reproductive system (vulva, vagina, uterus, fallopian tubes, ovaries) [1]. These cancers represent a public health issue worldwide. In 2020, gynecological cancers accounted for 7.2% of all cancers worldwide; 14.3% of cancers in Africa 14.4% of cancers in Togo [2]. In 2020, these cancers were dominated by cervical cancer, accounting for 3.1% of all cancers diagnosed, followed by cancer of the corpus uteri (2.2%) and ovarian cancer (1.6%) [3]. Gynecological cancers accounted for 20.2% of cancers in togolese women and were distributed as follows: 80.8% for the cervix; 8.3% for the uterine body; 6.4% for the ovaries; 3.2% for the vulva and 1.3% for the vagina [2]. In 2018, cervical cancer accounted for 3.2% of all cancers diagnosed. The incidence rate for cancer of the corpus uteri was 2.1%, and that for ovarian cancer was 1.6%. This reflects a slight increase in the incidence of cancer of the corpus uteri, while that of cervical cancer is decreasing [3, 4]. The incidence of these cancers remains relatively high in sub-Saharan Africa, mainly due to the difficulty of accessing healthcare facilities, which often have limited technical facilities [5].

Gynecological cancer is an important cause of mortality and morbidity in women, diagnosis is often delayed, making it difficult to access care, and there is a shortage of specialist doctors [6]. Indeed, gynecological cancerrelated deaths accounted for 26.4% of all cancer deaths in Africa and 13.3% in Togo [3]. Twenty-eight to thirtyseven% (28-37%) of gynecological cancer deaths could be prevented by early diagnosis and adequate treatment, in sub-saharan africa [3]. In Togo, awareness is very low and patients are routinely screened at an advanced stage because most of these women do not have access to early diagnosis and treatment; this is mainly due to the lack of a real screening programs, financial constraints, cultural barriers and high illiteracy rates [2, 7]. The changing incidence rates of these gynecological cancers challenge the traditional approach to screening, and the difficulties in accessing early diagnosis and treatment guide health workers to consider risk factors [8]. The focus should then be on primary prevention by raising awareness of the risk factors of gynecological cancers. Togo has no cancer control programs, and awareness is raised mainly during the month of October, known as 'Pink October', by various associations, mainly those of medical and pharmacy students at the University of Lomé. In view of their active involvement in cancer screening in our context; these health science students, as future health professionals, should play a key role in informing the population about the risk factors of gynecological cancers [9, 10, 11, 12]; however, there are global and regional gaps on this subject [1]. It is therefore necessary that they first have a good command of the risk factors of these gynecological cancers in order to raise awareness among the population.

In Tunisia, Hsairi et al. found a general level of knowledge about cervical cancer of around 85% [9]. Less than 40% of healthcare workers were aware of the risk factors for cervical cancer in the study by Mutyaba et al. in Uganda [10]. Jonathan et al. in Congo found an average level of knowledge about cervical cancer risk factors among female students at the University of Kinshasa, of almost 40% [11].

In Togo, Darré et al. found a satisfactory level of knowledge about breast cancer among medical and pharmacy students at the University of Lomé, at around 85% [12].

The objective of this study was to assess the knowledge of Faculty of Health Sciences students on the risk factors of gynecological cancers and to determine the factors associated with this knowledge; these occupy an essential place in cancer screening in Togo, where there is no national cancer control program.

Materials and methods

Type and period of study

This was a prospective cross-sectional study with a descriptive and analytical purpose; data collection was conducted from September 1 to 31, 2021.

Setting and study population

The Faculty of Health Sciences of University of Lome served as our study framework. This faculty has qualified, internationally recognised teaching staff with rigorous teaching methods, ensuring that students receive the best possible training, particularly in the overall management of cancers. These students are key players in the cancer screening campaigns organised by the various associations in our context.

The course on gynecological cancers is given to medical undergraduate to doctoral students in medicine in the context of gynecological semiology and anatomo-pathology. Master's students in pharmacy do an internship in the obstetrics gynecology department. As for doctoral students in medicine, they benefit from an internship in the gynecology-obstetrics department. Courses in gynaecological medical semiology are given to undergraduate students; special pathology courses are given to postgraduate students; and gynaecological therapeutics is taught to doctoral students.

Our study concerned all undergraduate to doctoral students in Faculty of Health Sciences, without distinction of age or sex, who have given their written informed consent to participate in the study. A total of 936 regularly enrolled students has been communicated to us by the Faculty of Health Sciences' Registrar's Office. The students having not correctly filled in the survey form were excluded. These were mainly those who had not specified their course of study, or whether or not they had already done a placement in the gynaecology department. The exclusion did not concern their answers to the questions on gynaecological cancer risk factors.

Sampling

The minimum size (n) was calculated with schwartz formula [9, 12]:

 $n = (t)^2 \times p \times q/d^2.$

t = value corresponding to the degree of confidence of 95%: (1.96)

p = population prevalence of FSS students with knowledge of risk factors is estimated at 50%.

q = 1 - p = (1 - 0.5) = 0.5.

d = desired degree of precision (0.05).

 $n = (1.96)^2 \times (0.5 \times 0.5) / (0.05)^2.$

The minimum size n = 385 students.

Variables studied

The variables studied were as follows: the socio-demographic characteristics of the students, namely age, gender, field of study (medicine or pharmacy), study cycle (bachelor, master or doctorate), the fact of having completed an internship in the obstetrics gynecology department; the notion of education on gynecological cancers and sources of information and finally knowledge of the risk factors for gynecological cancers. Regarding knowledge of risk factors for gynecological cancers, students first had to answer the question of whether they know that there are risk factors of gynecological cancers. Then, those who answered "yes", had to answer the question: "do you know the risk factors of the gynecological cancers". Those who answered "yes" to this question had to cite the risk factors of the gynecological cancers that they know, with comparison of risk factors confirmed in the literature.

Assessment and data collection tools

The data collection technique used was based on an individual questionnaire drafted in French, including the variables studied. To ensure the validity of the questionnaire, a pre-test was carried out with 50 students; with a satisfactory positive response rate of 98.7%, and validation of the survey form without modification. The questionnaire was given to the students by the team members assigned to this task. Due to reduced availability, doctoral students received the questionnaire online via WhatsApp and Google Forms. The questionnaire comprises six parts following the introduction: a first part relating to the socio-demographic data of the student, and from the 2nd to the 6th part, the questions concerned knowledge of the different risk factors of the gynecological cancer and the different sources of information. The data was collected by three members of our research team.

Data processing and analysis tools

The data was entered into Excel software. Data from forms that did not contain information on the cycle and whether or not the patient had completed a gynaecology placement were excluded. Statistical analysis was performed with R 4.0.4 software. in the RStudio 1.4 environment. We carried out a descriptive and analytical analysis. For the descriptive analysis, the results were presented in the form of means and standard deviation for the quantitative variables and in the form of counts and proportions for the qualitative variables. Univariate and multivariate logistic regression was performed to investigate associated factors. The variables statistically associated with knowledge of the risk factors of the gynecological cancer during the univariate analysis with a degree of significance p < 0.2 were introduced into the initial model. The multivariate analysis made it possible to estimate the adjusted odds ratio (ORa) and its 95% confidence interval for each variable used.

Ethical considerations

Prior authorization number 0989 was obtained from the Dean of Faculty of Health Sciences of University of Lome, to whom we sent a letter of request for authorization explaining the objectives and methodology of the study before the start of the investigation. The questionnaire did not include any part allowing the identification of the students and before the filling of the questionnaire, an explanation was given to the students.

Results

Sociodemographic characteristics

Of the 936 eligible students, 640 participated, yielding a 68.4% participation rate. The average age was 24.6 years with a standard deviation of 2.7 years and extremes of 19 and 32 years. The age group [25–30[years represented 51.6% of the total workforce (table 1). The sample consisted of 456 men (71.3%). The male-to-female ratio was 2.5:1. Doctoral students represented 63.3% of Table 4 Distribution of students by any survey

Table I	Distribution of students by age group	
	Number	%
[15-20[5	0.8
[20-25[281	43.9
[25-30[330	51.6
[30–35[24	3.8
Total	640	100.0

respondents (n = 405), followed by undergraduate students (18.9%) and masters students (17.8%). Medical students comprised 92.3% (n = 591) and pharmacy students 7.7% (n = 49). Out of 640 respondents, 588 or 91.9% completed an internship in the gynecology department. Of the 640 respondents, 81.9%; 88.9%; 67.7%; 26.4% and 12.7% had received education on cancer of the ovaries, cervix, endometrium, vagina and vulva respectively (table 2).

Cervical cancer

Student knowledge of cervical cancer risk factors varied. Out of 640 students, 545 respondents or 85.2% said that there are risk factors of cervical cancer. Among them, 66.4% (n = 362) knew the risk factors of the cervical cancer. The most commonly cited risk factors were multiple sexual partners (54.7%), HPV infection (53.3%), and smoking (24.0%) (table 3). There is a statistically significant association between knowledge of risk factors of cervical cancer and student age (p-value = 0.0002), female sex (p-value = 0.0001; ORa = 2.46; 95 CI % [1.31–3.36]) and the fact of having followed a course on cervical cancer (p-value = 0.0073; RCa = 1.68; 95% CI [1.25–32.08]). (table 4)

Endometrial cancer and ovarian cancer

Of the 640 students, 62.0% acknowledged the existence of endometrial cancer risk factors. Among them, 46.9% (n = 186) knew the risk factors of endometrial cancer. Family history and smoking were cited by 30.6% and 21.5% of students respectively (table 5). There is a

 Table 3
 Distribution of students by knowledge of risk factors for cervical cancer

	n=362*	%
Multiple sexual partners	198	54.7
HPV	193	53.3
Smoking	87	24.0
Early first sexual intercourse	63	17.4
Multiparity	61	16.9
low socio-economic level	39	10.8
Sexually transmitted infections	29	8.0
Unprotected sex	16	4.4
HIV	14	3.9
Family history	14	3.9
No vaccination against HPV	14	3.9
Lower genital infection	8	2.2
Immunodepression	5	1.4
Poorly treated cervicitis	3	0.8
Benign cervical lesions	2	0.6
HSV-2 infection's	1	0.3
Exposure to diethylstilbestrol	1	0.3
Illiterate	1	0.3

HPV: Human Papilloma Virus; HIV: Human Immunodeficiency Virus; HSV: Herpes Simplex Virus

*= Number of students aware of cervical cancer risk factors

statistically significant association between knowing the risk factors for endometrial cancer and having completed an internship in obstetrics gynecology (p-value = 0.0045; ORa = 2.63; 95% CI [1,56-3.07]). (table 6)

Overall, knowledge of ovarian cancer risk factors was higher than that of endometrial cancer.

Out of 640 students, 76.9% claimed that there are risk factors of ovarian cancer. Among them, 57.9% (n = 285) identified specific ovarian cancer risk factors. Genetics, age and smoking were cited respectively by 29.8%; 26.7% and 26.3% of students (table 7). There is a statistically significant association between knowing the risk factors for ovarian cancer and having completed an internship in obstetrics gynecology (p-value = 0.00001; ORa = 2.29; 95% CI [1,64-2.72]). (table 8)

Table 2	Distribution	of students	according to the	teaching of the	different o	gynecological	cancers
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	Ovary		Cervix	Cervix		Endometrium		Vagina		Vulva	
	n	%	n	%	n	%	n	%	n	%	
Already followed an education	640	100	640	100	640	100	640	100	640	100	
Yes	524	81.9	569	88.9	433	67.7	169	26.4	81	12.7	
No	116	18.1	71	11.1	207	32.3	471	73.6	559	87.3	
Information channel	524	100	569	100	433	100	169	100	81	100	
Courses at the faculty	511	97.5	542	95.3	411	94.9	127	75.1	64	79.0	
Personal research	117	22.3	161	28.3	91	21.0	65	38.5	31	38.3	
Awareness	42	8.0	110	19.3	24	5.5	18	10.7	8	9.9	
Television/Radio	37	7.1	123	21.6	30	6.9	17	10.1	7	8.6	
Friends	16	3.1	37	6.5	16	3.7	4	2.4	3	3.7	
Family	3	0.6	15	2.6	2	0.5	0	0.0	0	0.0	

n = number; %: estimated percentage proportion

	Univariate analysis						Multivariate analysis		
	n/N	%	OR	CI 95%	<i>p</i> -value	ORa	CI 95%	<i>p</i> -value	
Age (years)					0.0001			0.0002	
[15-20]	2/3	66.7	1.00	-		1.00	-		
[20-25]	130/205	63.4	1.42	1.12-2.76		1.33	1.02-2.35		
[25-30]	212/313	67.7	1.78	1.38-2.95		1.84	1.44-2.71		
[30-35]	18/24	75.0	2.37	1.44-3.08		2.61	1.72-4.21		
Gender					0.00005			0.0025	
Male	240/386	62.2	1.00	-		1.00	-		
Female	122/159	76.7	2.33	1.15-4.27		2.46	1.31-3.36		
Study cycle									
Bachelor	40/62	64.5	1.00	-	0.782				
Master	51/93	54.8	0.73	0.25-1.56					
Doctorate	271/390	69.5	1.74	0.84-3.22					
Internship in G-O					1.78				
No	27/38	71.1	1.00	-					
Yes	335/507	66.1	0.67	0.55-1.81					
Followed an education					0.0002			0.0073	
No	8/20	40.0	1.00	-		1.00	-		
Yes	354/525	67.4	1.84	1.41-2.42		1.68	1.25-2.08		

Table 4 Factors associated with knowledge of risk factors for cervical cancer

N = total number of respondents with the characteristic; n = number of respondents with the same characteristic and knowledge of risk factors; OR: Odds Ratio; 95% Cl: 95% Confidence Interval; ORa: Adjusted Odds Ratio; G-O: Gynecology Obstetrics

Table 5 Distribution of students according to knowledge of risk factors for endometrial cancer

	n=186*	%
Family history of endometrial cancer	57	30.6
Smoking	40	21.5
Late menopause	37	19.9
Obesity	34	18.3
Genetic factor	30	16.1
Hormonal facteur	27	14.5
Age	26	14.0
Early puberty	25	13.4
Endometriosis	17	9.1
Race	16	9.1
Diabete	14	7.5
Oral contraceptives	12	6.5
Hyperoestrogenism	9	4.8
Lynch syndrome	8	4.3
Hormone replacement therapy	5	2.7
Tamoxifen	5	2.7
Microplastic ovaries	3	1.6
Nullity	2	1.1

*= Number of students aware of endometrial cancer risk factors

Vaginal cancer and vulvar cancer

Out of 640 students, 40.2% claimed that there are risk factors of vaginal cancer. Among them, 37.0% (n = 95) knew the risk factors for vaginal cancer. Smoking, HPV infection and a notion of family history of vaginal cancer were mentioned respectively by 35.8%; 30.5% and 17.9% of students (table 9). There is a statistically significant

association between knowledge of vaginal cancer risk factors and study cycle (p-value = 0.003). (table 10)

Out of 640 students, 192 or 30% claimed that there are risk factors of vulvar cancer. Among them, 23% (n = 45) knew the vulvar cancer risk factors. Smoking, HPV infection and personal or family history of vulvar cancer were cited by 37.8%, 35.6% and 15.6% of students respectively (table 11). There is no statistically significant association between knowledge of vulvar cancer risk factors and socio-demographic data. (table 12)

Discussion

Our study had certain limitations. The assessment of knowledge was based on self-reporting, leading to a possible information bias. However, it remains valuable as it assessed the knowledge of Faculty of Health Sciences students regarding gynecological cancer risk factors.

Socio-demographic characteristics

The average age was 24.6 years with a standard deviation of 2.7 years and the [25-30] age group was the most represented. This average age was similar to those reported by Hsairi et al. [9] in Tunisia and Zoleikha et al. in Iran [13], which were 25.0 ± 1.4 and 25.6 ± 7.7 years respectively. Nevertheless, this average age remains lower than that reported by Halle-Ekane et al. in Cameroon [14] who were 32.3 ± 2.4 years. The average age of our respondents was higher than those reported by Serhier et al. in Morocco, which was 20.9 ± 2.1 years [15] and by Hoque et al. in South Africa, which was 19.4 ± 2.4 years [16]. The young age of the respondents in our study can be

	Univariate analysis					Multivariate analysis		
	n/N	%	OR	CI 95%	<i>p</i> -value	ORa	CI 95%	<i>p</i> -value
Age (years)					1.036			
[15-20]	0/0	0.0	1.00	-				
[20-25]	56/125	44.8	1.29	0.68-1.78				
[25-30[121/255	47.5	2.45	1.22-2.97				
[30-35[9/17	52.9	2.52	1.12-3.81				
Gender					0.298			
Male	131/302	43.4	1.00	-				
Female	55/95	57.9	1.93	1.63-2.37				
Study cycle					0.118			
Bachelor	8/26	30.8	1.00	-				
Master	29/55	52.7	2.19	1.17-2.73				
Doctorate	149/316	47.2	1.62	1.43-2.06				
Internship in G-O					0.0005			0.0045
No	6/15	40.0	1.00	-		1.00	-	
Yes	180/382	47.1	3.51	1.46-10.25		2.63	1.56-3.07	
Followed an education					0.214			
No	13/35	37.1	1.00	-				
Yes	173/362	47.8	1.29	0.76-1.85				

Table 6 Factors associated with knowledge of risk factors for endometrial cancer

N = total number of respondents with the characteristic; n = number of respondents with the same characteristic and knowledge of risk factors; OR: Odds Ratio; 95% Cl: 95% Confidence Interval; ORa: Adjusted Odds Ratio; G-O: Gynecology Obstetrics

Table 7 Distribution of students by knowledge of risk factors for ovarian cancer

	n=285*	%
Genetics	85	29.8
Age	76	26.7
Smoking	75	26.3
Hormonal factor	61	21.4
Family history	59	20.7
Early puberty	40	14.0
Late menopause	40	14.0
Nulliparity	40	14.0
Heredity	39	13.7
Use of oral contraceptives	26	9.1
Endometriosis	13	4.6
Obesity	6	2.1
History of breast cancer	6	2.1
Hyperoestrogenism	4	1.4
Lynch syndrome	4	1.4
Sedentary lifestyle	1	0.4

*= Number of students aware of ovarian cancer risk factors

explained by their youthful student background. Indeed, the current trend is to recruit young students to the faculty, given the long course of medical and pharmaceutical studies.

Male students comprised 71.3% of the sample, with a male-to-female ratio of 2.5:1. In contrast, Elbouri et al. [17] in Morocco and Hsairi et al. [9] found a predominance of females with a sex ratio of 0.38 and 0.65 respectively. This male predominance may reflect lower female enrollment in scientific fields in Togo, where the schooling rate for girls is 55% compared to 78% for boys, according to UNESCO [18].

Cervical cancer

In our study, 85.2% of the students stated that there are risk factors for cervical cancer. Of these, only 66.4% were aware of cervical cancer risk factor's. Similarly, Tsegaye et al. [16] reported that 67.9% of students were aware of cervical cancer risk factors. In contrast, in the study by Mutyaba et al. in Uganda, only 26.0% of the health workers were aware of the risk factors of cervical cancer [10]. This relatively high response rate in both our study and that of Tsegaye et al. could be explained by our study populations, which consisted exclusively of health science students.

The main sources of information were courses at the faculty (95.3%). Our results are in line with the literature. Indeed, Tsegaye et al. found that the main source was university courses (55.5%) [19]. On the other hand, in Saudi Arabia, Al-Darwish et al. found personal research to be the main source of information (38.7%) [20]. This result underlines the importance of lectures in the faculty.

The most frequently cited risk factor was having multiple sexual partners (54.7%). Tsegaye et al. [19] and Al-Darwish et al. [20] found multiple sexual partners to be the most frequently risk factors cited by students in 49.7% and 75.5% of cases. These results could be explained by the popularisation of the cervical cancer teachings by all possible means. In addition, Tebeu et al. in Cameroon found the notion of multiple sexual partners (68%) as the most risk factors cited by health professionals [21].

	Univariate analysis						Multivariate analysis		
	n/N	%	OR	CI 95%	<i>p</i> -value	ORa	CI 95%	<i>p</i> -value	
Age (years)					0.00001			0.196	
[15-20]	4/5	80.0	1.00	-		1.00	-		
[20-25]	97/178	54.5	1.55	1.25-2.69		1.35	1.08-2.86		
[25-30]	169⁄287	58.9	2.18	1.49-2.76		1.64	1.37-2.28		
[30-35]	15⁄22	68.2	2.56	1.05-3.86		2.27	1.15-3.53		
Gender					0.933				
Male	196⁄356	55.1	1.00	-					
Female	89⁄136	65.4	1.78	1.02-2.44					
Study cycle					0.831				
Bachelor	32⁄56	57.1	1.00	-					
Master	44⁄77	57.1	1.57	0.68-1.87					
Doctorate	209/359	58.2	1.49	0.67-2.33					
Internship in G-O					0.004			0.00001	
No	13⁄24	54.2	1.00	-		1.00	-		
Yes	272/468	58.1	2.09	1.28-4.26		2.29	1.64-2.72		
Followed an education					0.089				
No	21/37	56.8	1.00	-					
Yes	264/455	58.0	1.29	1.14-2.17					

Table 8 Factors associated with knowledge of risk factors for ovarian cancer

N = total number of respondents with the characteristic; n = number of respondents with the same characteristic and knowledge of risk factors; OR: Odds Ratio; 95% Cl: 95% Confidence Interval; ORa: Adjusted Odds Ratio; G-O: Gynecology Obstetrics

 Table 9
 Distribution of students by knowledge of risk factors for vaginal cancer

	n=95*	%
Smoking	34	35.8
HPV	31	32.1
Family history of vaginal cancer	17	17.9
Sexually transmitted infections	7	7.4
Prolonged vaginal irritation	6	6.3
Lower genital infections	5	5.3
Multiple partners	4	4.2
Hysterectomy	3	3.2
Unprotected sex	2	2.1
Vulvar or cervical cancer	2	2.1
History of pre-cancerous condition	2	2.1
Chronic vaginal infection	1	1.0
Immunodeficiency	1	1.0

HPV: Human Papilloma Virus; *= Number of students aware of vaginal cancer risk factors

In our study, 53.3% of the students cited Human Papilloma Virus (HPV) infection's as a risk factor for cervical cancer. This result is similar to that of Tsegaye et al. [19] where only 49.7% of students cited this risk factor. The link between cervical cancer and sexuality could justify these results HPV (in particular strains 16 and 18) is strongly implicated in the genesis of cervical cancer, and this virus is transmitted mainly by sexual intercourse, so multiple sexual partnerships increase the risk of contracting this infection and therefore the risk of developing cervical cancer [22].

Factors associated with this knowledge in our study were age (p-value = 0.0002), female sex (p-value = 0.0001;

aOR = 2.46; 95% CI [1.31–3.36]) and having received education about cervical cancer (*p*-value = 0.0073; aOR = 1.68; 95% CI [1.25–32.08]). In contrast, Tsegaye et al. reported year of study as an associated factor [19]. The fact that cervical cancer is the most common gynecological cancer and that it is a vaccine-preventable cancer may explain the interest of women in the risk factors for this cancer.

Endometrial cancer and ovarian cancer

Endometrial cancer and ovarian cancer are respectively the 2nd and 3rd most common gynecological cancer after cervical cancer [2]. Knowledge of modifiable risk factors for endometrial and ovarian cancer was low among students. For endometrial cancer, only 18.3% and 7.5% of the students cited obesity and diabetes respectively as modifiable risk factors. Indeed, the latter are proven risk factors for endometrial cancer [23]. For ovarian cancer, only 26.3% and 2.1% of the students cited smoking and obesity respectively as a risk factors. This level of knowledge is quite low.

Furthermore, having completed a placement in the gynaecology department was the only factor associated with knowledge of the risk factors for ovarian cancer (*p*-value = 0.00001; ORa = 2.29; 95% CI [1.64–2.72]) and endometrial cancer (*p*-value = 0.0045; ORa = 2.63; 95% CI [1.56–3.07]). This result indicates the importance of hospital placements in the training of health professionals, and underlines the urgent need to focus student training on the practical needs of healthcare professionals in their day-to-day working lives.

	Univariate analysis						Multivariate analysis		
	n/N	%	OR	CI 95%	<i>p</i> -value	ORa	CI 95%	<i>p</i> -value	
Age (years)					0.922				
[15-20[0/0	0.0	1.00	-					
[20-25[27/75	36.0	1.29	0.71-1.63					
[25-30]	62/170	36.5	1.71	1.22-2.36					
[30–35[6/12	50.0	1.56	0.85-3.67					
Gender					0.081				
Male	70/192	36.5	1.00	-					
Female	25/65	38.5	1.15	0.69-1.97					
Study cycle					0.041			0.003	
Bachelor	4/13	30.8	1.00	-		1	-		
Master	14/34	41.2	1.45	1.09-3.72		1.73	1.37-2.07		
Doctorate	77/210	36.7	1.22	1.01-2.65		1.69	1.51-3.22		
Internship in G-O					1.34				
No	8/16	50.0	1.00	-					
Yes	87/241	36.1	0.96	0.42-2.43					
Followed an education					1.225				
No	33/125	26.4	1.00	-					
Yes	62/132	47.0	1.11	0.47-2.06					

Table 10 Factors associated with knowledge of risk factors for vaginal cancer

N = total number of respondents with the characteristic; n = number of respondents with the same characteristic and knowledge of risk factors; OR: Odds Ratio; 95% Cl: 95% Confidence Interval; ORa: Adjusted Odds Ratio; G-O: Gynecology Obstetrics

 Table 11
 Distribution of students by knowledge of risk factors for vulvar cancer

	n=45*	%
Smoking	17	37.8
HPV	16	35.6
Personal or family history of cancer	7	15.6
Infections	5	11.1
Sexually transmitted infections	5	11.1
Immunosuppression	3	6.7
Irritation	2	4.4
History of gynaecological cancer	2	4.4
Recurrent vulvitis	2	4.4
History of cervical cancer	1	2.2
HDV/: Human Panilloma Virus: *- Number of	ctudopts awaro of wh	or concorrick

HPV: Human Papilloma Virus; *= Number of students aware of vulvar cancer risk factors

Vaginal cancer and vulvar cancer

Knowledge of rarer gynecological cancers was even lower. In our survey, 73.6% and 87.3% had not been taught about vaginal cancer and vulvar cancer respectively. In addition, only 37% and 23% knew the risk factors of vaginal cancer and vulvar cancer respectively. Smoking, HPV infection and sexual transmited infections were the most cited modifiable risk factors for vaginal cancer and vulvar cancer, with frequencies of 35.8%, 30.5% and 7.4% for vaginal cancer and 37.8%, 35.6% and 11.1% for vulvar cancer respectively. The rarity of these cancers and the lack of dissemination of information about them would explain the low level of knowledge [6, 24, 25].

Limitations and recommendations

Our study had certain limitations. The assessment of knowledge was based on self-reporting, leading to a possible information bias.

The study was carried out in the sole faculty of health sciences in Lomé, as Togo has two faculties of health sciences. This limits the generalizability of our findings to students from the second faculty of health sciences. The convenience sampling method used in the study may introduce a selection bias because participants were chosen on the basis of their availability and attendance at classes at the faculty. Participants' answers may be influenced by errors of understanding or by the desire to provide acceptable answers after reading documents; this may have led to an information bias.

A study including students from the two health science faculties is desired in order to better extrapolate this level of knowledge about gynaecological cancers. Curricula should be updated to include more practical workshops, discussion sessions, and clinical exposure to improve students' knowledge of gynecological cancer risk factors.

Conclusion

More than half of the students knew the risk factors for cervical cancer. However, risk factors for ovarian, endometrial, vaginal and vulvar cancers were not sufficiently known by the students. Our study reveals the importance of lectures in the faculty and hospital placements in the training of health professionals. A small proportion of students were aware of the risk factors of gynecological cancers through their personal literature. It is important

	Univariate analysis				
	n/N	%	OR	CI 95%	<i>p</i> -value
Age (years)					2.17
[15–20[0/0	0.0	1.00	-	
[20–25[15/60	25.0	1.56	0.27-2.93	
[25–30[28/119	23.5	1.23	0.77-3.41	
[30–35[2/13	15.4	0.83	0.31-2.06	
Gender					0.554
Male	32/140	22.9	1.00	-	
Female	13/52	25.0	1.92	1.42-2.91	
Study cycle					1.34
Bachelor	4/16	25.0	1.00	-	
Master	7/21	33.3	1.23	0.58-2.88	
Doctorate	34/155	21.9	1.03	0.29-1.85	
Internship in G-O					1.19
No	3/14	21.4	1.00	-	
Yes	42/178	23.6	1.28	0.39-6.72	
Followed an education					2.087
No	33/142	23.2	1.00	-	
Yes	12/50	24.0	1.25	0.45-1.62	

 Table 12
 Factors associated with knowledge of risk factors for vulvar cancer

N = total number of respondents with the characteristic; n = number of respondents with the same characteristic and knowledge of risk factors; OR: Odds Ratio; 95% Cl: 95% Confidence Interval; G-O: Gynecology Obstetrics

for students to increase their knowledge through selfstudy so that they can better inform, educate and communicate with the population about the risk factors of gynecological cancers so that the population can incorporate sustainable attitudes and behavioural changes. Curricula also need to be updated to adapt them to the practical needs of students. This will involve practical workshops, discussion sessions and field trips.

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Not applicable.

Author contributions

TDj was responsible for the study design, participated in the study design, performed the statistical analyses and interpretation, and wrote the article. LF, MB and PS were involved in data collection and reviewed the article. TD was responsible for the overall scientific management of the study and the preparation of the final article. All authors read and approved the final article for submission for publication.

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Data availability

Extracted data are with the authors and available for sharing on request. The datasets used and/or analyzed during this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Bioethics Committee for Health Research (CBRS) of the Ministry of Health of Togo, Ref N°: (0101/2019/MS/CAB/DGS/ DPLET/CBRS). Authorisation was also obtained from the Dean of the Faculty of Health Sciences of the University of Lomé (legal representative of the controlling institution), to whom we sent a letter of request for authorisation to survey medical students explaining the objectives and methodology of the study (Annex I) Ref N° 0989/2021/FSS/UL. Students were assured that their participation in the survey was voluntary and anonymous. They were also assured of the confidentiality of the information provided and that all data were to be treated anonymously. Oral informed consent was obtained prior to participation. As for the minor students, a parental authorisation is necessary before their registration at the Faculty of Health Sciences of the University of Lomé. Thus the authorisation issued by the Dean of the Faculty of Health Sciences for our study also concerns them. All methods were applied in accordance with the relevant quidelines and regulations.

Informed consent

was obtained from all subjects and/or their legal guardian(s).

Consent to participate

Students were assured that participation in the survey was voluntary and anonymous. They were also assured of the confidentiality of the information provided and that all data was to be treated anonymously. Written informed consent was obtained from all subjects before the study.

Competing interests

The authors declare no competing interests.

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