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Original Article

Acceptability and Awareness of Cervical Cancer Screening in Medical Students of Karachi

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Author`s Contribution

[1,2,3]Substantial contributions to the conception or design of the work; or the acquisition, analysis, drafting, [4]Final approval of the study to be published,Drafting the work or revising it critically for important intellectual content, [5,6]analysis, or interpretation of data for the work,

Conflict of interest: None
Funding source: None

Article received: 28-07-25
Article accepted: 10-11-25

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A B S T R A C T

Objectives: The aim of the study was to determine the level of awareness on cervical cancer screening and acceptability of HPV vaccination among medical students in Karachi, Pakistan.

Study design and setting: The study was a descriptive cross-sectional study that was carried out in the three medical colleges of Karachi and comprised both government and non-government institutions

Methodology: A stratified random sample of 425 undergraduate medical students (years 1–5) was selected. Data were collected using a structured self-administered questionnaire covering demographics, knowledge, attitudes, practices, and barriers. Descriptive statistics, chi-square tests, and multivariate logistic regression were used to analyze associations between variables.

Results: Of the 425 participants (59.5% female; mean age 21.4 ± 2.1 years), 75.3% had heard of cervical cancer, but only 42.4% recognized Pap smear as a screening method and 45.9% knew HPV vaccination prevents cervical cancer. Good knowledge (≥70% score) was observed in 32.9% of respondents. Acceptability of screening and HPV vaccination was reported by 62.4% and 69.4% respectively. Cost (65.9%) and cultural concerns (49.4%) were the most cited barriers. Logistic regression showed that female gender (AOR 1.85, 95% CI 1.20–2.85, p = 0.005), clinical year of study (AOR 2.30, 95% CI 1.45–3.66, p < 0.001), and family history of cancer (AOR 1.75, 95% CI 1.05–2.90, p = 0.031) were significant predictors of good knowledge, while acceptability was associated with female gender and higher knowledge levels.

Conclusions: Medical students demonstrated moderate awareness but significant knowledge gaps regarding cervical cancer prevention. Female and senior students showed higher awareness and acceptability. Targeted curriculum reforms, financial support for vaccination, and awareness campaigns are needed to strengthen cervical cancer prevention in Pakistan.

Keywords: Acceptability; Awareness; Cervical Cancer; HPV Vaccines; Karachi; Medical Students; Screening

Introduction

One of the most preventable cancers in the global community is cervical cancer, which, however, still remains one of the critical problems of the population health, especially in low- and middle-income countries (LMICs). The World Health Organization (WHO) reports that cervical cancer is the fourth cancer type that is most prevalent in women worldwide, with an estimated 604,000 of the new cases and 342,000 deaths in 2020 alone. Almost 90 % of such cases are found in LMICs, where health care facilities, screening, and immunization are in most cases scarce.[1] Although cervical cancer can be prevented to a great extent by regular screening and the use of human papillomavirus (HPV) vaccine, it still remains a source of significant morbidity and mortality. Cervical cancer is the third most common cancer in women in Pakistan, and its incidence is over 5,000 new cases annually and about 3,200 deaths per year.[2] The absence of a country-wide screening program and uneven adherence to preventive interventions among the provinces are also the contributing factors to late diagnosis and unfavorable results.[3] Pakistan still practices opportunistic screening as opposed to the organized cervical cancer screening practiced in developed countries, which has significantly lowered incidence and mortality rate as a result of which there is a disparity in access and usage. HPV infection is a proven cause of cervical cancer, of which two types 16 and 18 are high-risk HPVs that cause almost 70% of the infections worldwide.[4] In spite of this information, HPV vaccination awareness and adoption in most of

the LMICs is very low. A research conducted in Pakistan has continuously revealed that there is a lack of awareness of HPV and screening of cervical cancer among the general population and even among the healthcare providers.[5,6] The socio-cultural taboos of reproductive health, poverty and lack of incorporating preventive oncology into the medical curricula are some of the biggest obstacles to early diagnosis and prevention.[7] As future physicians, medical students are in the strategic position of filling the gap between the medical knowledge and its use in communities. Their understanding, perception, and disposition toward preventive measures have a direct impact on their chances of recommending screening and vaccination of cervical cancer to the patients. In South Asia and Africa, the studies indicate that even though most medical students are knowledgeable on cervical cancer, whether in terms of screening procedures and vaccination against HPV, there is still poor knowledge on the subject.[8,9] In Pakistan, there is an indication that despite the medical students showing a tendency in identifying cervical cancer as a health issue, there remains an issue of misconception and knowledge gaps, particularly in pre-clinical students.[10] In conservative cultures such as that of Pakistan, culture and religion determine the attitudes toward cervical cancer prevention. As an example, embarrassment over gynecological examination, stigma of sexually transmitted diseases and inability to freely discuss women health tend to restrict their joining of screening programs.[11] The problem is further compounded by financial barriers; HPV vaccination is expensive and there is little or no subsidies which make the vaccination unaffordable to most families.[12] On an international level, efforts have been initiated in an attempt to enhance preventive practices awareness and adoption. The WHO launched a global inquiry to eradicate cervical cancer aiming at the intention of 90% coverage with HPV vaccinations, 70% coverage with screening, and 90% coverage with treatment by 2030.[1] Whereas high-income nations have achieved great advancement towards these objectives, in Pakistan, the infrastructure is low and policy implementation is weak, which causes the country to be underdeveloped. Preventive education should also be incorporated into the medical programs and training of future healthcare workers to enhance the management of cervical cancer in the country. The current research will concentrate on the medical students in Karachi, the largest city of Pakistan, and the centre of both government and privately operated medical colleges. Karachi is a special environment because of its variety of socioeconomic statuses, institutions and accessibility of healthcare. The study aims to determine significant knowledge gaps and barriers by studying the knowledge/acceptability of cervical cancer screening and HPV vaccination among this group. Knowledge of how the future doctors are prepared to adopt and market preventive measures would be important to influence interventions that are in tandem with the healthcare realities of Pakistan. This research is expected to offer the evidence that can direct the educational changes, policy formulation, and awareness initiatives aimed at the prevention of cervical cancer. The research contributes to the general understanding of how to make future healthcare professionals more prepared to combat cervical cancer in Pakistan as it assesses both awareness and acceptability.

Methodology

The present study was a descriptive cross-sectional study that was conducted in three medical colleges that represented both the public and the private sector. The study sample comprised MBBS students enrolled in first to fifth year of study. The study involved students who gave informed consent and excluded those who were not available at the time of collecting data, those who refused to participate, and those who did not submit complete questionnaires.

The study was done with ethical approval of the Institutional Review Boards of the involved medical colleges. All the participants signed an informed consent form before the data collection process. The anonymity and confidentiality of the participants were ensured, and their participation was on a voluntary basis without academic or financial incentives. Sensitive questions were optional and students could opt out of the study at any time without any repercussions.

The WHO sample size calculator was used to determine the required sample size with a 95 % confidence interval, an expected prevalence of awareness of 50 % and a 5 % margin of error to maximize the sample size. The minimum sample size calculated was 385 students. The total sample size was then raised to 425 participants after the addition of a 10% margin to cover potential non-response. Participants were selected using stratified random sampling method. The students were stratified based on their year of study (first year to fifth year), and sample was selected randomly within each stratum with proportion to the number of students enrolled in each academic year.

A structured self-administered questionnaire was used to collect the data after studying pertinent literature on cervical cancer awareness and HPV vaccination. The questionnaire was divided into five sections that covered sociodemographic characteristics (age, gender, year of study, type of institution, and family history of cancer), understanding of cervical cancer, HPV infection, screening practices and vaccination,

attitudes and acceptability of cervical cancer screening and HPV vaccination, measured with a five-point Likert scale, preventive practices, including previous screening or vaccination and intention to undergo screening or vacc The questionnaire was pilot-tested with 20 medical students not involved in the actual analysis to determine clarity and reliability before the actual study. Cronbach alpha was used to measure the internal consistency of the attitude items and it was found to be 0.81 that shows good reliability.

The data was collected with the consent of the administrations of the respective colleges. Students were given questionnaires in lecture halls and informed about the purpose of the study, the confidentiality of their data, and their right to refuse to participate. Participation was voluntary and no incentives were offered. Completed questionnaires were collected on the same day to improve response rates.

Data were coded and entered into Statistical Package of Social Sciences (SPSS) version 25 to analyze it. Demographic variables and variables of the study were summarized using descriptive statistics such as frequencies, percentages, means, and standard deviations. Knowledge scores were determined by awarding one point to correct response and 0 to incorrect or don't know response and a score of 70 % or above was regarded as good knowledge. Categorical variables were compared using the chi-square test and continuous variables were compared using independent sample t-tests or analysis of variance (ANOVA) where applicable. Multivariate logistic regression analysis was done to find predictors of good knowledge and acceptability of cervical cancer screening and HPV vaccination, and was presented as adjusted odds ratios with 95% confidence interval. The p-value of the less than 0.05 was taken as statistically significant.

Results

A total of 425 medical students participated in the study. Table 1 presents the sociodemographic characteristics. The majority of the participants were females (59.5%), and males made up 40.5%. Most students were aged 21–23 years (56.0%). The sample was fairly balanced in terms of the academic years, with the respondents being almost equally represented by public (49.4%) and private (50.6%) medical institutions.

Table 2 summarizes knowledge and acceptability of cervical cancer screening and HPV vaccination. Overall, 320 (75.3%) students had heard about cervical cancer. Nevertheless, HPV infection was identified as a prime causal agent by only 57.9 %, Pap smear was identified as a screening tool by only 42.4 %, and knowledge of HPV vaccination to prevent cervical cancer was found in only 45.9 %. Student knowledge on the right time to screen was reported by 34.1% of respondents. In general, knowledge was good (score ≥70%) among 32.9 % respondents. In spite of these gaps, the attitude toward prevention was generally positive, with 87.1% of the participants agreeing that screening is important, 62.4% of the participants would accept screening in the future, and 69.4% of them would recommend HPV vaccination. The most common barriers included cost (65.9%), and cultural issues (49.4%).

As shown in Table 3, the most common source of information was the medical curriculum (45.9%), followed by internet/social media (25.9%), friends or peers (12.9%), health campaigns (9.4%), and family members (5.9%).

Multivariate logistic regression analysis (Table 4) showed that female gender (AOR 1.85, $p = 0.005$), clinical year of study (AOR 2.30, $p < 0.001$), and family history of cancer (AOR 1.75, $p = 0.031$) were significant predictors of good knowledge. Acceptability was significantly associated with female gender (AOR 2.10, $p = 0.001$) and good knowledge (AOR 2.85, $p < 0.001$). Perceived cost reduced acceptability (AOR 0.60, $p = 0.028$), whereas obtaining information through the medical curriculum increased acceptability (AOR 1.65, $p = 0.030$). Institution type and age were not significantly associated with outcomes.

Table 1. Sociodemographic Characteristics of Participants (n = 425)

Variable	Category	n (%)
Gender	Male	172 (40.5)
	Female	253 (59.5)
Age (years)	18–20	115 (27.1)
	21–23	238 (56.0)
	24–26	72 (16.9)
Year of Study	1st	85 (20.0)
	2nd	92 (21.6)
	3rd	80 (18.8)
	4th	88 (20.7)
	Final	80 (18.8)
Type of Institution	Public	210 (49.4)
	Private	215 (50.6)

Table 2. Knowledge and Acceptability of Cervical Cancer Screening and Vaccination

Variable	Correct Response n (%)
Knowledge of Cervical Cancer Screening	
Heard about cervical cancer	320 (75.3)
HPV is a major cause of cervical cancer	246 (57.9)
Pap smear is a screening method	180 (42.4)

HPV vaccine can prevent cervical cancer	195 (45.9)
Screening should begin after sexual debut	145 (34.1)
Good overall knowledge (≥70%)	140 (32.9)
Acceptability (Agree/Strongly Agree)	
Screening is important for women's health	370 (87.1)
Willing to undergo screening in future	265 (62.4)
Would recommend HPV vaccination	295 (69.4)
Cost is a major barrier	280 (65.9)
Cultural/religious sensitivity is a barrier	210 (49.4)

Table 3. Sources of Information on Cervical Cancer

Source	n (%)
Medical curriculum/lectures	195 (45.9)
Internet/social media	110 (25.9)
Friends/peers	55 (12.9)
Health campaigns/workshops	40 (9.4)
Family members	25 (5.9)

Table 4. Predictors of Good Knowledge and Acceptability of Cervical Cancer Screening (Logistic Regression)

Predictor	AOR	95% CI	p-value
Good Knowledge			
Female gender	1.85	1.20–2.85	0.005*
Clinical years vs. Pre-clinical	2.30	1.45–3.66	<0.001*
Family history of cancer	1.75	1.05–2.90	0.031*
Institution type	0.92	0.60–1.40	0.710
Age ≥22 years	1.45	0.95–2.20	0.082
Acceptability			
Female gender	2.10	1.35–3.25	0.001*
Good knowledge	2.85	1.80–4.55	<0.001*
Clinical years vs. Pre-clinical	1.50	0.95–2.35	0.075
Cost perceived as barrier	0.60	0.40–0.95	0.028*
Curriculum as source	1.65	1.05–2.60	0.030*

Discussion

This study explored awareness and acceptability of cervical cancer screening and HPV vaccination among medical students in Karachi. The results show that the general awareness of cervical cancer was comparatively high, but the specific knowledge about screening recommendations and preventive vaccination was lacking. Moreover, despite the fact that the majority of students recognized the significance of cervical cancer prevention, there was only moderate willingness to receive or order screening and vaccination, with cost and cultural issues having a major impact.

About 75 per cent of the students had heard about cervical cancer but only 42 per cent were aware of Pap smear as a screening tool and only less than half were aware of HPV vaccination as a preventive measure. These results align with the prior research carried out in Pakistan and other LMICs, where the level of basic awareness is high, but the general knowledge of screening guidelines is low.[5,6,9] Similar trends were reported in a systematic review carried out in Pakistan, where less than one-third of medical students showed an excellent understanding of HPV and cervical cancer prevention.[5] Our results were also similar with the findings from an India study, where fewer than 30% of medical students were aware of recommended screening intervals.[8]

The regression analysis further highlighted that female students and those in clinical years were significantly more likely to have good knowledge. Similar differences have been reported by gender and training factors in South Asia and sub-Saharan Africa, with female students always being more aware, potentially because of personal relevance and increased exposure during gynecology rotations.[9,10] Knowledge was also found to be predicted by family history of cancer, highlighting the importance of personal background in the creation of awareness.

In this research, the rates of acceptability (62% willing to screen and 69% willing to vaccinate) are similar to those of other South Asian groups, but lower than the WHO recommendations.[1] In a study conducted in Islamabad, 65% of the female medical students were found willing to undergo cervical cancer screening in case it was made available.[12] Approximately 70 percent of students in Bangladesh showed interest in vaccination yet there was very low uptake because of lack of financial and cultural access.[13] These trends indicate the discrepancy in the positive attitudes and the actual preventive practices.

Cultural sensitivities and cost were some of the significant issues in the study. Cost was cited by nearly two-thirds of students as a major barrier, and corresponds with other countries such as Malaysia, Saudi Arabia and Pakistan, where high vaccine cost is a barrier to uptake without national immunization initiatives [7,11,14]. Almost half of respondents also identified cultural or religious standards as obstacles, which represents the socio-cultural taboos of reproductive health in conservative societies. These

barriers do not only prevent individual acceptability but also the ability of students to counsel future patients with confidence.

Multivariate analysis showed that knowledge was a significant predictor of acceptability, indicating that a higher awareness level may directly translate into a higher level of preventive practices. This is confirmed by research in Nigeria and India, where more knowledge was associated with intention to vaccinate or screen.[8,10] Female students also showed a higher tendency to show willingness to undergo screening, which aligns with the world literature that women consider prevention of cervical cancer more personally relevant.[9] On the other hand, cost perceptions minimized acceptability, which highlights the importance of subsidized vaccination programs. Positively, students who referred to the medical curriculum as a source of information showed a higher acceptance of screening, which lends credibility to curricular interventions.

Our results highlight the necessity to reinforce medical education in Pakistan with the incorporation of preventive oncology, HPV vaccination, and cervical cancer screening guidelines into the academic program. Past research in Karachi and Lahore has indicated that curricular reforms, workshops and awareness campaigns can greatly enhance the preparedness of students to apply preventive practices.[6,15,16] Since almost half of the students in this research used formal lectures as their primary source of information, the enhancement of curriculum content is a viable and sustainable approach.

Financial and structural barriers identified at the policy level can be overcome through subsidizing HPV vaccination and organizing screening programs. Other initiatives, such as those in India and Rwanda, have shown a considerable increase in uptake with the assistance of government-funded vaccination campaigns [17,18]. Further, medical education may be supported by public health campaigns aimed at breaking cultural taboos and stigma, as it would remove the stigma surrounding reproductive health.

Strengths and Limitations

This study has several strengths such as the large sample size, varied representation of public and private medical colleges and strong analysis of the statistics. Using both dimensions of awareness and acceptability, the study offers an integrated picture of the readiness of medical students to deal with cervical cancer. There are certain limitations though. First, the cross-sectional design does not allow causal inference of knowledge and acceptability. Second, use of self-reported responses might have created a social desirability bias that could have inflated the amount of awareness or willingness. Lastly, the research was restricted to Karachi and could not necessarily be applicable to other parts of Pakistan with regard to medical students.

Conclusion

This research identifies important knowledge gaps and moderate acceptability of cervical cancer prevention in medical students in Karachi. Higher levels of knowledge and acceptability were linked to female gender, training in the clinical, and exposure to the curriculum, and the cost and cultural barrier impeded uptake. These results highlight the significance of the curricular changes, subsidies on vaccination, and awareness programs that are culturally sensitive to equip future medical practitioners to assume an active role in preventing cervical cancer in Pakistan.

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