

ROLE OF HEALTHCARE PROVIDERS IN PATIENT EDUCATION ON HPV INFECTION AND CERVICAL CANCER PREVENTION - A CROSS-SECTIONAL STUDY IN PUBLIC & PRIVATE HEALTH CENTERS OF DELHI-NCR, INDIA

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Abstract: Cervical cancer is the most frequent cancer among Indian women that is associated with sexually transmitted Human Papilloma Virus (HPV) infection. Unlike many other cancers, cervical cancer strikes at the most productive period of a woman's life. In a developing country like India, lack of early detection and treatment facilities is the main cause of the burden of this debilitating disease. This study presents the opinion of Women Healthcare Providers, having different professional profiles and training, about patient education on HPV infection, cervical cancer screening and importance of timely treatment in hospitals and Primary Health Centers (PHCs) of Delhi-NCR region. Data were collected from 312 healthcare facilities including public and private hospitals and PHCs of all nine districts from Delhi-NCR region. Overall 590 respondents including Gynecologists, Medical Officers, Women Health care Providers and Paramedical Staff were included in this survey. This study clearly shows that the basic facilities for the detection and treatment of cervical cancer are abhorrently lacking in Public hospitals and PHCs as compared to the Private hospitals in Delhi-NCR region. It demonstrates that there is an urgent need for providing periodic educational interventions for all healthcare professionals, particularly paramedical staff, working in PHCs and Govt. health centres in rural areas of Delhi-NCR region. Improvement in health education targeting healthcare providers will enhance dissemination of timely information to the patients about routine preventive cancer screening for decreasing the burden of cervical cancer in India.

Key Words: HPV, Cervical Cancer, Women health

INTRODUCTION

India has a population of 432 million women aged 15 years and older who are at risk of developing cervical cancer. It is the leading cancer among Indian women between 15 and 44 years of age and the second most common cancer in women worldwide (Bruni et al, 2014; Asthana & Labani, 2013). Of the nearly 528,000 new cases that occur annually, 83% are in the developing world, as are 85% of the 266,000 deaths associated with cervical cancer (Ferlay et al, 2013). Cervical cancer is preventable and curable if detected at an early stage (WHO, 2006). Despite the tremendous progress over the last ten years in prevention, diagnosis and treatment, cervical neoplasias are still on the rise in developing countries.

India has a disproportionately high burden of cervical cancer and contributes to 25.4% and 26.5% of the global burden of cervical cancer cases and mortality respectively (Seema Farhath et al, 2013) as there is an estimated 132,000 new cases and about 80,000 deaths each year. The prevalence and burden of cervical cancer is much higher among women of low socio-economic status and the rural women in India (Vallikad, 2006; Kurkue, and Yeole, 2006). The primary reasons for the high prevalence are attributed to lack of awareness of the risk factors of cervical cancer and lack of access to screening and healthcare facilities. Moreover, most cases are diagnosed at advanced stages when treatment is costly and cure rate is low. By 2025, the numbers of new

cervical cancer cases and deaths in India are estimated to increase to 226,084 and 115,171, respectively [WHO/ICO Information Centre on HPV and Cervical Cancer (a)]. These statistics are dismaying for the simple reason that cancer cervix is treatable and preventable disease if detected at an early stage. Therefore, the present investigation has focused to explore the opinion of women's healthcare providers, having different professional profiles and training, about patient education on HPV infection, cervical cancer screening and importance of timely treatment. The findings of this study could, therefore, act as useful input for ascertaining the needed resources to develop suitable cervical cancer control strategies.

Healthcare providers generally support patient education about HPV and do not think that such information will discourage women from having Pap tests. Informing women that HPV is a main cause of cervical cancer can cause confusion, anxiety, and conflict in partner relationships. Through this research survey, recommendation of healthcare providers on HPV vaccination and cervical cancer prevention was promoted with a view that they would handle issues of patient education about HPV with clarity and sensitivity in the clinical setting.

Some studies investigated role of the primary health care workers, nurses and midwives in the cervical cancer

prevention programme (Coskun et al 2013). A recent study from India, reported by Thippeveeranna *et al*, 2013, has shown that 88.8% of staff nurses had knowledge about Pap test and 91.5% showed positive attitude towards performing the Pap test. The most common reasons for avoiding the screening were lack of any symptoms (58.4%) and lack of counseling (42.8%). Pap smear is the conventional screening test for detection of pre-malignant lesions of cervical cancer in India but the coverage of this test is quite low in Indian population. Studies have shown that it is possible to train nurses for primary screening of cervical cancer.

Various similar KAP studies have been reported from other countries like Mexico, Thailand, Pakistan etc. Ljiljana Gojko Antic et al (2014) examined differences in the level of knowledge among healthcare students, midwives and women in the general population of Serbia. In comparison with the students and midwives, women had lower level of knowledge of causative agents of cervical cancer, genital warts, HPV types, screening for cervical cancer as well as about the target population for vaccine and its role. Difference in the numbers of right answers of respondents were statistically significant ($p < 0.001$). Four or more correct answers were obtained from 22.7% women, 35.3% from midwives and 83.8% from students.

Songthap *et al* (2009) reported a cross-sectional survey based study to evaluate acceptability, knowledge, and attitude regarding HPV, cervical cancer, and HPV vaccine among healthcare providers working in hospitals located in Bangkok, Thailand. Two hundred nurses and 100 doctors from three government hospitals and one private hospital were recruited. Approximately 36% of nurses and 55.5% of doctors were aware of the HPV subtypes. More than 90% of doctors knew the most important cause of cervical cancer, whereas 77.8% of nurses did. Another study reported by Esposito *et al* (2007), similar to our work, comprised 160 respondents who were all hospital nurses. It showed that nurses who worked at private hospitals were more aware about cervical cancer and its etiology than those who worked in public hospitals, which is why they were probably more ready to provide information to clients than those in the public sectors.

Another study reported by Al-Naggar *et al*, 2010 from Malaysia, on young women reflects the attitude of healthcare providers towards the Pap smear test, as 61% of them reported no encouragement or information from healthcare providers. A similar finding was reported among Women Healthcare Professionals working in hospitals where facilities for Pap test were available, as they showed a negative attitude towards having a Pap test (Olaniyan *et al.*, 2000; Ayinde *et al.*, 2004). Similarly, Udigwe (2000) has reported low levels (5.7%) of practicing Pap smear test amongst Women Healthcare Professionals. Aniebue & Aniebue (2010) have also reported that the practice of cervical cancer screening was very low (5.2%) among healthcare providers.

MATERIALS AND METHODS:

The present cross-sectional study is based on one-year project sponsored by ICMR that was conducted in Hospitals and PHCs of the State of Delhi-NCR region. It comprised a KAP survey which included the assessment of healthcare providers' role in patient education on HPV infection, cervical cancer screening and importance of timely treatment.

This study was carried out in Delhi-NCR region of India, between August, 2012 to April, 2013. For each question to the Healthcare Providers, data were collected from Public hospitals, Private Hospitals and Primary Health Centre (PHC) selected by statistically sampling. Data were collected from 312 healthcare facilities (232 hospitals and 80 PHCs) of all nine districts from Delhi-NCR region. The State of Delhi was divided into five geographic regions North, South, East, West and Central. The regions covered under NCR comprised Faridabad, Gurgaon, Ghaziabad, Gautam Budh Nagar. Healthcare providers including Gynecologists, Medical Officers, Women Healthcare providers and Paramedical Staff were interviewed, using a questionnaire, about patient education on HPV infection, cervical cancer screening and importance of timely treatment.

Sampling of service providers (Women Healthcare professionals, Gynecologists, and Oncologists) at Hospitals and (Medical Officers and Paramedical Staff) at PHCs:

As per IPHS, the total number of Medical Officers and Paramedical Staff range from 2 to 5 in PHCs. As this is a small sample, all service providers present at the time of survey were interviewed. The information on the total number of service providers in each hospital sampled was not available. Therefore, *convenient sampling* was used for interviewing service providers relevant for project purpose. Overall **590 respondents** were included in this survey having different socio-demographic profiles as shown in *Table 1*.

Table 1: SOCIO-PROFESSIONAL PROFILE OF HEALTHCARE PROVIDERS

Type of Physician	Sector of Practice	Age
Gynecologists: 275 Women Healthcare Professionals: 32 Medical Officers: 88 Others : 3	Government Sector: 294 Private Sector: 296	Under 40: 383 40-49: 141 50 and older: 66
Paramedical Staff	Gender	Area
ASHA: 2 ANM: 61 Staff Nurse: 119 Any other: 10	Male: 64 Female: 526	Urban: 429 Rural: 161

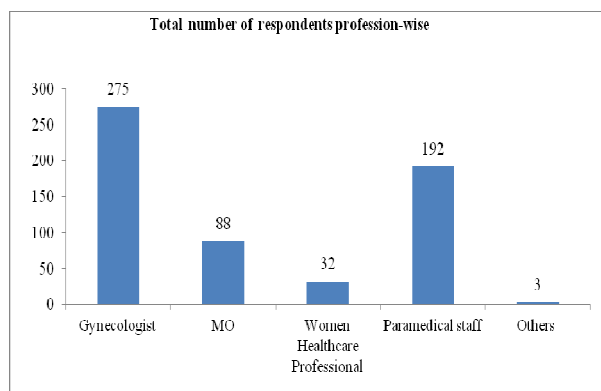


Figure 1: Profession-wise distribution of respondents

The majority of respondents were Gynecologists (275 out of 590) followed by Paramedical staff comprising ASHAs, ANMs and staff nurses (192 out of 590) and Medical Officers (88 out of 590). Women healthcare professionals (32 out of 590), comprising scientists, Asst. Medical Officers, MBBS-DGO and Asst. Professors, were also included in the survey (Figure 1).

Out of nine districts from Delhi-NCR, maximum (18%) participants were from West Delhi and minimum (3.4%) from Central Delhi (Figure 2).

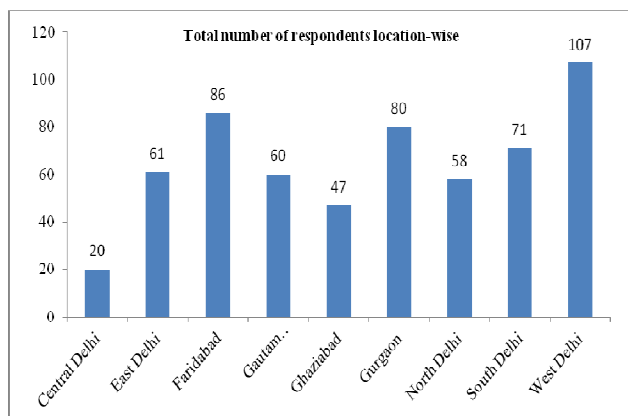


Figure 2: Location-wise distribution of respondents from Delhi-NCR region

As shown in Figure 3, almost equal number of respondents was included from both Private and Govt. sectors i.e. 296 and 294 respectively.

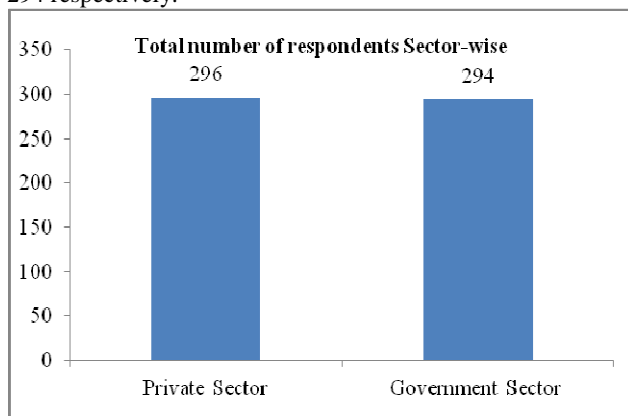


Figure 3: Sector-wise distribution of respondents from Delhi-NCR region

Statistical Analysis:

Statistical sampling of PHCs and Hospitals was done, using the formula applicable for survey research with normal approximation to hyper geometric. Sampling was done by using

$$\text{Formula } n = Nz^2pq / (E^2(N-1) + z^2pq)$$

n=Sample size of PHCs/ Hospitals to be covered

N =Total no. of PHCs / Hospitals on sample frame

z=confidence level (1.96 at confidence interval of 95%)
 =1.96E (+-error) =Standard error or sampling error (i.e. coefficient of variance or relative error*population estimate (p))
 =0.06*0.8=0.048 (Standard margin of error for surveys ranges from 5% to10% and maximum at 20%)p= is the

anticipated proportion of facilities with the attribute of interest (80 percent =0.8)q=1-p... (1-0.8=0.2)

It is anticipated that each of the key estimates of the survey of small number of facilities will be in the range of about 50 to 100 percent. In that case, the largest sample size needed is when the percent with the given attribute is 80, and this is the sample size that should be used. Thus p=0.8. For precision requirements, relative error (coefficient of variation) of 6% is taken. The sample size thus calculated at 95 percent level of confidence using above formula is 71 PHCs and 232 hospitals.

The overall percentage of government hospitals was less (12.8%; 48 govt. hospitals) in comparison to private hospitals (i.e.87.2 %; 327 private hospitals) and unevenly distributed over different geographic areas of the State of Delhi and NCR region. As per judgmental sampling, all government hospitals were to be included from each stratum and the remaining would be private hospitals, matching with the number of hospitals from each stratum which is calculated by PPS sampling. All the data were analyzed by using SPSS 17 software.

Results: A total of 590 healthcare providers from Delhi-NCR region were surveyed during the course of this one-year project and the role of healthcare providers on patient education for cervical cancer screening and importance of timely treatment were assessed.

From results shown in Figure 4, only 47% respondents out of 590 recommended young ladies to get vaccinated against HPV. The remaining 53% respondents either did not recommend HPV vaccination or did not know anything about it and, therefore, were not contributing to cervical cancer prevention through HPV vaccination.

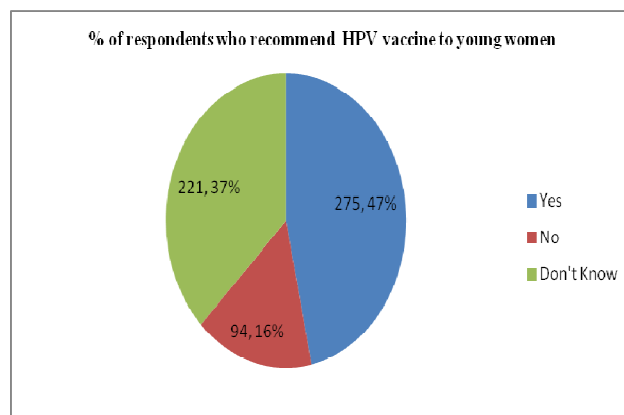


Figure 4: Frequency & distribution (%) of respondents who recommended HPV vaccination for young ladies

It was observed that 76% of Gynecologists were recommending young ladies to get vaccinated against HPV, while in contrast only 4% of the Paramedical staff were advocating HPV vaccination among young women (Table 2). Sector-wise, 51% respondents from the Govt. sector and 65% respondents from the Private sector were recommending young women to protect themselves from HPV infection by getting vaccinated (Table 3).

Table 2: Profession-wise awareness among healthcare providers towards HPV vaccine recommendation for young ladies

	HPV vaccine recommendation for young ladies						
	TotalNo.	Yes		No		Don't know	
		Frequency	%	Frequency	%	Frequency	%
Gynecologists	275	211	76	46	17	18	6
Women Healthcare Professionals	32	21	65	5	16	6	19
Medical Officers	88	35	40	35	40	18	20
Paramedical Staff	192	7	4	13	6	172	90

Table 3 : Sector-wise awareness towards HPV vaccine recommendation for young ladies (n=590)

	Total No.	Yes		No		Don't know	
		Frequency	%	Frequency	%	Frequency	%
		Government	294	152	51.7	70	26.7
Private	296	192	64.8	27	9.12	73	24.6

It was observed that 70% respondents from Central Delhi recommended that all ladies should get vaccinated against the HPV, whereas only about 32% respondents from Faridabad and as well as North Delhi were found to recommend HPV vaccination (Table 4).

Table 4: Area-wise awareness towards HPV vaccine recommendation for young ladies (n=590)

	TotalNo.	yes		No		Don't know	
		Frequency	%	Frequency	%	Frequency	%
		Central Delhi	20	14	70	3	15
East Delhi	61	24	39.3	25	41.0	12	19.7
North Delhi	58	19	32.8	4	6.9	35	60.3
South Delhi	71	37	52.1	9	12.7	25	35.2
West Delhi	107	60	56.1	11	10.3	36	33.6
Faridabad	86	28	32.6	8	9.3	50	58.1
Gautam BudhNagar	60	26	43.3	1	1.7	33	55.0
Ghaziabad	47	25	53.2	10	21.3	12	25.5
Gurgaon	80	32	40.0	9	11.3	39	48.8

Out of all the five districts of Delhi, a maximum of 70% respondents were reported from Central Delhi who were recommending HPV vaccination for young ladies and minimum level of awareness (32.8%) was reported from North Delhi (Figure 5).

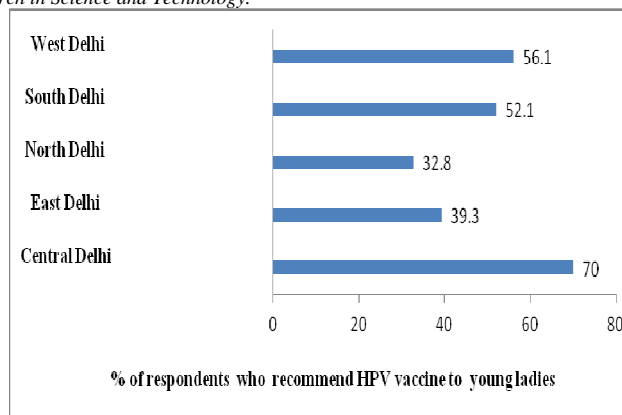


Figure 5: Recommendation (%) of HPV vaccines for young ladies by respondents from five districts of Delhi

Figure 6 represents the % of respondents, based on their number of years of experience, who advised HPV vaccination for young ladies. It was found that as the respondents' number of years of experience increases, a progressive increase in their number was observed who advised for HPV vaccination. A maximum of 70% respondents were reported from the group of more than 30 years of experience in comparison with 31% from the group that comprised respondents with lowest number of years of experience.

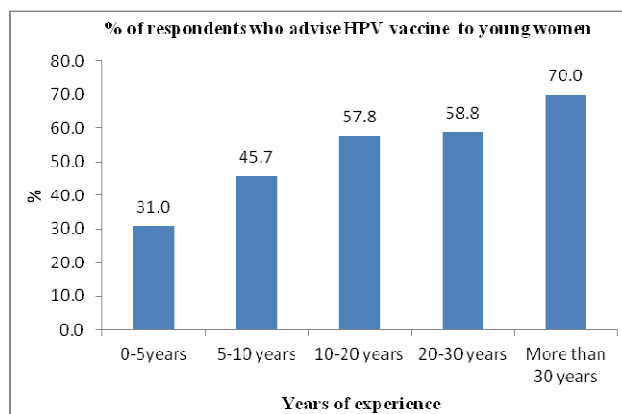


Figure 6; Correlation between respondents' number of years of experience and awareness (%) towards HPV vaccine recommendation for young ladies

Figure 7 represents the gender-wise % of respondents who advised HPV vaccination for young ladies. A significant difference was observed in % of male and female respondents. When respondents were distributed on the basis of their age, significant difference was observed between the less than 40 and other two groups (Figure 8).

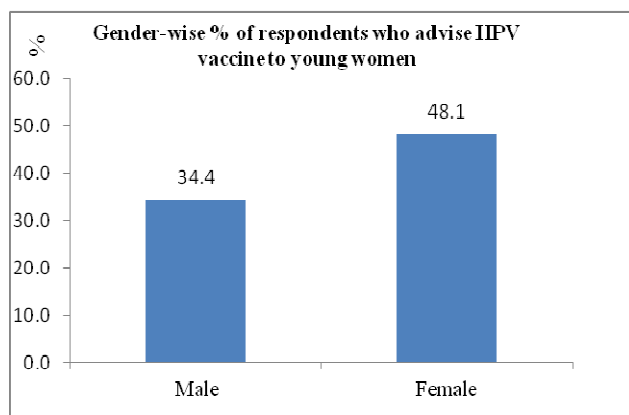


Figure 7: Gender-wise awareness (%) towards HPV vaccine recommendation for young ladies.

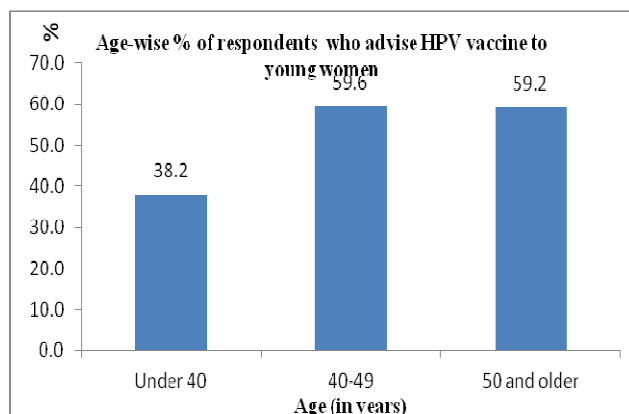


Figure 8: Age-wise awareness (%) towards HPV vaccine recommendation for young ladies

The doctor's attitude and behaviour was assessed towards the patients and cervical cancer prevention at large as shown in results summarized in Table 5. The assessments were scored in four categories: Poor, Average, Good and Excellent. It was observed that about 78% doctors' courteousness towards the patients was good/excellent. Further, 60.8% doctors had good ability to motivate their patients to get screened and get timely treatment done for cervical lesions while 5.7% did not motivate patients for it. About 77% doctors' utilization of IEC material developed by us, to disseminate knowledge about cervical cancer prevention & management, was assessed to be good/excellent. The ability of about 77% of doctors was found to be good/ excellent in motivating patients visiting their hospitals/PHCs to read the contents of posters on cervical cancer developed by us and distributed during the survey.

Table 5: Assessment of Doctors' Attitude & Behaviour Towards Attending Patients and Cervical Cancer Prevention (paramedical staff was not included)

		Poor	Average	Good	Excellent
Courteousness towards the patients	Frequency	10	73	254	60
	%	2.5	18.3	63.8	15
Doctors' ability to motivate patients to get early screening & timely treatment done for cervical lesions	Frequency	23	74	242	57
	%	5.7	18.5	60.8	14.3
Doctors' ability to utilize the IEC material developed by us and willingness to distribute it during the survey among the Paramedical staff to disseminate knowledge about cervical cancer prevention & management	Frequency	12	74	253	56
	%	3.0	18.5	63.6	14.1
Doctors' ability to motivate patients visiting the hospital/ PHC/ clinic to read the contents of posters on cervical cancer developed by us.	Frequency	11	76	252	55
	%	2.8	19.3	63.4	13.8

Out of 590 respondents, 261 were from the hospitals/PHCs where screening and treatment facilities for cervical cancer were found to be lacking, and they reported to have the referral policy for recommending the patients to get screened or treated in other hospitals (Figure 9). Out of these 261 respondents, 115 were from the Private sector (Figure 10).

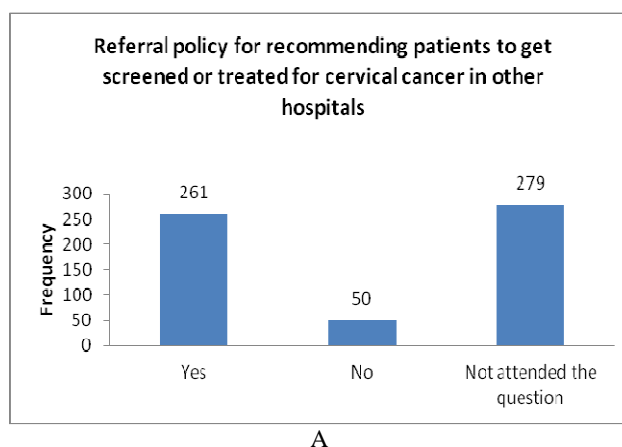


Figure 9: Frequency of respondents following referral policies for recommending patients to get screened or treated for cervical cancer in other hospitals (This question was attended by the healthcare providers from hospitals/PHCs where screening and treatment facility was lacking)

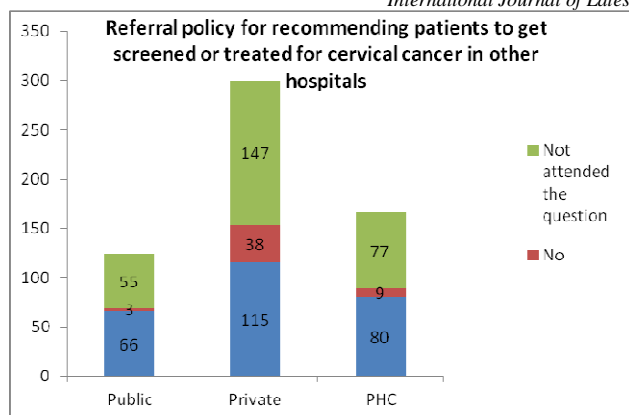


Figure 10: Sector-wise frequency of respondents following referral policies for recommending patients to get screened or treated for cervical cancer in other hospitals (This question was attended by the healthcare providers where screening and treatment facilities were lacking)

DISCUSSION:

Healthcare providers have the wherewithal to effectively change people's mind-set in favour of early diagnosis of cervical cancer, timely treatment and prevention of this disease through constant patient education initiatives. It is essential to examine socio-economic and demographic factors, as education and familiarity with the healthcare system are well associated with HPV knowledge and vaccine receptivity. Our findings show that only 47% respondents recommended young ladies to get vaccinated against HPV. As more than half of the total respondents did not recommend HPV vaccination or did not know anything about it, they were not contributing to cervical cancer prevention through HPV vaccination. Our study is the first report from India that has assessed the attitude of healthcare providers regarding the recommendation of HPV vaccine for young ladies. We also found that as the respondents' number of years of experience increases, a progressive increase in their number was observed who advised for HPV vaccination. Similar to our study, one study from US has shown that fewer family physicians and pediatricians recommended HPV vaccines for children aged 11–12 years than for older female subjects. It is reported that 89% of pediatricians in the US recommend HPV vaccines for girls aged 16–18 years, whilst only 46% recommend vaccines for younger girls (Daley *et al* 2006).

A significant difference was observed in the awareness levels of Gynecologists and Paramedical staff. The respondents from urban (91%) and rural (77%) areas showed a significant difference in their awareness levels about the causal relationship between HPV and cervical cancer. Lower levels of awareness among the Paramedical staff and healthcare providers working in rural areas highlights the importance of focusing educational efforts by way of conducting frequent IEC activities in PHCs and other health centres located in rural areas.

Moreover, there is severe lack of awareness about the importance of early detection of cervical cancer and HPV vaccination among healthcare providers of Govt. sector and

those working in rural areas of this region. This rural-urban divide is also evident in other low and middle income countries. But for India where the burden of this disease is very high, patient education for primary screening and HPV vaccination are pertinent which could be only possible if healthcare providers in particularly Govt. sector and those practicing in rural areas are well informed themselves about various aspects of cervical cancer prevention and management.

Healthcare providers at hospitals and PHCs include the Paramedical staff that constitutes the most visible, frontline personnel providing health education to patients and the general population. Since the Paramedical staff plays an integral role in educating women in the prevention of diseases, they influence cervical cancer screening adherence and health promotion among women. Moreover, it has been shown that recommendation of cervical cancer screening to individuals by medical professionals, including nurses, effectively improves screening coverage among the general population (Yoshino *et al.*, 2012).

Our study depicts the attitude and behavior of healthcare providers towards cervical cancer. Out of 590 respondents, 91% agreed that cervical cancer screening should become a part of regular health check-up for women. Also, 65% of healthcare providers recommended that women should continue pap testing after menopause, while 51% recommended that women should continue Pap testing even after hysterectomy. It came to light that 89.3% healthcare providers advised women coming to their hospitals/PHCs, with some gynecological problem, to maintain good sexual hygiene to prevent HPV infection.

The uniqueness of our study is that we have also assessed the doctor's attitude and behavior towards the patients and cervical cancer prevention at large. It was observed that about 78% doctors' courteousness towards the patients was good/excellent. Further, 60.8% doctors had good ability to motivate their patients to get screened and get timely treatment done for cervical lesions, while 5.7% did not motivate patients for it. About 77% doctors' utilization of IEC material developed by us, to disseminate knowledge about cervical cancer prevention & management, was assessed to be good/ excellent. The ability of about 77% of doctors was found to be good/ excellent in motivating patients visiting their hospitals/PHCs to read the contents of posters on cervical cancer developed by us and distributed during the survey.

Healthcare providers certainly influence women's screening behavior. It was found that the under-utilization of cervical cancer screening might be due, in part, to a lack of physicians' recommendation. There appears to be a need to improve patient health education by healthcare providers, as in many studies women have reported that they had never been informed of the existence and importance of Pap test by healthcare professionals. In a study by Wong *et al*, 2010 most respondents said they had never been approached for cervical cancer screening during their visits to healthcare professionals. Many respondents also said that they would agree to be screened if this was recommended by their healthcare provider. A woman undergoing gynecological

examination or seeking reproductive healthcare is more likely to receive a recommendation for a Pap test by her doctor. At the same time, healthcare providers such as General Practitioners and Gynecologists need to do their part in promoting cervical cancer screening. They should disseminate educational material that focuses on educating the women about cervical cancer risks, prevention and early detection to enhance uptake of screening practices.

In India, like in most developing countries, the Paramedical staff that includes nurses, ASHAs, ANMs etc., comprises the majority of healthcare personnel in health centres of rural areas. It is important that they are well educated regarding cervical cancer, as they have a prominent role to play in informing the general public and promoting preventive practices given their influence in society. Although knowledge of Pap test as a screening procedure for cervical cancer is high, its practice is still low. If we can improve the practice of Pap screening among women healthcare providers themselves, it would provide an impetus in bringing a positive change in their attitude and behavior towards effectively motivating the general population to join screening programs. Our findings warrant the need for providing periodic educational interventions for all healthcare professionals, particularly paramedical staff, working in PHCs and Govt. health centres in rural areas. Healthcare providers play a crucial role in effective dissemination of information to the patients about routine check-up, early detection, treatment and preventive measures which could certainly decrease the burden of cervical cancer in India.

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Ethical considerations: The study protocol was approved by the Research Ethics Committee of World Health Trust and was reviewed by the Project Review Committee of Indian Council of Medical Research, New Delhi. Prior approval was taken from all the competent medical authorities for conducting the survey.

REFERENCES:

1. Al-Naggar RA , Low WY, Zaleha Md Isa. 2010. Knowledge and Barriers Towards Cervical Cancer Screening Among Young Women in Malaysia. *Asian Pac J Cancer Prev*. 11: 867- 873.
2. Aniebue PN, Aniebue UU. 2010. Awareness and practice of cervical cancer screening among female undergraduate students in a Nigerian university. *J Cancer Educ*. 25: 106-108.
3. Asthana S & Satyanarayana L. 2013. Factors Associated with attitudes of rural women toward cervical cancer screening. *India Journal of community medicine*, **38** : 246-248.

4. Ayinde OA, Omigbodun AO, Ilesanmi AO. 2004. Awareness of cervical cancer, Papanicolaou's smear and its utilisation among female undergraduates in Ibadan. *Afr J Reprod Hlth*. 8: 68-80.
5. Bruni L, Barrionuevo-Rosas L, Serrano B, Brotons M, Cosano R, Muñoz J, Bosch FX, de Sanjosé S, Castellsagué X ICO HPV Information Centre on HPV and Cancer (HPV Information Centre). 2014. Human Papilloma virus and Related Diseases in India. Summary Report 03-17
6. Coskun S, Can H, Turan S. 2013. Knowledge about cervical cancer risk factors and pap smear testing behavior among female primary health care workers: a study from south Turkey. *Asian Pac J Cancer Prev*, 14, 6389-92.
7. Daley MF, Liddon N, Crane LA, Beaty BL, Barrow J, et al. 2006. A national survey of pediatrician knowledge and attitudes regarding human papillomavirus vaccination. 118: 2280-2289.
8. Esposito S, Bosis S, Pelucchi C, et al. 2007. Pediatrician knowledge and attitude regarding human papillomavirus disease and its prevention. *Vaccine* 25: 6437-46.
9. Ferlay J SI, Ervik M, Dikshit R, et al. 2013. GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013.
10. Kurkure AP and Yeole BB. 2006. Social inequalities in cancer with special reference to South Asian countries. *Asian Pac J Cancer Prev*, 7(1): 36-40.
11. Ljiljana Gojko Antic, Bosiljka Svetozar Djikanovic, Dragan Zivojin Antic, Hristos Georgios Aleksopoulos, Goran Zivojin Trajkovic. 2014. Differences in the Level of Knowledge on Cervical Cancer among Health Care Students, Midwives and Patients in Serbia. *Asian Pac J Cancer Prev*, 15, 3011-15
12. Olaniyan OB, Agboghroma OC, Ladipo OP. 2000. Knowledge and practice of cervical screening among female health workers in government hospitals in Abuja metropolis, Nigeria. *Trop J Obstet Gynaecol*, 17: 18-20.
13. Seema Farhath, PP Vijaya, P Mumtaj. 2013. Cervical Cancer: Is Vaccination Necessary in India?. *Asian Pac J Cancer Prev*, 14, 2681-84.
14. Songthap A, Pitisuttithum P, Kaewkungwal J, Fungladda W, Bussaratid V and Koonsaeng S. 2009. Knowledge, attitudes, and acceptability of a human papillomavirus vaccine among healthcare providers. *Southeast Asian J Trop Med Public Health*. 40: 1048-1056.
15. Thippeveranna C, Mohan SS, Singh LR, Singh NN. 2013. Knowledge, attitude and practice of the pap smear as a screening procedure among nurses in a tertiary hospital in north eastern India. *Asian Pac J Cancer Prev*, 14, 849-52.
16. Udigwe GO. 2009. Knowledge, attitude and practice of cervical cancer screening (Pap smear) among female nurses in Nnewi, south eastern Nigeria. *Niger J Clin Pract*, : 40-43.
17. Vallikad E, November 2006. "Cervical Cancer: The Indian Perspective", *International Journal of Gynecology Obstetrics*, 95(1): S215-S233.
18. World Health Organisation. Comprehensive cervical cancer control: a guide to essential practice. Geneva, WHO, 2006. Available at <http://www.who.int/reproductivehealth/publications/cancers/9241547006/en/index.html>
19. Wong L P, Wong Y L, Low W Y, Khoo E M, Shuib R. 2009. Knowledge and awareness of cervical cancer and screening among Malaysian women who have never had a Pap smear: a qualitative study. *Singapore Med J*. 50 : 49
20. Yoshino Y, Ohta H, Kawashima M, et al. 2012. The knowledge of cervical cancer and screening adherence among nurses at a university-affiliated hospital in Japan. *Kitasato Med J*, 42: 6-14.