

# Lack of knowledge and awareness on cervical cancer vaccination hinders the administration of HPV vaccination among the health care professionals.

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## Research article

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## **Abstract**

**Background:** Cervical cancer is the second most common cancer among females in India. This study was conducted regarding current awareness about cervical cancer, which is helpful in designing educational programs and to overcome barriers associated for knowledge enhancement about cervical cancer and its screening & vaccination.

**Methods :** This is a cross-sectional study conducted among 318 health care professionals working in tertiary hospitals across Chennai, Tamil Nadu, India. A semi-structured questionnaire with 31 items was developed by the researchers to explore the knowledge and attitudes on cervical cancer, cervical cancer prevention and HPV(Human Papilloma Virus)vaccination.

**Results:** Among the 318 respondents, 90.6% were aware of cervical cancer, but only 29.2% had done screening against cervical cancer and 19.8% got vaccinated. 94.7% of the study subjects heard of HPV and 86.2% knew that HPV causes cervical cancer. 83.3% people knew that PAP( Papanicolaou) smear test detects the cervical cancer. But, only 29.2% had PAP test. 68.2% of the study subjects knew that cancer cervix can be prevented by vaccination. But only 19.8% got vaccinated .Only 34.9% know that HPV vaccine can be given to boys. Most common reason for not getting vaccination was lack of awareness. 77.2% in our study are willing for vaccination and recommendation to their friends and family members.

**Conclusion:** Lack of awareness with regard to the cervical cancer could be the possible hurdle for the HPV vaccination among the health professionals.

## **Introduction**

Cervical cancer is the second most common cancer among women worldwide.<sup>1</sup> In India, most of the cervical cancer cases are diagnosed in advanced stage reducing the survival rate of women with cervical cancer. The main reason for the late stage diagnosis is due to lack of awareness about screening and preventive methods of cervical cancer.<sup>2</sup>

Human papillomavirus (HPV) infection is the cause of cervical cancer, particularly HPV 16 and 18 strains causes 75% of cervical cancers world wide.<sup>3</sup> Other risk factors include having multiple sexual partners, early age of sexual intercourse, tobacco consumption, prolonged use of oral contraceptive pills, increased parity, and early age of giving birth.<sup>4</sup> Most of the Genital HPV infections are asymptomatic but evidence show that nearly all cervical cancer cases are caused by high-risk HPV types.<sup>5</sup> Screening with Pap test or VIA, or application of effective HPV-DNA detection procedures, precursors of cervical cancer can be easily detected and successfully treated at an early stage. Thus, effective screening reduces cervical cancer can be easily prevented with regular screening programmes. Screening the women for cervical cancer is essential as the women often do not experience symptoms until the disease has advanced.<sup>5</sup> The prevention and control of cervical cancer depend on awareness about disease, screening procedures, and preventive measures.<sup>4</sup> Two vaccines Gardasil & Cervarix are available in India which are licensed

globally.<sup>6</sup> The vaccine dose is 0.5 mL given intramuscularly at 0, 2 and 6 months are recommended with Gardasil or 0, 1 and 6 months with Cervarix.<sup>7,8</sup> The recommended age for vaccination is 9–12 years. Catch-up vaccination is permitted up to the age of 26 years. Vaccine was approved for administration to boys between the ages of 9 and 26 years in developed countries.<sup>7</sup> The vaccine is not recommended for use in pregnant women.<sup>7,9</sup> Lactating women can also receive the vaccine. The vaccine was approved for administration to males between the ages of 9 and 26 years in developed nations.<sup>7,9</sup>

Hence, this study was conducted regarding current awareness about cervical cancer, which is helpful in designing educational programs and to overcome barriers associated for knowledge enhancement about cervical cancer and its screening & vaccination.

## Methods

### Study Participants:

A Cross-sectional study was conducted in Panimalar Medical College Hospital & research Institute, Varadharajapuram, Poonamallee, Chennai, Tamil Nadu, India. A random sample of 318 health care professions working in tertiary hospitals in Chennai, Tamil Nadu, India. Those participants who were above 18 years of age and who are willing to give their consent to participate in this study have been included. Informed consent has been obtained from all the participants. The study protocol was approved by the Institutional Review Board (IRB) of the Panimalar Medical College Hospital & Research Institute, Chennai (Panimalar Medical College Hospital & Research Institute IRB #1/2020/005) and conformed to the requirements of the Declaration of Helsinki (as revised in Seoul 2008).

### Measures:

The semi-structured questionnaire was developed by the researchers consists of thirty one questions/statements on demographic characteristics & information pertaining to the cervical cancer preventive methods. The socio demographic variables embrace Age, Gender, Profession, Educational Qualification, good Experiences, legal status, no of youngsters, and case history of Cervical Cancer. The demographics were followed by the questions/statements related to the knowledge on Cervical Cancer, preventive methods of cervical cancer and knowledge on HPV vaccination. For data collection through this survey on a 3 point Likert scale, the respondents have to record their response on the 3 point Likert scale ranging from: Yes/No/I don't know. The survey consists of one question aimed at exploring the plausible reasons reported for not administration of HPV and the respondents were instructed to record their choices (more than one reason) from pre-determined 6 choices/reasons (Lack of awareness/High cost/Fear of side effects/Doubt on efficacy/Lack of interest/Do not know the importance of the administration of HPV vaccine).

### Statistical Analysis:

All the categorical variables are presented as numbers or percentages. Descriptive analysis was performed using univariate statistics to report the Mean and Standard Deviation (SD) for the continuous variable and frequency distributions for the categorical variables. Correlation, T-statistic and Analysis of Variance (ANOVA) were performed to compare differences in the continuous variables. Pearson chi-square test was used to identify the differences in distribution. The relationship between preventive behaviors (i.e., Pap test or HPV vaccination) against cervical cancer and related factors (such as age, profession, marital status, Number of children, Family history of cervical cancer and knowledge of cervical cancer) was evaluated using logistic regression analysis. Odds ratios (ORs) and 95% confidence intervals (CIs) were also calculated. All statistical analyses were performed using Statistical Package for Social Science (SPSS, version 17) for Microsoft windows, SPSS Inc. USA.

## Results

90.6% of the participants were aware of cervical cancer. But only 29.2% had done screening against cervical cancer and 19.8% got vaccinated. 94.7% of the study subjects have heard of HPV and 86.2% knew that HPV causes cervical cancer. 83.3% people knew that PAP smear test detects the cervical cancer even before the symptoms appear, but only 29.2% had PAP test. 68.2% of the study subjects knew that cancer cervix can be prevented by vaccination. But only 19.8% got vaccinated. Only 34.9% know that HPV vaccine can be given to boys. Most common reason for not getting vaccination reported in our study was lack of awareness. 77.2% in our study are willing for vaccination and recommendation to their friends and family members.

Table: 1 it shows the socio demographic characteristics of the health care professionals. Out of the participants (n=318) are Female (77.7%) and Male (22.3%). Around 39.9% of the respondents were their professional experience is less than 6 months most of the health care professionals participated in this study were medicine 53.5% and Nursing 42.2% and health care professionals 73% were unmarried and 27% married.

**Table 1: Demographic characteristics of the Health Care Professional included in the study (N=318)**

<b>Variables</b>	<b>Number</b>	<b>Percent</b>
<b>Age</b>		
< 30 Years	254	79.9 %
=>30 Years	64	20.1%
<b>Gender</b>		
Female	247	77.7%
Male	71	22.3%
<b>Profession</b>		
Medicine	170	53.5%
Dentistry	4	13 %
Nursing	134	42.2%
Allied Health Science	7	22%
Pharmacy	3	9%
<b>Education Qualification</b>		
Diploma	55	17.3%
UG	160	50.3%
PG	103	32.4%
<b>Professional Experience</b>		
Less than 6 months	127	39.9%
6 months – 2 years	87	27.4%
2 – 6 years	63	19.8%
7 – 10 years	17	5.3%
More than 10 years	24	7.5 %
<b>Marital Status</b>		
Married	86	27%
Unmarried	232	73%
<b>Number of children</b>		
None	27	8.5%
One	33	10.4%
Two	23	7.2%
Three	2	6%
Not applicable	233	73.%
<b>Family History of Cervical Cancer</b>		
Yes	6	1.9%
No	302	95%
Don't know	8	3.1%

**Table 2: Knowledge towards cervical cancer among health care Professionals enclosed within the study (N=318)**

<b>Variables</b>	<b>Number</b>	<b>Percent</b>
Heard about cervical cervix		
Yes	288	90.6
No	30	9.4
Can screening prevent cancer cervix		
Yes	240	75.5
NO	59	18.6
Don't know	19	6.0
Cancer cervix associated with infection		
Yes	255	80.2
No	43	13.5
Don't know	20	6.3
Cancer Cervix lead to mortality		
Yes	263	82.7
No	32	10.1
Don't know	23	7.2
Pap smear screening is 100%effective		
Yes	197	61.9
No	96	30.2
Don't know	25	7.9
Did you ever had PAP test		
Yes	93	29.2
No	177	55.7
Not applicable	48	15.1
Is it possible to detect cervical cancer with PAP smear before symptoms appear		
Yes	265	83.3
No	20	6.3
Don't know	33	10.4
Cancer cervix preventable by vaccination		
Yes	217	68.2
No	71	22.3
Don't know	30	9.4
Is it possible to cure cervical cancer		
Yes	260	81.8
No	34	10.7
Don't know	24	7.5
Is early detection of cervical cancer good for treatment outcome		

Yes	297	93.4
No	5	1.6
Don't know	16	5.0

**Table 3: Knowledge towards HPV & HPV Vaccination among health care Professionals enclosed within the study (N=318)**

<b>Variables</b>	<b>Number</b>	<b>Percent</b>
Heard about HPV		
Yes	301	94.7
No	12	3.8
Don't know	5	1.6
HPV causes cervical cancer		
Yes	274	86.2
No	15	4.7
Don't know	29	9.1
HPV vaccine can be given to sexually active women		
Yes	180	56.6
No	75	23.6
Don't know	63	19.8
Can HPV vaccine be given to women who have already having HPV infection		
Yes	90	28.3
No	136	42.8
Don't know	92	28.9
Can HPV vaccine given to boys		
Yes	111	34.9
No	128	40.3
Don't know	79	24.8
Can HPV given to pregnant women		
Yes	34	10.7
No	195	61.3
Don't know	89	28.0
HPV vaccinated women requires screening		
Yes	237	74.5
No	31	9.7
Don't know	50	15.7
Have you or yours family members vaccinated for HPV		
Yes	63	19.8
No	224	7.4
Don't know	31	9.7
Willingness to receive HPV vaccine and recommendation		
Yes	247	77.7
No	71	22.3
Is HPV vaccine available in India		

Yes	255	80.2
No	11	3.5
Don't know	52	16.4
Reason for not having HPV vaccination		
Lack of awareness	234	73.6
High cost	95	29.9
Fear of side effects	68	21.4
Doubt on efficacy	62	19.5
Lack of interest	70	22.0
Don't know the importance of administration of HPV	164	51.6

**Table 4: Odds ratio and 95% confidence intervals of family members vaccinated for human papilomavirus vaccination according to selected variables among health care professionals included in the study (N=318)**

Sl No.	Selected Variables	Have you or your Family members vaccinated for HPV? = Yes	Crude OR 95% c	Adjusted or (95% C)	Have you or your Family members vaccinated for HPV? = No	Crude OR 95% c	Adjusted or (95% C)
1)	<b>Age</b>						
	<= 30 Yrs 64 (20.1%)	13 (14.1)	1.03	1.78	51 (16.0)	0.99	1.14
	>=30 Yrs 254(79.9%)	50 (15.7)			204 (64.2)		
	<i>Odd ratio Age (&gt;= 30 yrs / &lt; 30 yrs)</i>	63 (29.8)	1.040	2.06	-	-	-
2)	<b>Profession</b>						
	Paramedical	17 (5.3)	0.44	0.27	.127 (39.9)	1.20	1.08
	Medical	46 (14.5)		0.74	.128(40.3)		1.34
	<i>Odd ratio for Profession (Paramedical / Medical)</i>	0.372	0.20	0.68	-	-	-
3)	<b>Professional Experience</b>						
	Less than 2 Yrs	44 (13.8)	1.13	0.69	170 (53.5)	0.97	0.87
	More than 2 Yrs	19 (6.0)		1.83	85 (26.7)		1.09
	<i>Odds ratio</i>	1.158	0.64	2.11	-	-	-
4)	<b>Marital Status</b>						
	Married	16 (5.0)	0.92	0.55	47 (14.8)	1.02	0.91
	Un married	47 (14.8 )		1.53	185 (58.2)		1.15
	<i>Odds ratio</i>						
5)	<b>Family history of cervical cancer</b>						
	Yes	3 (9.)	2.60	1.13	60 (18.9)	0.62	0.278
	No	3 (9)		5.97	252 (79.2)		1.380
	<i>Odds ratio</i>	-	4.20	0.83	-	-	-
6)	<b>No. of Children</b>						
	one and above	11 (3.5)	0.95	0.53	4.7 (14.8)	1.01	0.88
	None	52 (16.47)		1.70	208 (65.4)		1.16
	<i>Odds ratio</i>	0.936	0.45	1.93	-	-	-
7)	<b>Have you heard about cervical cancer</b>						
	Yes	56 (17.6)	0.82	0.42	232 (73.0)	1.05	0.86
	No	7 (2.2 )		0.86	23 (7.2)		1.29
	<i>Odds ratio</i>	0.793	0.32	1.94	-	-	-
8)	<b>Have you heard of human papiloma virus</b>						
	Yes	61 (19.2)	1.72	0.46	240 (75.)	0.90	0.75
	No	2 (6)		6.46	15 (4.7)		1.09
	<i>Odds ratio</i>	1.906	0.42	8.56	-	-	-
9)	<b>PAP Smear Screening is 100% effective</b>						
	Yes	32 (10.1)	0.63	0.41	165 (51.9)	1.12	0.99
	No	31 (9.7)		0.98	90 (28.3)		1.27
	<i>Odds ratio</i>	0.563	0.32	0.98	-	-	-
10)	<b>Did you ever had PAP test</b>						
	Yes	18 (5.7)	0.97	0.59	75 (23.6)		
	No	45 (14.2)		1.58	110 ( 56.6)		

	<i>Odds ratio</i>	0.96	0.52	1.77	-	-	-
11)	<b>Cancer cervix is preventable by vaccination</b>						
Yes		49 (15.4)	1.62	94.50	168 (52.8)	0.90	0.80
No		14(4.4)		2.81	87 (27.4)		1.00
	<i>Odds ratio</i>	1.81	0.95	3.46	-	-	-
12)	<b>Can HPV vaccination be given to boys</b>						
Yes		26 (8.2)	1.31	0.83	85 (26.7)	0.93	0.83
No		37 (11.6)		2.04	170 (53.5)		1.05
	<i>Odds ratio</i>	1.4	0.79	2.47	-	-	-
13)	<b>Lack of awareness</b>						
Yes		48 (15.1)	1.14	0.68	186 (48.5)	0.97	0.86
No		15 (4.7)		1.93	69 (21.7)		1.09
	<i>Odds ratio</i>	1.18	0.65	2.25	-	-	-
14)	<b>Do not know the importance of the administration of HPV vaccine</b>						
Yes		33 (10.4)	1.033	0.66	131 (41.2)	0.99	0.88
No		8.0 (9.4)		1.6	124 (39.0)		1.1
	<i>Odds ratio</i>	1.04	0.6	-	-	-	-

## Discussion

Cervical cancer remains the most common cancer among the women inspite of advances in prevention and treatment. Our study found that majority of the participants were aware of cervical cancer. But only 29.2% had done screening against cervical cancer and 19.8% got vaccinated. In our present study, 90.6% were aware of cervical cancer which is better than other studies.<sup>9,10</sup> When asked about the HPV 94.7% of the study subjects said they have heard of it and 86.2% knew that HPV causes cervical cancer which seems to be better than a similar study in which only 73% study subjects heard of HPV.<sup>9</sup>

In our study 83.3% people knew that PAP smear test detects the cervical cancer even before the symptoms appear, which were in comparison with similar studies.<sup>11-13</sup> But only 29.2% had PAP test in our study but it was only 5% in few studies.<sup>14,15</sup> This shows that we lack an organized opportunistic screening program for cervical cancer in India. It is essential to screen all eligible women when they visit health care units for other services. 68.2% of the study subjects knew that cancer cervix can be prevented by vaccination. But only 19.8% got vaccinated which was higher when compared with studies by Swarnapriya et al<sup>16</sup>and Sunite GA et al<sup>17</sup>where vaccination coverage was 6.8% and 5.5% respectively. In contrast, 26.73% of them were vaccinated in a study conducted by Hoblidar S et al.<sup>18</sup> This is because Indian parents are less interested in vaccinating their children and hence the vaccine coverage in the target population is not up to the required level. There is a need for educational programmes regarding screening and vaccination to reduce the disease burden. Only 34.9% know that HPV vaccine can be given

to boys. In developing countries like India, administration of HPV vaccine to the boys was not practised, so this could be the reason for lack of awareness that HPV can be given to boys which is reflected in our study.

Most common reason for not getting vaccination reported in our study was lack of awareness which is in similarity with other studies.<sup>18</sup> In contrast, high cost of the vaccine was the most common reason reported for not being vaccinated.<sup>19</sup> Various studies have reported that people with family history of genital cancer had shown greater acceptability for vaccination against HPV.<sup>20</sup> 77.2% in our study are willing for vaccination and recommendation to their friends and family members which is in contrast with other studies in which they were not keen on getting vaccinated.<sup>16</sup>

The profession, knowledge on cervical cancer, HPV, screening, availability of vaccine associated(statistically significant association) and have a negative effect on administration of HPV vaccination. Knowledge on HPV vaccine to pregnant women associated and have a positive effect on HPV vaccination. When combined together all the variables, only the knowledge of the HPV vaccination in pregnant women was positively associated with decision to administer the HPV vaccine or recommend the administration of HPV vaccination to the family/friends.

There is a large gap which has to be filled to improve the awareness about HPV vaccination. This requires that every child needs to be vaccinated and every mother needs to be screened. This kind of interactive and informative session helps in developing a positive attitude towards vaccination and screening. Medical colleges need to be focussed as an academic curriculum on screening and vaccination to motivate the society towards vaccination as they are the primary source of information.

## Conclusion

By virtue of our findings in this present study, it is evident that lack of awareness with regard to the cervical cancer could be the possible hurdle for the HPV vaccination among the health professionals. This clearly establishes the need to devise intervention programmes to educate the healthcare professionals on the cervical cancer and more importantly the importance of the administration of the HPV vaccine, that improves the quality of women wellbeing.

## Abbreviations

HPV: Human Papilloma Virus, CI: Confidence interval, OR: Odds ratio, PAP: Papanicolaou

## Declarations

**-Ethics approval and consent to participate:** Institutional Review Board (IRB) Approval has been obtained prior to start of the study (Panimalar Medical College Hospital & Research Institute IRB #1/2020/005). Informed Consent has been obtained from all the participants of the study.

**-Consent for publication:** All authors provided their consent for publication of this manuscript.

**-Availability of data and material:** The data used to support the findings of this study are available from the corresponding author upon request.

**-Competing interests:** "All the authors declare no conflict of interest."

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**-Authors' contributions:** SM, PC, SKM: having contributed equally to the work; DR, GB, PS, UMC, KMJ: contributed to data curation, validation, visualization and writing the manuscript; BP, SRTK, CPA, PP: contributed to formal analysis, validation, visualization and writing the manuscript; SM, PC, DR, GB, PS, BP, UMC, KMJ, SRTK, CPA, PP & SKM: All authors reviewed the manuscript and approved the submitted manuscript.

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