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Research Article

Basic Knowledge About Cervical Cancer and its Screening Tests Among Secondary School Teachers in Baghdad City

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Abstract

Background: Cervical cancer is a well-defined and preventable major health problem. The main cause behind it is persistent human papillomavirus (HPV) infection. There are more than 200 HPV subtypes, but only a minority of them are oncogenic. The main mode of transmission of this infection is by sexual intercourse. It can be prevented by regular checking for premalignant states by taking cervical smears (Pap smears) and vaccinating young girls. In Iraq, there are no official policies for the preventive measures, and personal awareness is the only way to make women seek screening tests or vaccines. **Objectives:** To explore the general information of secondary school teachers in Baghdad city/Iraq who are college graduates about cervical cancer. **Methods:** A cross-sectional study was done, including 232 female secondary school teachers who were interviewed and asked to fill out a written questionnaire. **Results:** Only 5.6% of the respondents mentioned viral infection as the main cause of cervical cancer, and 14.2% answered a sexually transmitted disease. 14.7% of the teachers included recognize cervical smear as a screening test. Only one teacher (0.4%) knows there is a vaccine to prevent HPV infection. Teaching material mostly has no significant association with the teacher's information. The main source of information was social media (76.7%). **Conclusions:** There is poor knowledge about cervical cancer among the educated class, secondary school teachers, and this can affect the rate of occurrence of this preventable disease in the future. Social media can be used to disseminate information regarding cervical cancer among Iraqi women.

Keywords: Cervical cancer, HPV, Iraq, Knowledge, Pap smear, Women.

المعرفة الأساسية بسرطان عنق الرحم وفحوصاته لدى معلمي المدارس الثانوية في مدينة بغداد

الخلاصة

الخلفية: سرطان عنق الرحم هو مشكلة صحية رئيسية محددة جيداً ويمكن الوقاية منها. السبب الرئيسي وراء ذلك هو عدوى فيروس الورم الحليمي البشري (HPV). هناك أكثر من 200 نوع فرعي من فيروس الورم الحليمي البشري، ولكن أقلية منها فقط مسرطنة. الطريقة الرئيسية لانتقال هذه العدوى هي عن طريق الجماع. يمكن الوقاية منه عن طريق الفحص المنتظم للحالات السابقة للورم عن طريق أخذ مسحات عنق الرحم (مسحات عنق الرحم) وتطعيم الفتيات الصغيرات. في العراق، لا توجد سياسات رسمية للتدابير الوقائية، والوعي الشخصي هو الطريقة الوحيدة لجعل النساء يسعون للحصول على اختبارات الفحص أو اللقاحات. **الأهداف:** استكشاف المعلومات العامة لمعلمي المدارس الثانوية في مدينة بغداد / العراق من خريجي الجامعات حول سرطان عنق الرحم. **الطرائق:** أجريت دراسة مقطعية شملت 232 طالبة في المرحلة الثانوية تمت مقابلتهن وطلب منهن ملء استبيان مكتوب. **النتائج:** ذكر 5.6% فقط من المستجيبين العدوى الفيروسية كسبب رئيسي لسرطان عنق الرحم، و 14.2% أجابوا بمرض ينتقل عن طريق الاتصال الجنسي. 14.7% من المعلمين الذين شملهم المعلمون يعتبرون مسحة عنق الرحم كاختبار فحص. يعرف مدرس واحد فقط (0.4%) أن هناك لقاحاً للوقاية من عدوى فيروس الورم الحليمي البشري. لا ترتبط المواد التعليمية في الغالب بمعلومات المعلم. كان المصدر الرئيسي للمعلومات هو وسائل التواصل الاجتماعي (76.7%). **الاستنتاجات:** هناك معرفة ضعيفة بسرطان عنق الرحم بين الطبقة المتعلمة ومعلمي المدارس الثانوية ومعدل حدوث هذا المرض الذي يمكن الوقاية منه في المستقبل. يمكن استخدام وسائل التواصل الاجتماعي لنشر المعلومات المتعلقة بسرطان عنق الرحم بين النساء العراقيات.

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INTRODUCTION

Cervical cancer is the 4th most prevalent cancer among women all over the world. Out of all gynecological cancers, it ranks number one [1]. Chronic infection has long been linked to cancer occurrence, and treating or preventing these infections can effectively decrease the incidence of related cancers [2]. Cervical cancer can be considered a sexually transmitted disease as 95% of cases are directly caused by persistent human

papillomavirus (HPV) infection [3]. HPV is a DNA virus with nearly 200 types that are classified according to their oncogenic impact into high risk and low risk. The low-risk, non-oncogenic types often cause genital warts, and the most common of these are HPV types 6 and 11. High-risk, oncogenic types infect the basal layer of the epithelial tissues, usually causing no symptoms, inducing malignant transformation, and stimulating abnormal cell division. They are highly related to the development of cervical, anal, vulval, vaginal, and

penile cancer. Fortunately, most of these infections are transient, and the virus is cleared out by the immune system within 2 years, and malignant transformation takes place only if the virus persists. There are around 15 high-risk HPV types, and of these, types 16 and 18 are responsible for 70% of all cervical cancers [4-8]. Luckily, 15-20 years is the duration needed for the premalignant abnormal cells to become cancer [9]. So, cervical cytological examination, Pap smear, was used since the 1960s to screen women and treat the premalignant conditions followed by screening for oncogenic HPV in the cervix using polymerase chain reaction (PCR). Furthermore, cervical cancer can be prevented by giving the HPV vaccine, which was first FDA approved to be given to girls in 2006, preferably before sexual activity [10-13]. The application of these primary and secondary preventive measures has led to a significant reduction in cervical cancer cases and deaths by nearly 74% in the last 50 years [14-16]. In spite of the evident reduction in the cervical cancer cases and related deaths, 660,000 new cases were reported in 2022, and 350,000 women died of the disease in the same year [8]. Noticeably, most of these cases were found in less developed countries where there is a lack of facilities for effective national screening policies, and more than 90% of the deaths occurred in these countries due to failure of prevention and early detection of this cancer [9,17,18]. WHO in 2018 announced a global appeal to eliminate cervical cancer and set up a target to decrease the incidence of this disease to 4 per 100,000 women in all countries by 2030. This goal is intended to be achieved through vaccination, screening, and proper treatment of precancerous cases in addition to improving treatment of cancer cases [19]. Personal knowledge about cervical cancer and its surveillance tests is one of the most important factors that affect women's engagement in the screening and prevention of this disease in middle- and low-income countries [20]. In Iraq, there is no national screening program nor vaccination policy to prevent cervical cancer. Therefore, women's awareness and knowledge about this disease is a mainstay to prevent or early detect this cancer. This study aims to evaluate the knowledge of an educated class, secondary school teachers, who are all university graduates, about their knowledge regarding cervical cancer's causative association with HPV, screening tests (Pap smears), and prevention of HPV infection by vaccination.

METHODS

Study design and setting

A cross-sectional study was conducted in secondary schools in Al-Karkh, Baghdad, Iraq, from September 15, 2024, through December 15, 2024. The study aimed to determine the knowledge of female secondary school teachers regarding cervical cancer and its prevention.

Inclusion criteria

University graduate female teachers from secondary schools in Al-Karkh, Baghdad, who volunteered to participate in the study were included.

Exclusion criteria

Male teachers and other staff of the school were excluded from the study. Additionally, teachers who refused to participate or did not complete the questionnaire were excluded from the final assessment.

Sampling and research instrument

A stratified sampling method was used to select 26 secondary schools from the 138 schools in Al-Karkh. A written, structured questionnaire was designed to assess the knowledge of participants about cervical cancer, including its causes, screening, and prevention. The questionnaire was divided into two sections: Indirect questions about cervical cancer risk factors, main causes, and demographic data (age, marital status, and subject taught). Direct questions to evaluate knowledge regarding cervical smear testing and HPV infection.

Data collection and outcome measurement

Teachers assembled at their respective staff rooms, where the researcher explained the aim of the study. Those willing to take part proceeded to complete the first section of the questionnaire. They then had an interface with the second section designed to determine their level of knowledge regarding cervical smear testing and HPV. Data collection was performed using direct interviews and self-administered questionnaires.

Ethical considerations

Ethical approval was gained from the Ethical Approval Committee at the University of Anbar, as seen on certificate number 96, dated March 12, 2024. Written approval was also taken from the Ministry of Education/Al-Karkh Directorate for conducting the research. Informed consent was taken from all the participants for voluntary participation and confidentiality of their responses.

Statistical analysis

Data gathered were inputted and analyzed using IBM SPSS Statistics version 29 (IBM, Chicago, IL, USA). Descriptive statistics such as frequency, percentage, mean, standard deviation, and range (minimum to maximum) were employed to describe the data. Pearson Chi-square test (χ^2 -test) was employed to determine significant differences among categorical variables, where Yates' correction or Fisher's Exact test was applied where necessary. A p-value of < 0.05 was regarded as statistically significant.

RESULTS

232 female teachers agreed to engage in this study. Most of those teachers (88.8%) were married and aged

between 30 and 49 years (69.8%). Regarding the subjects they teach, 135 (58.2%) were teaching social

studies, and the remaining 97 (41.8%) were teaching various sciences (Table 1).

Table 1: Sociodemographic characteristics of participated female teachers (n=232)

Variables		n(%)	p-value
Age (years)	20-29	11(4.7)	0.43
	30-39	67(28.9)	
	40-49	95(40.9)	
	50-59	59(25.4)	
	Mean±SD (Range)	42.7±8.4 (22-59)	
Marital status	Married	206(88.8)	0.082
	Single	24(10.3)	
	Divorced/Widowed	2(0.9)	
Teaching field	Sciences	97(41.8)	0.098
	Social studies	135(58.2)	
Teaching material	Biology	17(7.3)	0.34
	Chemistry	27(11.6)	
	Mathematics	22(9.5)	
	Physics	16(6.9)	
	Computer	15(6.5)	
	Second Languages:	49(21.1)	0.23
	Kurdish	3(6.1)	
	English	40(81.7)	
	French	6(12.2)	
	History/Geography/Social affairs	35(15.1)	
	Islamic Religion	14(6)	0.18
	Arabic Language	24(10.3)	
	Sport	7(3)	
	Art	6(2.6)	

The majority of surveyed teachers (46.9%) replied they don't know when asked about the main cause of cervical cancer, and of those who answered this question, 33 teachers (14.2%) answered as sexually transmitted disease, 13 (5.6%) as viral infection, and 11 (4.7%) relate this cancer to multiple sexual partners, reflecting poor knowledge in this regard (Table 2).

Table 2: Knowledge about the main cause of cervical cancer among secondary school teachers (n=232)

What is the main cause behind cervical cancer?	n(%)	p-value
I don't know	109(46.98)	0.21
Genetic predisposition	27(11.6)	
Chemical	13(5.6)	
Radiation	2(0.9)	
Viral infections	13(5.6)	
Sexually transmitted diseases	33(14.2)	
Multiple sex partners	11(4.7)	
Unhygienic habits	22(9.5)	
Use of contraceptive intrauterine devices	2(0.9)	

Considering the knowledge about screening tests for early detection of cervical cancer, more than half of the participants (57.7%) mentioned that they don't know. Only 34 women out of 323 (14.6%) answered properly as cervical smear (Table 3).

Table 3: Knowledge about screening tests for cervical cancer among secondary school teachers (n=232)

How to screen woman to prevent cervical cancer?	n(%)	p-value
I don't know	134(57.8)	0.025
Cervical smear	34(14.7)	
Ultrasound	20(8.6)	
Laparoscopy	8(3.4)	
Clinical examination of the cervix by speculum	27(11.6)	
Blood test	9(3.9)	

On asking the respondents direct questions in the second part of the questionnaire, 72.8% of them heard about cervical smear, but only 30.2% heard about HPV, indicating poor information about its correlation with cervical cancer. Only one teacher (0.4%) answered that HPV infection can be prevented by use of vaccine (Table 4).

Table 4: Knowledge about cervical smear, human papilloma virus and way of its prevention

Variables		n(%)	p-value
Heard about cervical smear	Yes	169(72.8)	0.021
	No	63(27.2)	
Heard about Human Papilloma Virus	Yes	70(30.2)	0.13
How to prevent human papilloma virus infection?	No	162(69.8)	
Personal hygiene	I don't know	160(68.96)	0.034
Drugs		36(15.5)	
Regular test		1(0.4)	
Regular examination		10(4.3)	
Vaccine		24(10.3)	
		1(0.4)	

Regarding the source of their information, 178 teachers (76.7%) mentioned social media, and in 21.7% of the participants, a doctor or nurse was their source (Table 5).

Table 5: Source of the information of the teachers surveyed

Source of information	n(%)	p-value Chi square
Medical (Doctor/ Nurse)	50(21.6)	0.088
Social media	178(76.7)	0.132
Friends & Relatives	4(1.7)	0.234

This study showed no significant association between the teaching field and the teachers' information about the main cause of cervical cancer or method of its early

detection, but science teachers significantly heard about HPV more than those teaching social studies (Table 6 and Table 7). There was no significant association

between teaching field and knowledge about HPV prevention, as demonstrated in Table 8.

Table 6: Relationship between the teaching field and knowledge of the main cause of cervical cancer

Variables		Teaching field		p-value
		Science n(%)	Humanitarian n(%)	
Genetic predisposition	Yes	14(51.9)	13(48.1)	0.676
	No	22(46.8)	25(53.2)	
Chemical	Yes	8(61.5)	5(38.5)	0.306
	No	28(45.9)	33(54.1)	
Radiation	Yes	2(100)	0.0(0.0)	0.141
	No	34(47.2)	38(52.2)	
Viral infections	Yes	5(38.5)	8(61.5)	0.418
	No	31(50.8)	30(49.2)	
Sexually transmitted diseases	Yes	17(51.5)	16(48.5)	0.658
	No	19(46.3)	22(53.7)	
Multiple sex partners	Yes	5(45.5)	6(54.5)	0.818
	No	31(49.2)	32(50.8)	
Unhygienic habits	Yes	11(50)	11(50)	0.880
	No	25(48.1)	27(51.9)	
Use of contraceptive intrauterine devices	Yes	1(50)	1(50)	0.969
	No	35(48.6)	37(51.4)	

*Significant difference using the Chi-square test (χ^2 -test) at $p < 0.05$ level.

Table 7: The relationship between the teaching field and teachers knowledge about screening test of cervical cancer and whether they heard about cervical swab and HPV or not

Variables		Teaching field		p- value
		Science n(%)	Humanitarian n(%)	
Cervical smear	Yes	16(47.1)	18(52.9)	0.069
	No	11(26.8)	30(73.2)	
Ultrasound	Yes	4(20)	16(80)	0.082
	No	23(41.8)	32(58.2)	
Laparoscopy	Yes	4(50)	4(50)	0.383
	No	23(34.3)	44(65.7)	
Clinical examination of the cervix	Yes	9(33.3)	18(66.7)	0.718
	No	18(37.5)	30(62.5)	
Blood test	Yes	3(33.3)	6(66.7)	0.859
	No	24(36.4)	42(63.6)	
Heard about cervical swab	Yes	67(39.6)	102(60.4)	0.273
	No	30(47.6)	33(52.4)	
Heard about Human Papillomavirus	Yes	38(54.3)	32(45.7)	0.011
	No	59(36.4)	103(63.6)	

Significant difference between the percentages using the Chi-square test (χ^2 test) at $p < 0.05$ level.

Table 8: The relation between teaching field and knowledge about HPV prevention

How to prevent human papilloma virus infection?		Teaching field		p-value
		Science n(%)	Humanitarian n(%)	
Personal hygiene	Yes	20(55.6)	16(44.4)	0.069
	No	77(39.3)	119(60.7)	
Drugs	Yes	1(100)	0.0(0.0)	0.237
	No	96(41.6)	135(58.4)	
Regular test	Yes	7(70)	3(30)	0.065
	No	90(40.5)	132(59.5)	
Regular exam	Yes	6(25)	18(75)	0.078
	No	91(43.8)	117(56.3)	
Vaccine	Yes	1(100)	0.0(0.0)	0.237
	No	96(41.6)	135(58.4)	

Significant difference between the percentages using the Pearson Chi-square test (χ^2 -test) at $p < 0.05$ level.

DISCUSSION

Cervical cancer is the 12th most prevalent cancer among women aged between 15 and 44 in Iraq, with 286 new cases diagnosed annually [21]. However, different studies showing a worrying increment in HPV infection and accordingly a sharp increment in cervical cancer

cases in the next 10-15 years are expected unless preventive measures are set up. A study published in 2023 investigating HPV presence in cervical swabs of 362 randomly chosen Iraqi women revealed that 17.9% of tested women are infected and 30% of those had abnormal Pap smears [22]. Another larger study enrolling 3500 in Al-Kufa city showed a low rate of

abnormal cervical cytology but sounded the alarm of HPV infection among a considerable proportion of Iraqi women (23.6%) [23]. For comparison, the prevalence of HPV infection is 4% and 4.7% among Jordanian and Saudi women, respectively [24,25]. The current study revealed poor knowledge towards cervical cancer causation, risk factors, screening, and preventive measures among secondary school teachers in agreement with a similar outcome of a study exploring the knowledge and attitude of Ministry of Higher Education and Scientific Research employees, who all are well educated, in which poor answers were found in 79.8% [26]. Another study was carried out using Google Forms in Baghdad [27], which showed that 87% of the responders heard about cervical smear in comparison to 72.8% in our study, and 38% correlate HPV as a cause of cervical cancer, while only 5.6% mentioned viral disease and 14.2% sexually transmitted disease in the current study. Well, these higher results in the previous study are probably due to the method of data collection in which the participants were asked to choose an answer rather than answering freely. Another possible explanation is that the responders do not answer by direct interview and have the time to search for the right answers. On comparing the current study findings with those of neighboring countries, a large study among Saudi females concluded that there is moderate to low awareness regarding HPV, cervical cancer, and HPV vaccine, as only 34% of participants knew that sexually transmitted viruses are related to cervical cancer, while in our study only 14.2% correlate cervical cancer directly to sexually transmitted diseases and 4.7% indirectly by relating it to multiple sexual partners. Furthermore, 44.6% of Saudi women answered Pap smear as a screening test, while only 14.7% of the surveyed Iraqi teachers recognize cervical smear as a screening test. In our study, only one teacher (0.4%) knew there is a vaccine for HPV in front of 12.6% among Saudi women [28]. In comparison with another neighboring state, Jordan, 61% of Jordanian women did not correlate cervical cancer to HPV infection, but there was still a higher percentage in our study in which teachers of higher education failed to do so. A good proportion of Jordanian women have awareness about Pap smears (87.6%), parallel to a considerable percentage of Iraqi teachers (72.8%). Despite the poor knowledge about the HPV vaccine among Jordanian women (42%), it is still better than the disappointing finding that only one out of 232 Iraqi teachers (0.4%) had knowledge about this vaccine [29,30]. This study showed that a relatively good proportion of female teachers (72.8%) have heard about cervical smear when asked about it directly, and this is a good indicator, while a study performed in Oman, which is a country of similar culture to that of Iraq and witnessing an increased rate of cervical cancer in the last few years, found that 55% of Omani women had heard of it [31]. It seems that Iraqi women lack a comprehensive source of information to increase their knowledge regarding this

cancer. Regarding the source of information, 59.1% of Jordanian women mentioned gynecologists, while only 21.6% of Iraqi teachers referred to medical staff, and the main source of Iraqi teachers was social media (76.7%), but only 9.1% of Jordanian women mentioned social media as a source of information [29]. This reflects poor dissemination of information about cervical cancer by Iraqi gynecologists. Well, during data collection for the current study and after filling out the questionnaires, we took the opportunity to educate all female staff in each school about this serious disease. On the other hand, social media can be used by the Iraqi Ministry of Health and other women's organizations to increase Iraqi women's awareness about this disease.

Study limitations

Geographic Scope Constraints: The research was confined to secondary schools in Al-Karkh, Baghdad, which could limit its representativeness of the entire teacher population in Iraq. Hence, the results may not be generalizable to other areas with differing socioeconomic and educational settings. *Self-Reported Data:* The study relies on self-reported data from the participants, who may suffer from recall bias or social desirability bias and provide responses that they believe are expected and not always what they know. *Lack of Holistic Evaluation:* Although the research evaluated knowledge levels, it did not evaluate attitudes or readiness to embrace preventative strategies such as HPV vaccination or cervical smear screening. Future research ought to include qualitative approaches in examining perceptions and obstacles to screening. *Potential Sampling Bias:* Despite stratified sampling, there is still a possibility that the sample selected might not be representative of all secondary school teachers in Baghdad, given that issues such as the type of school (public or private) and individual interest in health-related subjects could affect participation.

Conclusion

There is poor knowledge about cervical cancer among women with higher education in Iraq, where there is no national screening nor HPV vaccination program. The documented increase in HPV infection necessitates a media campaign to educate people and hence prevent the highly probable future increase in cervical cancer cases.

Conflict of interests

No conflict of interest was declared by the author.

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Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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