Cross-sectional Study

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The level of medical students' knowledge regarding the prevention of cervical cancer

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Background: In Palestine, cervical cancer is the third most common gynaecological cancer, exhibiting higher mortality rates compared to regional counterparts. Late-stage diagnosis and limited awareness contribute to this disparity. This study aims to assess the awareness of Palestinian medical students regarding cervical cancer prevention.

Methods: A questionnaire-based survey involving 532 medical students from various Palestinian universities was conducted between October 2023 and December 2023. The survey encompassed closed-ended quantitative and demographic questions distributed through social media.

Results: The study was carried out on a group of 532 medical students (66.3% women and 33.6% men), (average age 21.7 years). Most students (77.7%) knew that the main risk factor for cervical cancer was human papillomavirus (HPV) infection. Participants doing the internship had the greatest knowledge, whereas students from the first year had the poorest knowledge about the main risk factors for cancer of the cervix. Only about half, 50.2% of all students, knew that in Palestine, there is no screening program. 84.4% of students correctly indicated that the cervical cancer screening test is a pap smear test. 41.4% of respondents knew that microscopic evaluation of the exfoliated cells from the vaginal part of the cervix is the screening test for cervical cancer which is used. Only about half of the students (45.1%) knew that there were no specific early symptoms of cervical cancer.

Conclusions: This study highlights the need for enhanced education, particularly regarding screening program awareness, among Palestinian medical students. Addressing these knowledge gaps is crucial for effective preventive strategies.

Keywords: cervical cancer, HPV, knowledge, palestine, prevention

Background

Cervical cancer stands as the most frequently diagnosed gynaecological cancer and ranks among the primary contributors to cancer-related fatalities among women across the globe. Cervical cancer continues to be a significant issue, even though there has been a decline in its occurrence in developed nations in recent times[1,2]. In 2020, it was estimated that there were more than 600 000 new cases of cervical cancer worldwide, comprising 3.1% of all cancer cases in women[1]. Additionally, it was estimated that ~300 000 deaths were attributed to cervical cancer in the same year. Approximately half of these fatalities transpired in nations with low and medium levels of human development indices[1].

In Palestine, a lower-middle-income country, cervical cancer ranks as the third most prevalent gynaecological cancer, with an age-standardized incidence rate of 2.5 per 100 000 females[3–5]. Notably, the age-standardized mortality rate for cervical cancer in Palestine surpasses that of other countries in the region[5]. This disparity could potentially be attributed to the absence of an effective screening program and the tendency for diagnosis to occur in later stages; this is often due to inadequate awareness

HIGHLIGHTS

- Despite being the third most common gynaecological cancer, cervical cancer in Palestine exhibits higher mortality rates, partly due to late-stage diagnosis and limited awareness.
- Alarmingly, only 50.2% of surveyed students were aware of the absence of a Population Prevention and Early Diagnosis Program in Palestine, emphasizing a crucial gap in awareness regarding available preventive measures.
- The study underscores the urgent need for enhanced education, especially in the early years of medical training, to address knowledge deficiencies about cervical cancer screening programs and risk factors among Palestinian medical students.
- The findings provide valuable insights for tailoring healthcare policies, educational initiatives, and public health interventions in Palestine, aiming to reduce the burden of cervical cancer through targeted awareness campaigns and education.

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among both educated and non-educated individuals. A primary contributor to the high mortality rate associated with cervical cancer is the late-stage diagnosis of the disease[6,7]. This late diagnosis can be attributed to several factors, including limited awareness of cervical cancer symptoms and risk factors, as well as restricted access to healthcare facilities, especially in low-income and middle-income countries[8–12]. Several key factors are known to elevate the risk of developing cervical cancer. The most significant risk factor for cervical cancer is the infection with human papillomavirus (HPV)[13–16]. Specifically, HPV types 16 and 18, which are high-risk sexually transmitted viruses, are responsible for more than 70% of cervical cancer cases[14–16]. Additionally, other behavioural and sexual factors that may contribute to the development of cervical cancer include having multiple sexual partners, engaging in sexual activity at an early age, giving birth to multiple children, having sexual intercourse with an uncircumcised male, smoking, and maintaining poor personal hygiene[17–22].

In the context of Palestine, understanding the level of awareness among students regarding the prevention of cervical cancer is of paramount importance. Cervical cancer is one of the leading causes of cancer-related morbidity and mortality among Palestinian women, and it poses a considerable public health challenge in this region. It is essential to acknowledge the unique circumstances that surround healthcare in Palestine. The Palestinian territories, including the West Bank and Gaza Strip, have faced numerous political, economic, and social challenges, which have undoubtedly affected healthcare infrastructure, resource allocation, and access to healthcare services. These challenges may, in turn, influence the awareness, education, and utilization of preventive measures against cervical cancer. The Palestinian Ministry of Health and various international organizations have initiated efforts to combat cervical cancer through vaccination campaigns, screening programs, and educational initiatives. However, the effectiveness of these efforts, as well as the awareness levels among students, remains a topic that requires further exploration.

This research aims to investigate the level of medical students' awareness regarding the prevention of cervical cancer in Palestine. By doing so, it seeks to contribute valuable insights that can inform healthcare policies, educational programs, and public health interventions tailored to the specific needs and challenges faced by the Palestinian population.

Methods and material

Study design and questionnaire

This study involved 532 medical students from different Palestinian universities during the period from October 2023 to December 2023. The questionnaire comprised eight primary closed-ended quantitative questions and five queries related to demographic information such as gender, age, level of medical school, discussions about cervical cancer, and if yes with who? (Supplementary Materials, Supplemental Digital Content 1, http://links.lww.com/MS9/A403). The questionnaire was distributed via social media as a Google form. This work has been reported in line with the STROCSS criteria[23], Supplemental Digital Content 2, http://links.lww.com/MS9/A404.

Statistical analysis

Data analysis and entry were done using SPSS version 24. Descriptive statistics such as mean and standard deviation were used for quantitative variables like age. Percentage and frequency were utilized for qualitative variables like sex, medical school year etc. Participants were compared for any difference through χ^2 test. P value of less than 0.05 was taken as significant. The normality of data is presented by both graphical and statistical methods.

Results

The study was conducted on a group of 532 students in the age range 18–30 years old (average age 21.7). The analysis included 353 women (66.3%) and 179 men (33.6%). The students were from medical faculties at different universities in Palestine. More students were from all years including first year (4.7%), second year (13.7%), third year (11.3%), fourth year (11.7%), fifth year (26.3%), sixth year (23.3%) and internship (9.0%). The majority of students (97.9%) were single, and the majority (77.1%) never ever had a conversation with someone about cervical cancer (Table 1).

Knowledge about risk factors for cervical cancer

Most students (77.7%) knew that the main risk factor for cervical cancer was human papillomavirus (HPV) infection. Participants doing the internship had the greatest knowledge, whereas students from the first year had the poorest knowledge about the main risk factor for cancer of the cervix (87.23% vs. 52%; $P < 0.05$). Both age and gender were associated with better awareness in respondents ($P < 0.05$). Women significantly more often indicated the correct answer than men (80.1% vs. 72.6%, respectively). There were no differences observed between respondents based on marital status or having had a conversation with someone about cervical cancer ($P > 0.05$). 78.5% of all respondents knew that HPV vaccination reduces the risk of cervical cancer (80.16% of women vs. 75.4% of men ;($P > 0.05$). 85.24% of respondents who had a conversation with someone about cervical cancer knew HPV vaccination reduces risk (Table 2).

Table 1

Characteristics of respondents

	n (%)
Sex	
Male	179 (33.6)
Female	353 (66.3)
Level of medical school	
First year	25 (4.7)
Second year	73 (13.7)
Third year	60 (11.3)
Fourth year	62 (11.7)
Fifth year	140 (26.3)
Sixth year	124 (23.3)
Internship	48 (9.0)
Marital status	
Single	521 (97.9)
Married	11 (2.1)
Have you ever had a conversation with someone about cervical cancer?	
Yes	122 (22.9)
No	410 (77.1)

Table 2

Awareness of HPV as the main risk factor

	Awareness of risk factor	P
Age	Mean 21.7	0.001
Sex, *n* (%)		0.028
	Male 283 (80.1)	
	Female 130 (72.6)	
Marital status, *n* (%)		0.655
	Single 406 (77.9)	
	Married 7 (63.6)	
Have you ever had a conversation with someone about cervical cancer?, *n* (%)	Yes (80.3)	0.796
	No (76.8)	

HPV, human papillomavirus.

Knowledge about cervical cancer screening

In Palestine, there is no Population Prevention and Early Diagnosis Program for cervical cancer screening[24]. Only about half 50.2% of all students had this knowledge, and half of all women (50.1%) and half of all men (50.2%) knew this ($P = 0.001$). There was no significant difference in knowledge of the Population Prevention and Early Diagnosis Program when correlated with other respondent characteristics (age, level of education, marital status, having a conversation about cervical cancer). 84.4% of students correctly indicated that the cervical cancer screening test is a pap smear test (women 85.8%, men 81.56%; $P = 0.208$). There was no significant difference in knowledge of Pap smear tests used as screening tests with age, marital status, level of education, or having a conversation about cervical cancer. 41.4% of respondents knew that microscopic evaluation of the exfoliated cells from the vaginal part of the cervix is the screening test for cervical cancer which is used. The most knowledgeable in this regard was sixth year and internship students (65.32% and 57.44%, respectively), and the least knowledgeable were students of first year (28%), second year (27.39%) and third year (20%) ($P < 0.05$). A comparison of respondents based on gender and marital status showed no significant difference for this question. A total of 59.6% of respondents claimed that the first preventive cytological examination should be done shortly after initiation of sexual activity. No statistical significance was observed based on sex, age, marital status and level of education.

Knowledge about cervical cancer

Only about half of the students (45.1%) knew that there were no specific early symptoms of cervical cancer. Statistical significance was observed in this question, as well as in sex ($P = 0.010$) and level of medical school ($P = 0.004$). The most knowledgeable in this regard were third-year students (56.67%) and least knowledgeable were second-year (27.3%) and fourth-year (29.0%) students. No statistical significance with marital status, age or having a conversation about cervical cancer was observed. Only women are affected by cervical cancer; therefore, females' knowledge was analyzed separately (Figs. 1 and 2).

Discussion

Cervical cancer is notable for its high global incidence and mortality rates. However, the prevalence of this cancer in the population can be significantly diminished through early prevention measures. One well-recognized risk factor for cervical cancer is HPV infection. Administering HPV vaccinations to girls and young women constitutes an effective primary prevention strategy against cervical cancer. Moreover, when diagnosed at an early clinical stage, there are highly effective treatment methods available. Through screening tests, it is possible to detect even the earliest and precancerous stages of cervical cancer. Implementing appropriate primary and secondary prophylactic measures for cervical cancer leads to a substantial reduction in mortality. Therefore, it is crucial for women to comprehend the issue and actively participate in preventive measures.

Cervical cancer poses a potential risk to young women, prompting us to focus our questionnaire on risk factors and preventive methods for cervical cancer among medical students. The survey revealed that a significant majority of students were aware that HPV infection stands as the primary risk factor for the development of cancer (77.7%) and recognized that vaccination is an effective means of reducing this risk (78.5%). In a prior study conducted in Palestine[24] that focused the general population, 23.7% of participants exhibited a good level of knowledge regarding cervical cancer risk factors, aligning with findings from comparable studies in Tunisia, Libya, Qatar, and Oman[25–28]. The relatively lower incidence and mortality rates of cervical cancer in these Arab countries may have influenced health authorities to prioritize educating women about other types of cancers with higher prevalence, such as breast cancer[29].

Optimal awareness of cervical cancer, coupled with early detection and prompt treatment, continues to be essential for enhancing survival outcomes, particularly in low-income and middle-income countries[30–33]. The awareness among students regarding the link between genital HPV infection and cervical cancer varied by country, with percentages ranging from 20% in Nigeria, 34% in Costa Rica, 45% in Scotland, 58% in Turkey, to 65% among medical students in China[34–38]. In Germany, less than 50% of vocational school students understood that HPV infection is sexually transmitted[39]. Adults in the US, UK, and Australia displayed low levels of detailed knowledge about HPV infection and its association with cervical cancer, with only 61% of respondents having heard about HPV[40].

Young adults' knowledge about HPV vaccination was found to be insufficient. In Serbia, among female students, only 14% were aware of both the connection between HPV infection and cervical cancer and the preventive role of the HPV vaccine in reducing cervical cancer incidence[41]. Belgium and Spain showed the highest levels of student knowledge, at around 85%[42]. Regarding adults, the awareness about HPV vaccination was highest in the UK (90%) and Spain (80%), while low awareness was noted in the Netherlands (6%)[42]. A large percentage of participants in our study knew about the preventive role of HPV vaccination, although there is no national vaccination program in Palestine.

Participants doing Internship Students had the greatest knowledge, whereas students from the First year had the poorest knowledge about the main risk factor for cancer of the cervix (87.23% vs. 52%; $P < 0.05$). Students undertaking master's degrees in a previous study[43] had a greater knowledge than

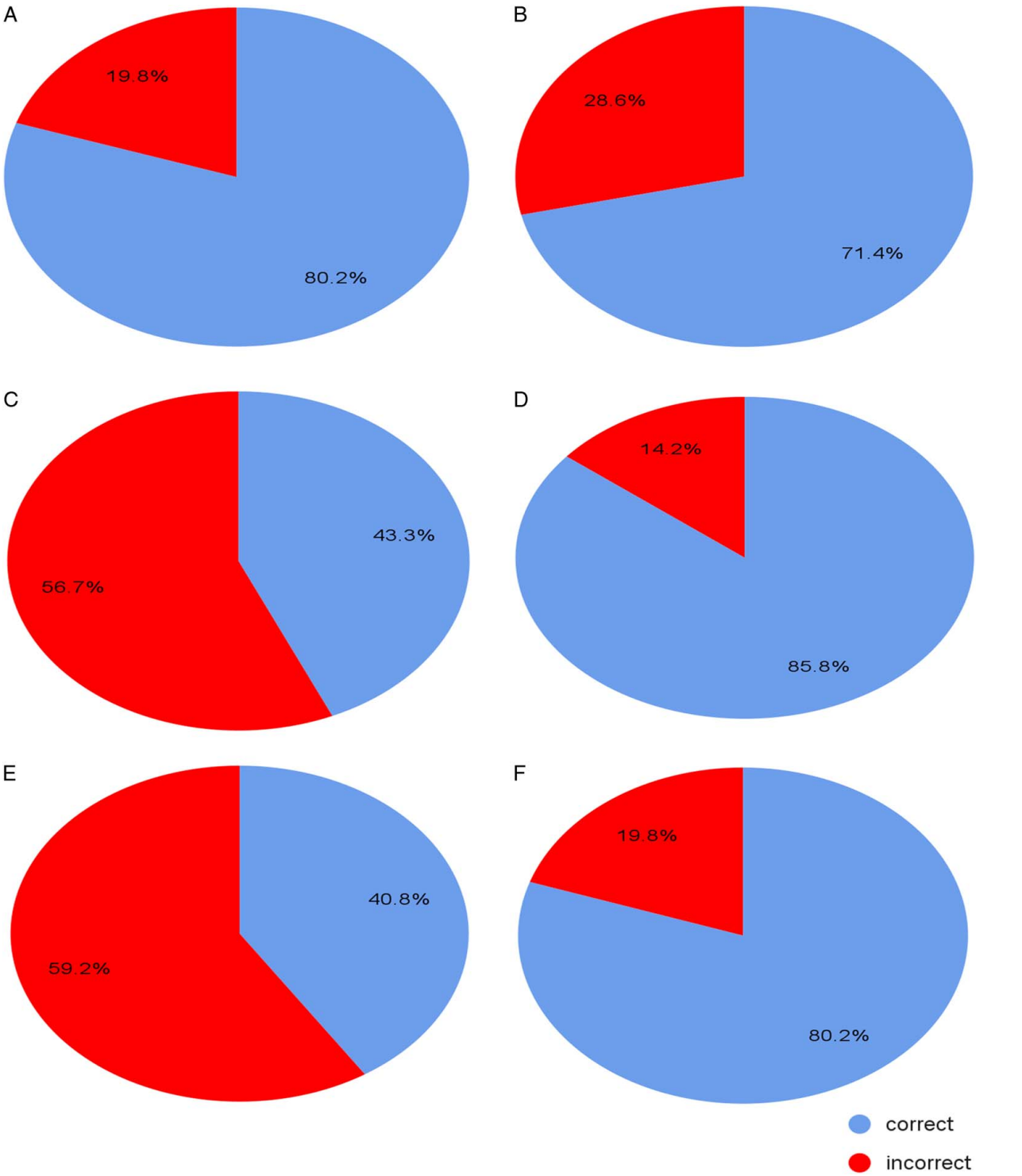

Figure 1. Women respondents' awareness of risk factors and prevention of cervical cancer: (A) What is the main factor risk of cervical cancer? (correct answer: human papillomavirus); (B) Is cervical cancer genetically inherited? (correct answer: No); (C) What is the characteristic symptom of early-stage cervical cancer? (correct answer: There are no characteristic symptoms of cervical cancer); (D) What is the name of the screening test for cervical cancer? (correct answer: Pap test); (E) What is the screening test for cervical cancer? (correct answer: Microscopic evaluation of the exfoliated cells from the vaginal part of the cervix); (F) What is.

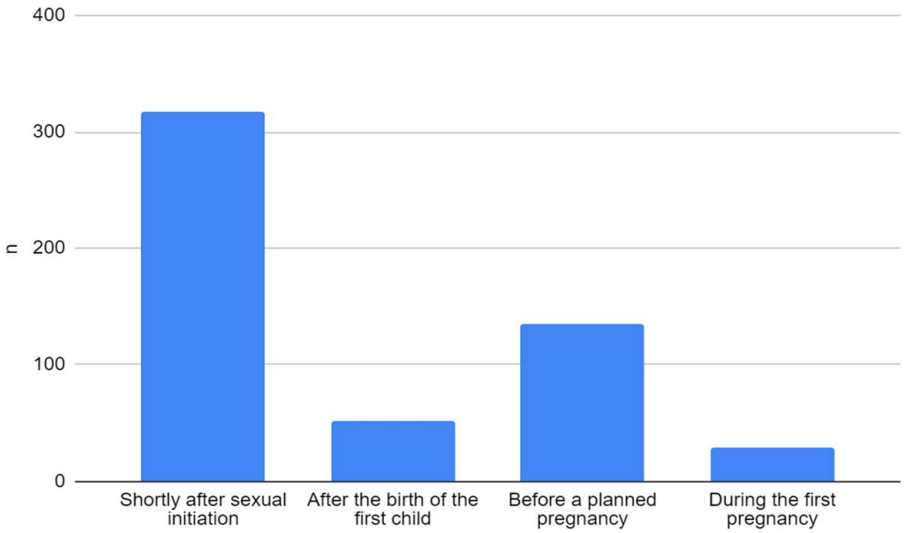

Figure 2. The women's answers about the point of life when the first prophylactic test for cervical cancer should be done.

those studying for bachelor's degrees. Similarly, Marlow's study[40] showed the relationship between higher education and better knowledge. It is evident that female students possess more knowledge about HPV infection and HPV vaccination compared to their male counterparts[36,38]. Similarly, in an adult group, women demonstrated more comprehensive information about the subject[40]. Our findings align with this trend, indicating that girls exhibit better knowledge about cervical cancer risk factors and preventive strategies.

It appears that general awareness regarding cervical cancer and its primary and secondary prevention measures falls short. There is a crucial need to educate individuals about the importance of the HPV vaccine and screening procedures, as knowledge plays a significant role in vaccine acceptance[44]. Rodriguez and colleagues conducted a meta-analysis involving 17 articles with over 68 thousand participants, demonstrating that behavioural and informational interventions effectively doubled HPV vaccine initiation. The analysis highlighted the association between individual knowledge, acceptance, and the initiation of HPV vaccination[45].

Education efforts should be targeted at young people, encompassing both girls and boys. Primary prevention of cervical cancer should involve parents imparting safe sexual behaviours to their children and advocating for vaccination[42]. Access to national immunization and screening programs is essential. In some countries, parental concerns drive HPV vaccine uptake, emphasizing the need for comprehensive information for informed decision-making[46]. Adolescents with a vaccinated older sister demonstrated better knowledge about HPV[42]. In our study, only 22.9% of respondents reported engaging in conversations about cervical cancer.

Gaps in knowledge were evident, with approximately half of the students in our study unaware that cervical cancer typically lacks specific early symptoms. A prevalent misconception in the general public is the belief that the absence of symptoms equates to the absence of disease. In the case of cervical cancer, waiting for symptoms is not advisable. Without early symptoms, abnormalities must be identified through alternative methods such as screening tests. It is crucial for women to be aware of screening tests for cervical cancer, and the Pap test is widely utilized worldwide for this purpose. Fortunately, most women in our study were knowledgeable about the type of examination used as a screening test for cervical cancer. Only half of all investigated students knew that the Palestinian medical system lacked a specific screening program for cervical cancer. In the study conducted by Marlow *et al.*[47], 28% of women aged 25–64 years who did not partake in cervical cancer screening reported unfamiliarity with the screening process, particularly among younger individuals. A systematic personal invitation for cervical cancer screening has proven to be an effective method for disseminating information about screening. For instance, in Lithuania, the use of a single reminder letter more than doubled the coverage of screening[48]. The participant's answers about the point of life when the first prophylactic test for cervical cancer should be done was shortly after sexual initiation, similar to the findings in a previous Polish study[43].

According to WHO recommendations, the elimination of cervical cancer is feasible within a country if 90% of girls receive full vaccination against HPV by the age of 15, 70% of women undergo high-performance screening tests at the ages of 35 and 45, and 90% of women diagnosed with cervical cancer receive treatment. The WHO estimates that, by 2030, the median incidence of cervical cancer can be reduced by 10%, potentially averting 62 million cervical cancer deaths over a 100-year period[49].

In Palestine, where there is currently no national screening program for cervical cancer, the importance of raising public awareness cannot be overstated in order to mitigate the morbidity and mortality associated with cervical cancer. A solid understanding of cervical cancer risk factors is crucial for early detection and, consequently, an improved prognosis[6,9]. Women who possess good knowledge of cervical cancer risk factors are more likely to recognize themselves as high-risk individuals for the disease, prompting them to seek medical advice at an earlier stage. Moreover, women who are aware of their high-risk status are better equipped to adopt behaviours that can reduce their likelihood of developing cervical cancer[50–52].

Conclusion

While Palestinian medical students demonstrated awareness of the connection between HPV and cervical cancer, as well as the risk-reducing effects of the HPV vaccine, some gaps in their knowledge were identified. There is a need for further education among Palestinian medical students, particularly regarding the existence or absence of a specific national screening program for cervical cancer. Providing additional information in this area could enhance their understanding and awareness of the screening measures available for cervical cancer in the Palestinian context.

Ethics approval and consent to participate

Ethical approval for this study was provided by the Research Ethics Committee (REC) at Al-Quds University, Jerusalem, Palestine with reference number of 339/REC/2023 on 08/10/2023.

Consent for publication

Written informed consent was obtained from each participant for the publication of this research paper. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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Author contribution

O.N.S. and B.J. conceived and designed the research, and were responsible for data collection and acquisition of data. O.N.S. performed the literature review and wrote the manuscript. A.H.: formal analysis. O.N.S. and B.M.M.O. reviewed and critically revised the manuscript. All authors have approved the final manuscript.

Conflicts of interest disclosure

The authors declare that they have no competing interests. This manuscript is not being considered by any other journal.

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Availability of data and materials

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

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References

[1] Sung H, Ferlay J, Siegel RL, *et al*. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2021;71:209–49.
[2] Organization WH. *Improving data for decision-making: a toolkit for cervical cancer prevention and control programmes*. 2019. Accessed October 13, 2023. https://www.who.int/publications/i/item/9789241514255
[3] Cancer IAfRo. *GLOBOCAN 2020: estimated cancer incidence, mortality and prevalence Gaza strip and west bank in 2020*. Accessed October 13, 2023. https://bit.ly/2QUyO9Y
[4] Bank TW. *Data for lower middle income*. 2022. Accessed October 13, 2023. https://bit.ly/31N7Cw5
[5] Arbyn M, Weiderpass E, Bruni L, *et al*. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. Lancet Glob Health 2020;8:e191–203.
[6] Ott JJ, Ullrich A, Miller AB. The importance of early symptom recognition in the context of early detection and cancer survival. Eur J Cancer 2009;45:2743–8.
[7] McPhail S, Johnson S, Greenberg D, *et al*. Stage at diagnosis and early mortality from cancer in England. Br J Cancer 2015;112:S108–15.
[8] Hull R, Mbele M, Makhafola T, *et al*. Cervical cancer in low and middle-income countries. Oncol Lett 2020;20:2058–74.
[9] Simon AE, Wardle J, Grimmett C, *et al*. Ovarian and cervical cancer awareness: development of two validated measurement tools. J Fam Planning Reprod Health Care 2012;38:167–74.
[10] Organization WH. *Comprehensive cervical cancer control: a guide to essential practice, 2nd edition*. 2014. Accessed October 13, 2023. https://www.who.int/publications/i/item/9789241548953
[11] Organization WH. *WHO director-general calls for all countries to take action to help end the suffering caused by cervical cancer*. 2018. Accessed October 13, 2023. https://www.who.int/news/item/18-05-2018-who-dg-calls-for-all-countries-to-take-action-to-help-end-the-suffering-caused-by-cervical-cancer
[12] Organizatio WH. *WHO director-general calls for all countries to take action to help end the suffering caused by cervical cancer*. 2022. Accessed October 13, 2023. https://bit.ly/3dLD3fI
[13] Wardak S. Human Papillomavirus (HPV) and cervical cancer. Med Dosw Mikrobiol 2016;68:73–84.
[14] Okunade KS. Human papillomavirus and cervical cancer. J Obstet Gynaecol 2020;40:602–8.
[15] De Martel C, Plummer M, Vignat J, *et al*. Worldwide burden of cancer attributable to HPV by site, country and HPV type. Int J Cancer 2017;141:664–70.
[16] Arbyn M, Xu L, Simoens C, *et al*. Prophylactic vaccination against human papillomaviruses to prevent cervical cancer and its precursors. Cochrane Database Syst Rev 2018;5:CD009069.
[17] Louie KS, de Sanjose S, Diaz M, *et al*. Early age at first sexual intercourse and early pregnancy are risk factors for cervical cancer in developing countries. Br J Cancer 2009;100:1191–7.
[18] Morris BJ, Hankins CA, Banerjee J, *et al*. Does male circumcision reduce women's risk of sexually transmitted infections, cervical cancer, and associated conditions? Front Public Health 2019;7:4.
[19] Sugawara Y, Tsuji I, Mizoue T, *et al*. Cigarette smoking and cervical cancer risk: an evaluation based on a systematic review and meta-analysis among Japanese women. Jpn J Clin Oncol 2019;49:77–86.
[20] Kashyap N, Krishnan N, Kaur S, *et al*. Risk factors of cervical cancer: a case-control study. Asia Pac J Oncol Nurs 2019;6:308–14.
[21] Harper DM, Demars LR. Primary strategies for HPV infection and cervical cancer prevention. Clin Obstet Gynecol 2014;57:256–78.
[22] Kumar RV, Bhasker S. Potential opportunities to reduce cervical cancer by addressing risk factors other than HPV. J Gynecol Oncol 2013;24:295–7.
[23] Mathew G, Agha R. STROCSS 2021: strengthening the reporting of cohort, cross-sectional and case-control studies in surgery. Int J Surg Open 2021;37:100430.
[24] Elshami M, Thalji M, Abukmail H, *et al*. Knowledge of cervical cancer risk factors among Palestinian women: a national cross-sectional study. BMC Women's Health 2021;21:1–14.

[25] El Mhamdi S, Bouanene I, Mhirsi A, *et al*. Cervical cancer screening: women's knowledge, attitudes, and practices in the region of Monastir (Tunisia). Revue D'épidémiologie Et De Santé Publique 2012;60:431–6.
[26] Hweissa NA, Su TT. Awareness of cervical cancer and socio-demographic variations among women in Libya: An exploratory study in Az-Zawiya city. Eur J Cancer Care (Engl) 2018;27:e12750.
[27] Al Meer FM, Aseel MT, Al-Khalaf J, *et al*. Knowledge, attitude and practices regarding cervical cancer and screening among women visiting primary health care in Qatar. EMHJ Eastern Mediterranean Health J 2011;17:855–61; 2011.
[28] Nasar A, Waad A, Atheer A, *et al*. Awareness of cervical cancer and Pap smear testing among Omani women. Asian Pacific J Cancer Prevent 2016; 17:4825.
[29] Cancer IAfRo. *Cervix Uteri Fact Sheet*. 2021. Accessed December 04, 2023. https://bit.ly/3cz4l an
[30] WHO. *Comprehensive cervical cancer control: a guide to essential practice, 2nd edition*. 2014. Accessed December 04, 2023. https://bit.ly/31QUi qy
[31] Organization, w.H. *Human papillomavirus and cancer*. 2023. Accessed December 04, 2023. https://www.who.int/news-room/fact-sheets/detail/human-papilloma-virus-and-cancer
[32] Organization, w.H. *Guide to cancer early diagnosis 2017*. 2017 Accessed December 04, 2023. https://www.who.int/publications/i/item/9789241511940
[33] Randall TC, Ghebre R. Challenges in prevention and care delivery for women with cervical cancer in sub-Saharan Africa. Front Oncol 2016;6:160.
[34] Lauren M. Carlson LMC. Knowledge of cervical cancer pathology of high school students in San Carlos, Costa Rica. Revista de Biol Trop 2014;62:877–86.
[35] Rathfisch G, Güngör İ, Uzun E, *et al*. Human papillomavirus vaccines and cervical cancer: awareness, knowledge, and risk perception among Turkish undergraduate students. J Cancer Educ 2015;30:116–23.
[36] McCusker SM, Macqueen I, Lough G, *et al*. Gaps in detailed knowledge of human papillomavirus (HPV) and the HPV vaccine among medical students in Scotland. BMC Public Health 2013;13:1–7.
[37] Makwe CC, Anorlu RI, Odeyemi KA. Human papillomavirus (HPV) infection and vaccines: knowledge, attitude and perception among female students at the University of Lagos, Lagos, Nigeria. J Epidemiolo Glob Health 2012;2:199–206.
[38] Wen Y, Pan XF, Zhao ZM, *et al*. Knowledge of human papillomavirus (HPV) infection, cervical cancer, and HPV vaccine and its correlates among medical students in Southwest China: a multi-center cross-sectional survey. Asian Pacific J Cancer Prevent 2014;15:5773–9.
[39] Blodt S, Holmberg C, Muller-Nordhorn J, *et al*. Human Papillomavirus awareness, knowledge and vaccine acceptance: a survey among 18-25 year old male and female vocational school students in Berlin, Germany. Eur J Public Health 2012;22:808–13.
[40] Marlow LAV, Zimet GD, McCaffery KJ, *et al*. Knowledge of human papillomavirus (HPV) and HPV vaccination: an international comparison. Vaccine 2013;31:763–9.
[41] Souza JO, Pires TMV, Soares IL, *et al*. Panorama geral do enfrentamento ao Papilomavírus Humano (HPV) no Brasil e no Mundo: Uma revisão de literatura com foco em estratégias educativas. Res Soc Dev 2021;10: e56410615848–.
[42] López N, Garcés-Sánchez M, Panizo MB, *et al*. HPV knowledge and vaccine acceptance among European adolescents and their parents: a systematic literature review. Public Health Rev 2020;41:1–24.
[43] Osowiecka K, Yahuza S, Szwiec M, *et al*. Students' Knowledge about Cervical Cancer Prevention in Poland. Medicina 2021;57:1045.
[44] Loke AY, Kwan ML, Wong YT, *et al*. The uptake of human papillomavirus vaccination and its associated factors among adolescents: a systematic review. J Prim Care Community Health 2017;8:349–62.
[45] Rodriguez AM, Do TQN, Goodman M, *et al*. Human papillomavirus vaccine interventions in the US: a systematic review and meta-analysis. Am J Prev Med 2019;56:591–602.
[46] Radisic G, Chapman J, Flight I, *et al*. Factors associated with parents' attitudes to the HPV vaccination of their adolescent sons: a systematic review. Prev Med 2017;95:26–37.
[47] Marlow LAV, Chorley AJ, Haddrell J, *et al*. Understanding the heterogeneity of cervical cancer screening non-participants: data from a national sample of British women. Eur J Cancer 2017;80:30–8.
[48] Paulauskiene J, Ivanauskiene R, Skrodeniene E, *et al*. Organised versus opportunistic cervical cancer screening in urban and rural regions of Lithuania. Medicina 2019;55:570.
[49] Organization WH. *World Health Assembly Adopts Global Strategy to Accelerate Cervical Cancer Elimination*. 2020. Accessed December 04, 2023. https://www.who.int/news/item/19-08-2020-world-health-assembly-adopts-global-strategy-to-accelerate-cervical-cancer-elimination
[50] Whitaker KL, Smith CF, Winstanley K, *et al*. What prompts help-seeking for cancer 'alarm'symptoms? A primary care based survey. Br J Cancer 2016;114:334–9.
[51] Simon AE, Waller J, Robb K, *et al*. Patient delay in presentation of possible cancer symptoms: the contribution of knowledge and attitudes in a population sample from the United Kingdom. Cancer Epidemiol Biomark Prevent 2010;19:2272–7.
[52] Esteva M, Leiva A, Ramos M, *et al*. Factors related with symptom duration until diagnosis and treatment of symptomatic colorectal cancer. BMC Cancer 2013;13:87.