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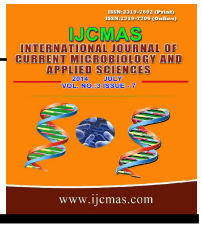

Original Research Article

Prevalence of Human papilloma viral infection from women in tertiary care teaching hospital, Tiruchirapalli, India

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A B S T R A C T

Cervical cancer, mainly caused by Human Papillomavirus infection, is the leading cancer in Indian women and the second most common cancer in women worldwide. Though there are several methods of prevention of cervical cancer, prevention by vaccination is emerging as the most effective option, with the availability of two vaccines. Studies on HPV prevalence have been conducted in different parts of the country but no data were available from the study area. The present study aimed to determine the status of HPV seroprevalence among the study population. Prevalence of HPV was investigated in a total of 108 serum samples of both symptomatic and asymptomatic women. It is determined that 32.4% samples showed seropositive to HPV infection. Among the age groups, 21 – 50 were very active group in sex further the infection rate is also found high in this age group.

Keywords

HPV infection, Seropositivity, Tiruchirapalli

Introduction

Human papillomavirus (HPV) infection is now a well established cause of cervical cancer and there is growing evidence of HPV being a relevant factor in other anogenital cancers (anus, vulva, vagina and penis) and head and neck cancers. Cervical cancer, the second most common gynaecological malignancy worldwide, has been reported to occur in abundance in different populations. The major causative factor of the disease is understood to be Human papillomavirus (HPV), a double-stranded DNA virus. Sexually transmitted human papilloma virus (HPV) infection is the most important risk factor for cervical intraepithelial neoplasia and invasive cervical cancer (Schiffman et al., 2007). The worldwide incidence of cervical cancer is approximately 510,000 new cases annually, with approximately 288,000 deaths worldwide (Sankaranarayanan and Ferlay, 2006).

According to World Health Organization, in India approximately 1,34,420 women are diagnosed with the disease every year, and of them 72,825 die. Unlike many other cancers, cervical cancer occurs early and strikes at the productive period of a woman's life. The incidence rises in 30–34 years of

age and peaks at 55–65 years, with a median age of 38 years (age 21–67 years). Estimates suggest that more than 80% of the sexually active women acquire genital HPV by 50 years of age (Kaarthigeyan, 2012). Persistent infection with one of the high-risk human papillomaviruses (HPV) has been established as the cause for cervical cancer and the documentation of the prevalence of HPV types in cervical cancer in different regions of India is useful for a prevention program combining both screening and vaccination (Deodhar et al., 2012).

HPV infection is a highly prevalent sexually transmitted disease and there is evidence of the relationship of HPV infection and the development of genital warts, penile intraepitelial neoplasia, invasive penile carcinoma and cervical cancer (Freire et al., 2014). Nearly 120 types of HPV are known to occur and are categorized into three broad categories based on the potentiality of causing cancer; 1. High risk type – HPV 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 73 and 82; 2. Intermediate type – HPV 26, 53, 66 and low risk type – HPV 6, 11, 40, 42, 43, 44, 54, 61, 70, 72, 81 and CP6108 (Shikha et al., 2012). HPV types 16 and 18 infections are responsible for about 70% of all cervical cancer cases worldwide. HPV vaccines against HPV 16 and 18 are now available and have the potential to reduce the incidence of cervical and other anogenital cancers.

In the year 2012 and 2013, a clinical based survey was conducted in Tiruchirapalli (Tamilnadu, India) to identify the infectious state of HPV infection among women who attended the OBG clinic and also identified the risk factors and sociodemographic determination. As reported elsewhere, the prevalence of HPV cervical infection in those cities ranged from 6.1% to 10.2% and the prevalence of high risk HPV infection was from 5.6% to 9.3% (Vu and Bui, 2012; Vu et al., 2013). The previous publications however yet provided the prevalence of HPV 16, 18 infections in those cities, important input information for the decision to include HPV vaccines into routine immunization program. This study aims to use data from that survey to provide specific estimation of the prevalence of HPV infections in Tiruchirapalli.

Materials and Methods

Study population

Pre treatment serum samples from 108 women suspected with HPV infection based on the clinical symptoms were included in this study. In this investigation, the HPV antibodies measurements are performed and 20 healthy controls are also included. The controls are a 1:1 age matched subset of the controls and selected without the knowledge of the serological results. All the subjects included are classified according to FIGO (International federation of Gynecologists and Obstetricians).

Subject's inclusion

The subjects were grouped according to the types of warts determined including common warts, flat warts, plantar warts, filiform warts, genital warts and precancerous warts. The sociodemographic status is also compared with age, marital status, educational background and occupation. The exclusion criteria are pregnant, those who undergone hysterectomy and psychologically imbalanced patients. Only married women were included because under cultural and ethical norms of India, it was not feasible to implement the pelvic examinations and pap smear among unmarried women without their voluntariness. Further, institutional ethical clearance and informed consent from the subjects were also done.

Laboratory method

Serum samples for HPV analysis obtained from all individuals were frozen, preserved at -80°C and used for later HPV serology. Serum IgG antibodies to HPV capsids were measured using standard direct ELISA methods, developed and validated in previous studies (Silins et al., 1999; Kirnbauer et al., 1994; Heino et al., 1995). The cut-off levels for determining seropositivity for the oncogenic HPV types from continuous OD values were preassigned and had originally been established using the data from previous studies (Dillner et al., 1995).

Results and Discussion

Characteristics of population

The age groups of the subjects included in this investigation were ranged from 21 to 65. Most of the women who participated were aged from 31 to 50 (64.8%) and depicted in Figure 1. The socio demographic details other than age including occupation, marital status and educational background were interpreted in Table 1.

Symptoms

The detailed history was collected from the subjects and was recorded. Other information regarding obstetric/ gynecologic history and sexual lifestyle were also collected. After interviewing, each participant was scheduled for pelvic examination carried out by a gynecologist thereby the warts were classified among the subjects and included in Figure 2.

HPV positive data

Among the subjects (108) included, 35 samples showed positive to HPV infections and 3 were not determined. The detailed HPV infection data by ELISA antibody detection assay was depicted in Figure 3.

Age verses HPV seropositivity

Seroprevalences were likely to be increased among cervical cancer patients for any types including low, moderate and high risk groups. Among the healthy control groups, 5 samples showed positive to HPV serology. Further confirmation required including the HPV DNA assay and determination of the specific type of HPV infection etc. The prevalence of HPV infection among married women in this study is 32.4% (35/108). Since HPV is the most common virus type in cervical cancers, it is expected that by comparison a larger proportion of the virus exposures are causal and that studies on causal interference should have the best power to detect interference in the case of HPV. The strongest interaction detected was an antagonistic interference between different types of HPVs, which is well in line with previous suggestions of antagonism between benign and malignant HPV infections (Silins et al., 1999; Luostarinen et al., 1999).

Strict protocols to avoid biases were followed in this study: women were randomly chosen, all clinical examination and specimen collections were done by qualified gynaecologists and all samples were examined in duplicate. The detection of HPV positivity using ELISA antibody detection method and further the genotyping of HPV infection using reverse dot blot method is planned further as continuation of this study that will provide more precise results compared to the other methods. However, it is important to note that this study covered only married women aged 21–65 so the results did not cover a subgroup of the population already sexually active but not yet married.

Figure.1 Age wise distribution of HPV suspected subjects (n=108)

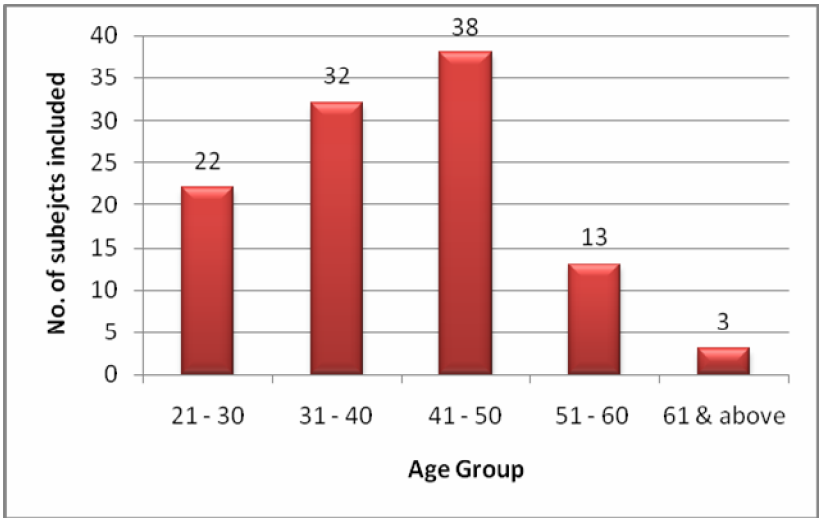

Table.1 Characteristics of the study sample (n=108)

Category	Characteristics	N (%)
Educational background	Higher education	08 (7.4)
	Higher secondary	34 (31.5)
	High school	42 (38.9)
	Secondary	13 (12.0)
	Primary	11 (10.2)
Occupation	Government servants	2 (1.9)
	Workers/ Daily wages	56 (51.8)
	Small business	24 (22.2)
	Unemployed/ home maker	26 (24.1)
Marrital status	Live with husband	92 (85.2)
	Separated/ Divorced	10 (9.3)
	Widower	08 (7.5)

Figure.2 Types of warts among subjects (n=108)

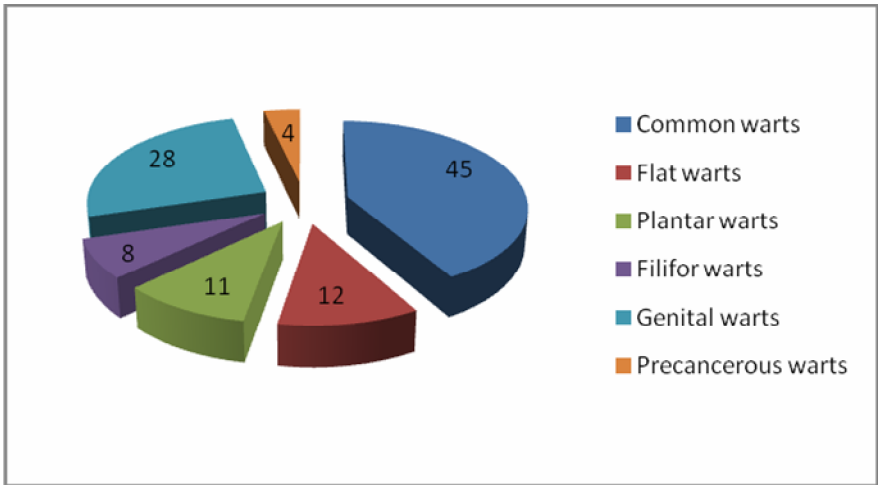

Figure.3 HPV – Serology status

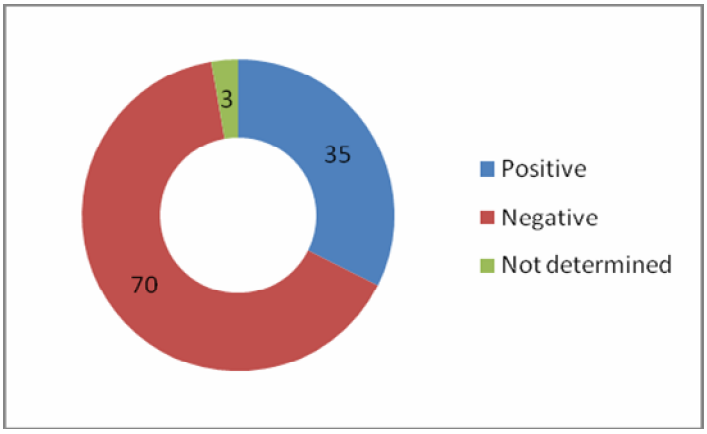

Table.2 HPV seropositivity among subjects (108) and controls (20)

Age group	No. of suspected cases		No. of healthy controls		Total
	Negative	Positive	Negative	Positive	
21 – 30	16	6	2	1	25
31 – 40	21	11	3	1	36
41 – 50	27	11	5	2	45
51 – 60	7	6	3	1	17
61 & above	2	1	2	-	5
Total	73	35	15	5	128

This is a limitation of the study, but under the cultural and ethical norms of India, it is very difficult to invite unmarried women to participate in a study with pelvic examinations. Women in tropical area are also having the fear and belief on their partners, which further restricted the involvement in the study. Since the prevalence of HPV was higher in the age group of 31 – 50 in this study, and this group was underrepresented due to the sampling frame, the actual prevalence.

As the results of this study came from combined areas of both urbanized and ruralized places of Tiruchirapalli, caution must be taken in generalizing these findings to the entire population, especially to those in rural areas. In conclusion, the prevalence of HPV infection in this study is noteworthy percentage further the study to be extended to understand the infectious status among the younger married women. As HPV infection has a high correlation with cervical cancer, this study emphasizes the need for both primary prevention of cervical cancer with HPV vaccines as well as secondary prevention with screening. Policy-makers in India should consider making HPV vaccines effectively and screening for cervical cancer as routine practices in all health care settings.

References

Deodhar, K., T. Gheit, S. Vaccarella, C.C. Romao, V, Tenet, B.M. Nene, K. Jayant, R. Kelkar, S.G. Maliv, B.S. Sylla, S. Franceschi, J. Jerorimo, S. Shastri, R. Sankaranarayanan and Tommasino, M. 2012. Prevalence of human papillomavirus types in cervical lesions from women in rural western India. Journal of Medical Virology. 84: 1054-1060.

Dillner, J., F. Wiklund, P. Lenner, C. Eklund, S.Z.V. Fredriksson, J.T. Schiller, M. Hibma, G. Hallmans and Stendahl, U. 1995. Antibodies against linear and conformational epitopes of human papillomavirus type 16 that independently associate with incident cervical cancer. International Journal of Cancer. 60: 377-382.

Freire, M.P., D. Pires, R. Forjaz, S. Sato, I. Cotrim, M. Stiepcich, B. Scarpellini and Truzzi, JC. 2014. Genital prevalence of HPV types and co-infection in men. International Brazilian Journal of Urology. 40: 67-71.

Heino, P., B. Skyldberg, M. Lehtinen, I. Rantala, B. Hagmar, J. W. Kreider, R. Kirnbauer and Dillner, J. 1995. Human papillomavirus type 16 capsids expose multiple type-restricted and type-common antigenic epitopes. Journal of General Virology. 76: 1141-1153.

Kaarthigeyan, K. 2012. Cervical cancer in India and HPV prevention. Indian Journal of Paediatric Oncology. 33: 7-12.

Kirnbauer, R., N.L. Hubbert, C.M. Wheeler, T.M. Becker, D.R. Lowy and Schiller, J. T. 1994. A virus-like particle enzyme-linked immunosorbent assay detects serum antibodies in a majority of women infected with human papillomavirus type 16. Journal of the National Cancer Institute. 86: 494-499.

Luostarinen, T., V, Geijersstam, T. Bjorge, C. Eklund, M. Hakama, T. Hakulinen, E. Jellum, P. Koskela, J. Paavonen, E. Pikkala, J.T. Schiller, S. Thoresen, L.D. Youngman, J. Dillner and Lehtinen, M. 1999. No excess

risk of cervical carcinoma among women seropositive for both HPV 16 and HPV 6. International Journal of Cancer. 80: 818-822.

Sankaranarayanan, R., and Ferlay, J. 2006. Worldwide burden of gynecological cancer: The size of the problem. Best Practice of Research in Clinical Obstetrics and Gynecology. 20: 207-225.

Schiffman, M, P.E, Castle, J. Jeronim, A.C. Rodrigue and Wacholde, S. 2007. Human papillomavirus and cervical cancer. Lancet. 370: 890-907.

Shikha, S., G. Sadhana and Jagat, K.R. 2012. High prevalence of oncogenic HPV 16 in cervical smears of asymptomatic women of eastern Uttar Pradesh India: a population based study. Journal of Biosciences. 37: 63-72.

Silins, I., Z. Wang, A.L. Elisabeth, B. Frankendal, V. Uldis, S. Martin, T.S. John and Joakim, D. 1999. Serological evidence of protection by human papillomavirus (HPV) type 6 infection against HPV type 16 cervical carcinogenesis. Journal of General Virology. 80: 2931-2936.

Vu, T.H.L. and Bui, D. 2012. Prevalence of cervical HPV infection among married women in Vietnam 2011. Asian Pacific Journal of Cancer Prevention. 13: 37-40.

Vu, T.H.L., D. Bui and Le, H.T.T. 2013. Prevalence of cervical infection with HPV type 16 and 18 in Vietnam: implications for vaccine campaign. BMC Cancer. 13: 53-59.