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Original Article

Effect of Health Education on Knowledge and Perceptions Regarding Cervical Cancer Screening and Prevention among Female Students of a Medical College in Rawalpindi, Pakistan: Pre and Post Analysis

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ABSTRACT

Objective: To evaluate and compare the knowledge and attitude of future female health care providers regarding pap smear screening for cervical cancer at a medical and dental institution in Pakistan. The quality of knowledge of the students was analysed to measure the efficacy of awareness intervention sessions of the students. This was aimed to highlight their role in public awareness and identify the deficit thereof in their training towards practicing preventive community medicine.

Study Design: This was a pre and post analysis comparative study.

Place and Duration of Study: Conducted at Army Medical College Rawalpindi Pakistan, over an 8-months period from Nov 2019 to Jun 2020.

Methodology: A total of 754 responses, pre intervention -401- and one-month later post intervention-353 were collected through a validated questionnaire by convenience sampling. Changes in the knowledge and attitude of students using an independent sample t test were determined one month after 20-minute educational intervention detailing cervical cancer and its screening. Association between course and year of study on the knowledge and attitude scores was determined by comparing means using ANOVA tables.

Results: Comparison of pre and post intervention scores revealed a statistically significant difference in knowledge ($p< 0.001$) and attitude ($p=0.002$) with a change in mean knowledge scores from 46.31±15.93 to 74.03±15.71 and mean attitude scores from 45.84±14.37 to 48.86±12.54 after the intervention. MBBS students showed a statistically significant improvement in attitude ($p<0.001$) than their BDS counterparts ($p=0.535$).

Conclusion: Pre-intervention knowledge and attitude was inadequate. The intervention was successful with a significant increase in scores. Emphasis should be on implementing national HPV vaccination and cervical screening awareness campaigns.

Keywords: Attitude, Early detection of cancer, Female, Health education, Health personnel, Knowledge, Papanicolaou test, Papillomavirus infection, Students, Uterine cervical neoplasms.

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INTRODUCTION

Carcinoma of the cervix is a cancer affecting women of reproductive age worldwide. Cervical cancer incidence is on the rise in developing countries making them more susceptible to the serious repercussions of this disease. The 2018 WHO fact sheet found it to be the fourth most common cancer in women in the world affecting 570,000 women that year resulting in 7.5% of all female cancer deaths. Of the annual 311000 deaths, 85% were of females from underdeveloped regions.[1]

The most common cause of cervical cancer, attributing to approximately 99% of cases is infection of Human Papillomavirus (HPV).[2] Non-HPV related causes of cervical cancer also exist such as oral contraceptive pills, malignancy, hormonal therapy & trauma.

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Due to the infectious nature of most cases the disease is considered easily preventable by bivalent and tetravalent vaccines available against HPV. Vaccination of girls and boys before sexual activity is pivotal to disease prevention and control. However, the vaccine is only for prevention not for cure. Thus, screening for cervical cancer is crucial. Screening methods include HPV DNA testing, biopsy, Visual Inspection with Acetic Acid (VIA), and the Papinocolaou (Pap) smear. Pap smear is the more commonly used screening method in most countries so this method will be discussed in this study.[3,4]

Due to the availability of vaccinations and screening programmes the high-income countries have had a better control over the incidence and mortality of cervical cancer. A study on the incidence of cervical cancer reported that high income countries had rates two to four times lower than low income countries.

Based on human development index (HDI), the countries with the highest HDI had the lowest age standardized incidence rate (ASIR) of 9.6 per 100,000 women while the countries with the lowest HDI had an ASIR of 26.7 per 100,000.[5] The lower rates of this carcinoma in high HDI countries is due to successful cytological screening (Pap smear).[6-8]

Developing countries have not fared well either. A 2019 study reported that even though cervical cancer is the fourth most common cancer affecting women worldwide, it is the second most common for women in the developing world.[9] The lack of effective preventative programmes has thwarted progress. South-East Asia has the second highest incidence with an ASIR of 17.2 per 100,000 women.[5]

For Pakistan, the ASIR as per 2018 estimates is 7.3 per 100,000,[10] however since quality data overtime is scant no observable trends are available.[11] A study declared this as the fifth most common cancer from 1977-88, but another reported it be the ninth most common by 1992-2001.[12] A 2017 study from Lahore reported the prevalence of cervical cancer to have risen in Pakistan stating that almost 20 women are diagnosed with cervical cancer daily and thus leading to increased mortality.[11]

The probable rise and the severe absence of quality data impress upon the need for further research and increase in awareness of the Pakistani population. The situation of cervical cancer is generally unknown in the common public. Of the few studies that have been done on cervical cancer screening awareness in Pakistan most have shown similar results. A study at a tertiary care hospital of females visiting the OB/GYN physician only 2.5% (27/1070) had heard of a pap smear only 2% had undergone the procedure and 2.2% knew about the symptoms.[13] Another study conducted on university students in Karachi in 2018 reported that 74.5% knew about the procedure but only 1.6% had undergone it.[14] These data show that it is imperative that our health care workers current and future know about the interventional methods, recommend them and educate the general populace visiting them. Extremely limited data exists that analyses the role of health care professionals. A cross sectional study conducted in June 2009 across three major tertiary care hospital in Karachi assessed the knowledge of interns and nurses revealing that only 26% knew of the risk factors, 9.25% knew of the HPV vaccine and only 37% recognized Pap smear as a screening test.[15]

These results highlight the need to improve the knowledge and attitudes of medical, dental and nursing students because these future health care workers (HCWs) will be the source of awareness and tools for implementation of cervical cancer control and prevention programmes. This study aims to educate these students through an interventional discussion and assess their knowledge uptake and attitude. The findings of this study will enable establishment of better policy making and interventions for HCWs and later for the masses regarding the imminent public health concern of cervical cancer.

METHODOLOGY

This was a pre and post analysis comparative study conducted on female medical and dental students with a gap of 1 month between pre and post intervention.

This study took place at Army Medical College, Rawalpindi Pakistan. The institute provides degrees of Bachelor of Medicine Bachelor of Surgery (MBBS) and Bachelor of Dental Sciences (BDS) of 5 year and 4-year duration, respectively. The study lasted 8 months, it was started in November 2019 and ended in June 2020.

Convenience sampling was utilised. The natural groups of students according to year and course of study were approached.

A total of 754 pre and post intervention responses were recorded. 401 pre intervention forms and 353 post intervention forms were collected, and their data entered. The total female population from 1st to 4th year of the institute was 495, and the required sample size for a 99% confidence level was calculated to be 285 using the Rao soft calculator.[16] Both pre and post intervention forms exceeded this requirement.

The students were approached again after one month, asked to fill the same questionnaire. The natural division of groups allowed easy follow up of the groups during their classes together. Individuals who failed to return the post intervention forms were identified by comparing forms and traced and tracked using their unique university roll numbers, names, and class schedules. Forms that lacked these details and could not be followed were input as missing data.

Inclusion Criteria: The study group constituted registered female students from 8 classes i.e 1st year MBBS, 1st year BDS, 2nd year MBBS, 2nd year BDS, 3rd year MBBS, 3rd year BDS, 4th year MBBS and 4th year BDS. All participants present upon the days of intervention sessions were included. Upon follow up only those students who had previously filled the forms were included.

Exclusion Criteria: All participants absent upon the days of intervention sessions were excluded.

Questions were adapted from previously validated questionnaires which were self-administered amongst the students who filled it independently both times. The questionnaire was divided into 2-sections: knowledge and attitude. Responses of both sections were recorded on a 4-point Likert scale; from 1-being strongly agree to 4-being strongly disagree, which was transformed to 0 to 100 score. Two multiple choice questions and 3-checklists were also part of the knowledge section. Participants were grouped based on their year and course in a lecture hall and requested to fill the questionnaire. For standardization purposes, every class was given a slide show presentation along with a video which included pertinent topics such as incidence, risk factors, prevention and screening of cervical cancer. Authenticated content was derived from WHO, CDC, and NHS guidelines. The same participants were requested to regather 1-month after the intervention. Data was input an SPSS version 23.0 data set and analysed. Mean and standard deviation of knowledge and attitude domain was calculated and was subjected to an independent sample t test to identify if there was any significant difference between different independent variables. This was done to determine the effectiveness of the intervention in changing knowledge and attitudes toward cervical cancer screening. Then a student t-test was also used to determine any association between mean knowledge and mean attitude score both pre and post intervention. Other associations between change in knowledge and attitudes and course of study and year of study were determined by comparing means.

RESULTS

There were 401(53.18%) participants in the pre-intervention group from which 278(69.33%) belonged to MBBS and 123(30.67%) to BDS. The post intervention group had 353(46.82%) participants, from which 244(69.12%) were from MBBS and 107(30.31%) from BDS, 2 forms were missing course details.

Majority of students, 64.8%, were less than or equal to 20 years of age. The mean age of the participants was 19.92±1.44. The youngest subjects were aged 17 years and the oldest were 24 years.

As elaborated by Table-I, there was a statistically significant increase in the knowledge after the intervention, with a *p*-value <0.001. The attitude scores also showed an improvement with a statistically significant *p*-value <0.05.

Table-I: Overall impact of intervention session on students' Knowledge and Attitude regarding Pap smear.

Dependent Variable	(n)	(%)	Mean Scores with SD	*p*-value
Knowledge Domain				
Pre intervention	401	53.18	46.31±15.93	<0.001
Post intervention	353	46.82	74.03±15.71	
Attitude Domain				
Pre intervention	401	53.18	45.84±14.37	<0.01
Post intervention	353	46.82	48.86±12.54	

Both MBBS and BDS courses showed a statistically significant improvement in their respective knowledge score with *p*-value<0.001 as shown by Table-II. It can be deduced from the results mentioned that MBBS students showed a greater overall knowledge score post intervention, 76.31%, as compared to BDS which showed 68.84% score. Fourth year students showed statistically the greatest increase in knowledge score with a significant *p*-value< 0.001, while second year had the lowest increase.

Table-II: Overall Impact of intervention session on students' knowledge regarding Pap smear

Knowledge Domain				
Independent Variable	**(n)**	**(%)**	**Mean Scores with SD**	***p*-value**
MBBS				
Pre intervention	278	69.33	46.58 ±14.34	<0.001
Post intervention	244	69.12	76.31 ±14.82	
BDS				
Pre intervention	123	30.67	45.69 ±19.10	< .001
Post intervention	107	30.31	68.84 ±16.62	
First Year				
Pre intervention	124	30.92	39.91 ± 19.56	< .001
Post intervention	106	30.02	68.20±17.39	
Second Year				
Pre intervention	89	22.19	46.49±14.22	< .001
Post intervention	63	17.85	69.26±12.94	
Third Year				
Pre intervention	95	23.69	51.33±12.14	< .001
Post intervention	85	24.08	74.84±15.57	
Fourth Year				
Pre intervention	92	22.94	49.19±12.14	< .001
Post intervention	92	26.06	83.09±11.00	

The best answered question from the form was "Vaccine for HPV is present?" with a pre intervention score of 39.14±34.29 and an improved post intervention score of 74.93±30.54.

Table-III shows that MBBS students had a statistically significant improvement in attitude with a *p*-value <0.001. BDS on the other hand did not show significant attitude change with a *p*-value of 0.535. First, second and fourth year showed significant

increase in attitude with *p*-value of <0.05. Amongst the four classes second year had the most increase from 42.68±14.89 to 47.43±13.63 with a statistically significant *p*-value<0.05. Third year showed no improvement in attitude after the intervention.

Table-III: Overall Impact of intervention session on students' Attitude regarding Pap Smear

Attitude Domain				
Independent Variable	**(n)**	**(%)**	**Mean Scores with SD**	***p*-value**
MBBS				
Pre intervention	278	69.33	44.72±12.61	< 0.001
Post intervention	244	69.12	48.59±12.91	
BDS				
Pre intervention	123	30.67	48.39±17.52	0.535
Post intervention	107	30.31	49.63±11.70	
First Year				
Pre intervention	124	30.92	44.00±16.24	0.028
Post intervention	106	30.02	48.49±14.15	
Second Year				
Pre intervention	89	22.19	42.68±14.89	0.047
Post intervention	63	17.85	47.43±13.63	
Third Year				
Pre intervention	95	23.69	51.58±10.53	0.303
Post intervention	85	24.08	49.86±11.73	
Fourth Year				
Pre intervention	92	22.94	45.22±12.95	0.026
Post intervention	92	26.06	49.15±10.79	

DISCUSSION

Cervical cancer is ranked as the 7th most deadly cancer in Pakistan yet, its early detection through pap-smear is still a very under-discussed topic in Pakistan. The mean awareness level before intervention of 46.31% and mean attitude of 45.84% is quite alarming because the participants under discussion are female medical students aging from 17-24 years. As medical students they did have higher knowledge than the general public as seen in this study conducted among housewives in India showing only 38% had heard about pap-smear.[17] However, lack of knowledge in this age group is also shown by a research conducted among Swedish women showing that older women aged 40-59 years had a superior level of knowledge as compared to younger women aged 20-39years,[18] and another which showed that women below 22 were less likely to get themselves vaccinated against HPV as compared to women above 22.[19]

The total knowledge score for MBBS students' pre-intervention was slightly better than that of BDS students with scores 46.58% and 45.69% respectively. This is relatively better than another study conducted among Nigerian students which showed that only 35.8% of MBBS and 9.3% of BDS students had 'good' knowledge regarding HPV.[20] There was a significant change in the attitude after the intervention of MBBS students but not for BDS students. This shows that MBBS students are more aware of the necessity of pap-smear for diagnosing cervical cancer as they must have been exposed to the topic during their gynae/obstetric clinical rotations.

These results, showing a general lack of knowledge and attitude, are in accordance with other studies conducted in Karachi,[14] and Lahore.[21] This not only goes for Pakistan, but also for other South-Asian countries as shown by this research conducted in UAE,[22] India,[23] and amongst South-Asian women in Canada.[24] A study conducted among Turkish Muslim women showed that most women agreed to "talking about sex" as a taboo hindering pap-smear discussion.[25] The people in this region have certain cultural restrictions superimposed with religious taboos related to cervical smearing, all of which have their roots in lack of proper formal education. As this topic concerns females it is pertinent that this group be educated first and foremost however, we cannot rule out the importance of educating males as well because HPV can be transmitted sexually and also because the male population plays an important role in educating their families in a typical Pakistani household.

First year and second year had the lowest level of knowledge and attitude before our intervention. This is because the college supports a mid-modular and annual system of education which, unlike the modular system, does not inculcate all the core subjects in the study of systems, and they are also not exposed to clinical wards till third year. However, after intervention the scores for knowledge increased in students of all classes with fourth year having the highest and first year the least scores. This trend is also seen in another study conducted among medical and dental students in Nigeria,[20] and another among nursing students in Turkey. The mean scores for attitude also significantly increased in all but 3rd year students. This necessitates that help from proper professionals including gynecologists and nursing staff is required to change the differing viewpoints that the students might have.

One of the focal points of our study was on the relationship of HPV with cervical cancer. When risk factors were evaluated it was found that only 67% of students recognized multiple partners, 68% recognized STDs and 65.5% recognized high risk male partners as

a risk factor for cervical cancer. Another study done in Karachi had even lower scores which showed that only 21.8% women mentioned unsafe sexual practices as a risk factor for cervical cancer. This shows that in Pakistan there is little awareness regarding the transmission of HPV due to the lack of vaccination coverage. Another study shows that a survey done by WHO shows that there is no quality assurance and monitoring of cervical screening and that screening coverage is only 1% in rural and 3.4% in urban areas.[10] Therefore, in addition to spreading awareness there is a dire need for increased availability of cervical screening and national HPV vaccination plans especially in the rural areas. These centres should be within the reach of rural populations, supplied with well trained staff and monitored regularly.

Our study showed that "media" served as a major source of knowledge (44.8%) for cervical cancer and pap-smear as compared to "gynaecologist", "nurses" and "general practitioners" combined (27.2%). Lack of participation of healthcare workers in spreading awareness is further shown by a research done in tertiary hospitals in Karachi which shows that only 37% of the nursing staff was aware that pap-smear was a diagnostic test for cervical cancer.[15] Our interventional study showed that it was possible to raise the knowledge and attitude of female students through a simple video and presentation. This form of intervention is also supported by a study which concludes that "educational talk" was able to positively change the viewpoints of the female population. However, their results proved to be even more positive with "reminder texts". This needs to be taken under consideration in any future studies or implementations of spreading pap-smear awareness.

CONCLUSION

The participants lack proper knowledge and attitude regarding cervical cancer and pap-smear. Our results show that the mean knowledge increased from 46.31% to 74.03% through our intervention. While attitude increased from 45.84% to 48.86% only. This shows that if the topic is tackled one on one it will become easier for women to understand and accept the necessity of pap-smear in early diagnosis of cervical cancer. However, more rigorous methods of mass health education will be required to challenge the current religious and social barriers and help in improving the attitude of not only women but men as well towards cervical cancer diagnosis.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

AZ:, RR:, SA: Literature review, Mamuscript writing & Editing, Statistical analysis & approval for the final version to be published.

SFM: Supervision, Proof reading, Publishing, Literature review, manuscript writing, editing, Statistical analysis & approval for the final version to be published.

IS:, MS: Editing, Proof reading, data analysis, Supervision & approval for the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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