MINI-REVIEW

Current Status of Knowledge, Attitude and Practice (KAP) and Screening for Cervical Cancer in Countries at Different Levels of Development

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Abstract

Cancer of the uterine cervix is a worldwide menace taking innumerable womens' lives. The literature is vast and a large number of studies have been conducted in this field. Analyses have shown significant differences exist in terms of screening and HPV testing facilities among high income and low to middle income countries. In addition, acute lack of awareness and knowledge among the concerned population is particularly noted in rural areas of the low income countries. A detailed review of Indian case studies revealed that early age of marriage and childbirth, multiparity, poor personal hygiene and low socio-economic status among others are the principal risk factors for this disease. This review concludes that a two pronged strategy involving strong government and NGO action is necessary to minimize the occurrence of cervical cancer especially in low and medium income countries.

Keywords: Cervical cancer - pap smear - HPV- risk factors – KAP - country income levels

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Introduction

Cancer of the uterine cervix is a killer disease, which affects the female population in India. Next to breast cancer, cervical cancer is the most dreadful type of human cancer (Mitra, 2009). It has been estimated that 100,000 new cases of cancer of the cervix occur in India every year and 70% or more of these are stage III or higher at diagnosis (Nandakumar et al., 1995).The risk factors known to increase the incidence of cervical cancer are early marriage (child marriage) and sexual practice, delivery of the first baby before the age of 20, too many or too frequent childbirths, multiple sexual partners, poor practice of personal hygiene, low socio economic status, Human Papilloma Virus, Herpes Simplex Virus type II, HIV positivity, use of oral contraceptive pill, smoking etc.

The present review is a report on retrospective as well as recent publications on assessment of risk factors and awareness of cervical cancer across the world. The discussion has tried to highlight the significant difference in the context of knowledge, attitude and practice (KAP) and screening between high income and low income countries. India is separately taken as a case study to magnify some of the lesser known but widely prevalent causes of cervical cancer.

International scenario

High income countries

Cervical carcinoma is the third most common gynaecological malignancy in the USA. (Jemal et al., 2002). The number of women with cervical adenocarcinoma (AC) has been increasing over the past decades. The observed survival rate for patients with cervical AC generally has been poorer compared with the survival rate for patients with cervical squamous cell histologies. The independent significance of AC histology in cervical carcinoma however remains controversial and is a subject of debate in the literature. Recent studies of cervical AC, have been conflicting, showing both a poor prognosis and minimal or no importance as a predictor of overall survival of patients diagnosed with cervical carcinoma (Smith et al., 2000; Lea et al., 2002).

In addition, some authors have suggested that only the adenosquamous histology of cervical AC carries a poor prognosis whereas other authors discount the significance of this particular histology.

Ruffin et al. (2000) carried out an investigation on the current rates of cancer screening (breast, cervical, colorectal, and prostatic cancer) and also to determine which factors predict completion of a single screening test, of all tests for each cancer and of all procedures for age and sex. Medical records of 200 eligible patients (100 men and 100 women) from each of 24 community based primary care practices were abstracted for cancer screening events. The study indicated that it is essential to increase the percentage of patients who schedule a health maintenance visit which could serve to increase cancer screening and help to reach goals set for the year 2010.

A wealth of evidence has led to the conclusion that

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virtually all cases of cervical cancer are attributable to persistent infection by a subset of human papilloma virus (HPV), especially HPV type-16 (HPV-16) and HPV type-18 (HPV 18). These HPV types also cause a proportion of other cancers, including vulval, vaginal, anal, penile, and oropharyngeal cancers. Although cervical cancer screening, primarily with the Papanicolaou (Pap) smear, has reduced the incidence of this cancer in industrialized countries, cervical cancer remains the second most common cause of death from cancer in women worldwide, because the developing world has lacked the resources for widespread, high quality screening. In addition to advances in Pap smear technology, the identification of HPV as the etiologic agent has produced 2 recent advances that may have a major impact on approaches to reduce the incidence of this disease. The first is the development of a preventive vaccine, the current versions of which appear to prevent close to 100% of persistent genital infection and disease caused by HPV-16 and HPV 18. Future second generation vaccines may be able to protect against oncogenic infections by a broader array of HPV types. The second is the incorporation of HPV testing into screening programs. In women aged>30 years, HPV testing can identify high grade cervical intraepithelial neoplasia earlier than Pap smear with acceptable rates of specificity. These results together with the high sensitivity of HPV testing, suggest that such testing could permit increased intervals for screening. An inexpensive HPV test is in development (Lowy et al., 2008)

Liu et al. (2001) generated data on the incidence of cervical cancer by histologic subtype and mortality for the Canadian provinces of Ontario, Saskatchewan, and British Columbia. Age adjusted incidence rate of squamous cell carcinoma of the cervix decreased from 11.1 per 100,000 women in 1970-72 to 5.3 in 1994-96, while the rate for cervical adenocarcinoma increased from 1.1 per 100,000 women to 1.5 over the same period. Age adjusted mortality rate declined from 7.9 per 100,000 women in 1953-55 to 1.9 in 1195-97. The patterns in Age specific mortality in 1953-72 were different from those in 1973-97; younger women experienced larger reduction in mortality during the earlier period while older women benefited to a greater extent during the latter period. Age-period-cohort modeling showed that cohort effects were responsible for the decreasing trends in the incidence of squamous cell carcinoma of the cervix and increasing trends in adenocarcinoma, and both period and cohort effects account for the observed trends in the mortality. The results suggested that Pap smear screening played a significant role in the reduction in squamous cell cervical carcinoma. The causes for the increase in cervical adenocarcinoma are unclear.

To determine trends in the incidence of invasive adenocarcinoma of the uterine cervix in East Anglia, Stockton et al. (1997) obtained data for both squamous cell carcinomas and adenocarcinomas from the East Anglia Cancer Registry for the period 1971-94. The authors also obtained similar data for England and Wales. European Age Standardized Rates (ASRs) were used for comparisons. The mean incidence (ASRs) of cervical adeno carcinoma was 0.85 per 10(5) in 1971-1976, rising to 2.54 per 10(5) in 1989-1994. There has been a marked age shift with the main increase in incidence occurring in younger women aged 30-39. The mean incidence (ASR) of squamous cell carcinoma of the cervix has decreased from 9.78 to 8.74 per 10(5) over the period 1971-76 and 1989-94. Again there has been an age shift moving from a single incidence peak in the 45 to 59 age band in earlier years to incidence peaks in both 30-39 and 55-69 age bands in more recent years. Similar trends were noted when data for England and Wales were analysed. Birth cohort analysis show that both tumors are occurring progressively earlier (about 5 years earlier in each 5 year birth cohort). This study indicated that although the overall incidence of cervical carcinoma is declining, an increased incidence of cervical adeno carcinoma, particularly in the younger age groups was imminent.

Mathew and George (2009) summarized and quantified the trends in incidence and mortality rates of cervical squamous cell carcinoma (SSC) and adenocarcinoma (AC) worldwide. The authors included all indexed publications, which provided information on time trends in incidence or mortality rates of cervix, published during 1998-2009. According to these authors cytology screening as well as changes in socioeconomic profile have led to declines in cervical SCC incidence and mortality rates worldwide. Higher percentage decline in SSC is observed in countries where organized screening programmes were available. The results suggested that Pap smear screening has played a significant role in the reduction in SCC in the US, Canada, New South Wales and in almost all European countries (except Ireland) as well as in some of the Asian countries. Increasing incidence and mortality rates of cervical AC has been reported in many countries such as the US, Canada, UK, Iceland, Sweden, England, Spain, Finland, Slovakia, Slovenia, Netherlands particularly among young women. However the increase was mainly in earlier periods till 1995 and stable or declining trends in cervical AC have been observed in later periods in many of the above countries such as the US, UK, Canada, Sweden. The increasing risk of AC suggested that a major role for an increasing prevalence of persistent oncogenic HPV infection and its cofactors, whereas the down turn in period effects in several countries during the 1990s provided evidence that cytological screening is detecting more preinvasive ACs than in previous decades and suggested that cytology screening might be starting to have a protective impact on AC. The decline in AC incidence might be due to improved specimen collection as well as due to increased awareness of AC precursors among cytopathologists and clinicians, improvements in laboratory training and quality assurance. In conclusion, cytology screening in combination with HPV screening for high risk HPV types may maximize the possibilities of having early cervical lesions detected and treated.

Assessment of KAP of female students towards cervical cancer prevention was studied (Ghotbi et al., 2012) words should be deleted in Japan. A national immunization plan to vaccinate 13-16 year old female students was initiated in Japan in 2010 and may reach full coverage by the end of 2012. According to these authors HPV vaccination alone does not offer full protection,

because only some HPV types are covered by the vaccines and the long term efficacy of the vaccines has not been determined yet. A survey was therefore conducted at an international university in Japan to study the KAP of female college students towards cervical cancer. The authors opine that there is need to increase awareness among Japanese female adolescents and to enhance the cervical screening rates among older females who are already sexually active.

In Korea, cervical cancer is the third leading cancer among females and is fifth highest in mortality. The persistent oncogenic human papillomavirus (HPV) infections are the greatest risk of developing cervical intraepithelial neoplasia and invasive cancer. The overall prevalence of HPV was 10.4% in Korea and strong risk factors for HPV infection included a young age at sexual debut. The National Cancer Screening Program, which includes cervical cancer screening, has the following principles: the main screening tool is the Papanicolaou test conducted by gynecologists, which targets. All women aged 30 and over, and which is done every 2 years. HPV DNA tests have not yet been permitted as a screening test for cervical cancer in Korea; however, these are conducted along with a Pap test for screening cervical cancer in the clinic. The use of prophylactic HPV vaccine has been accepted in Korea; The Korean Society of Gynecologic Oncology and Colposcopy's recommendation for routine vaccination is for females aged 15-17 years with a catch-up vaccination recommended for females aged 18-26 years who have not been previously vaccinated. However, many people in Korea are not familiar with the HPV vaccine. Therefore, it is necessary to improve awareness of the disease and HPV vaccination and to establish the effective strategies to obtain funding for HPV vaccination. In future, cervical cancer is expected to disappear throughout the world, including the Asia Pacific region, through a combination of vaccination and qualified screening programs for cervical cancer (Kim, 2009). Tran et al (2011) made a comparative study among rural and urban female health care practitioners in Korea regarding KAP and screening for cervical cancer. According to these authors misconceptions and ineffective clinical practices need to be addressed among both study groups. The authors found no major differences between rural and urban respondents regarding their KAP.

Low and middle income countries

A study was conducted to determine whether use of hormonal contraceptives is associated with cervical dysplasia and cancer in a population of Jamaica (McFarlen-Anderson et al., 2008) where there is a widespread use of hormonal contraception and the rates of cervical cancer remain high at 27.5/100,000. This study included women visiting the colposcopy and gynaecological clinics at a tertiary referral hospital. Two hundred and thirty six cases CIN I (72), II (59), III (54), cancer (51) and 102 controls consented and were interviewed on use of contraceptives using a structured questionnaire. Contraceptives used were: oral contraceptives-35%, injections depot medroxy progesterone acetate (Depo-provera)-10%, Intrauterine devices-2%, combinations of these and tubal ligation-30%. 23% reported use of other methods, barrier methods or no form of contraception. Barrier contraceptive use was not significantly different between cases and controls. Current and/or past exposure to hormonal contraceptives (HC) by use of pill or injection, alone or in combination with other methods was significantly higher in the cases. The study indicated that hormonal contraception did confirm some risk of dysplasia and women using HC should therefore be encouraged to do regular Pap smear screening.

Screening facilities for cancer cervix are available in South Africa but the incidence and mortality from cervical cancer remains very high and many women present at the facilities with late stage disease. A study was conducted by Hoque et al. (2008) to determine the baseline information on knowledge and practices on risk factors for cervical cancer and Pap smear and to design an intervention to improve Pap smear uptake. A cross sectional population based descriptive study was undertaken at a rural community of South Africa targeting women 30 years and over. The assessment was performed by means of a questionnaire survey. Outcome measures were percentage of women with the knowledge on risk factors for cervical cancer and use of Pap smear test and had under taken Pap smear test. This study showed low uptake of Pap smear test and low level knowledge on prevention of cervical cancer and risk factors thus warranting urgent extensive health education program for these rural communities.

Cervical Cancer is the commonest cancer of women in Uganda. Over 80% of women diagnosed in Mulago national referral and teaching hospital, the biggest hospital in Uganda, have advanced disease. Pap smear screening, on opportunistic rather than systematic basis, is offered free in the gynaecological outpatients clinic and the postnatal/family planning clinics. A study was undertaken to describe knowledge on cervical cancer, attitudes and practices towards cervical cancer screening among the medical workers of Mulago hospital. (Mutyba et al., 2006). The study indicated that attitude and practices towards Pap smear screening were negative.

Terefe and Gaym (2008) carried out a study on KAP of cancer cervix among reproductive health clients at three teaching hospitals in Addis Ababa, Ethiopia. Most respondents had never heard of Pap smear screening. The source of information for those who were aware of the test, were health institutions. The younger population was better informed than their older counterparts. According to these authors there is a need to intensify the level of health education in the city.

HPV prevalence and Cervical Intraepithelial Neoplasia (CIN) in HIV infected women were studied in Yunnan province, China by Zhang et al. (2012). The authors employed cervical cytology, HPV detection by Hybrid Capture assay and diagnostic colposcopy with cervical biopsy. Colposcopic histopathologically proven CIN2+ lesions were found to be present in 8.4% HIV infected women. Nearly half (43%) were co-infected with carcinogenic HPV genotypes. According to these authors HIV/AIDS care and treatment programmes should integrate effective cervical cancer prevention.

Currently, little is known regarding cervical cancer incidence in Laos, although it is anticipated to be high

like in neighboring countries. To be able to develop a screening program in the country, it is essential to explore women's perception of the disease. The purpose of this study was therefore to describe knowledge, awareness, and attitudes regarding cervical cancer among rural women of Laos. In a descriptive cross-sectional study, women were interviewed using a structured questionnaire covering socio-demographic factors, knowledge of the disease and its risk factors, awareness, and attitudes toward cervical cancer and its prevention. Eight hundred women were included in the study, and 58% claimed to knew about cervical cancer. Approximately one third (38%) considered themselves to be at risk, but less than 5% had ever had a Papanicolau test. Sixty-two percent believed it was possible to prevent cervical cancer and that vaccination may be a suitable method, but only 14% knew about risk factors. Another method for prevention was frequent vaginal douching, which was suggested by 70% of the women. Symptoms like bleeding and discharge were correctly identified as possible indicators of cervical cancer, but only 57 women (7%) knew that an early stage of the disease could be symptom-free. Lack of subjective symptoms was the main reason for women to refrain from gynecological examinations. This study indicates that rural women in Laos have limited knowledge about cervical cancer and even less about screening and prevention. According to the authors (Phongsavan, 2010) there is a need to educate the general community about the disease and its prevention.

Vu and Bui (2012) showed that the burden of cervical cancer is increasing in Vietnam in the recent years, infection with high risk HPV being the cause. The authors studied prevalence of HPV and the distribution of specific types of HPV in five big cities in Vietnam. The most common HPV types in all five cities were HPV 16, 18 and 58. Most of the positive cases were infected with high risk HPV both in Hanoi and Can Tho.

Although one-third of the world cervical cancer burden is endured in India, Bangladesh, Nepal and Sri Lanka, there are important gaps in our knowledge of the distribution and determinants of the disease in addition to inadequate investments in screening, diagnosis and treatment in these countries. Prevalence of human papillomavirus (HPV) infection among the general populations varies from 7-14% and the age-specific prevalence across age groups is constant with no clear peak in young women. This observation may be the result of a low clearance rate of incident infections, frequent re-infection/reactivation, limited or no data in target high-risk age groups (teenagers), and sexual behavioural patterns in the population. High-risk HPV types were found in 97% of cervical cancers, and HPV-16 and 18 were found in 80% of cancers in India. Beyond research studies, demonstration projects and provincial efforts in selected districts, there are no serious initiatives to introduce population-based screening by public health authorities in these countries. Cervical cancer is a relatively neglected disease in terms of advocacy, screening and prevention from professional or public health organizations. Cytology, HPV testing and visual screening with acetic acid (VIA) or Lugol's iodine (VILI) are known to be accurate and effective methods to detect cervical cancer and could contribute to the reduction of disease in these countries. While HPV vaccination provides hope for the future, several barriers prohibit the introduction of prophylactic vaccines in these countries such as high costs and low public awareness of cervical cancer. Efforts to implement screening based on the research experiences in the region offer the only currently viable means of rapidly reducing the heavy burden of disease (Sankarnarayanan et al., 2008)

The Indian Scenario

Among the modern epidemics, cancer is the second largest non communicable disease and it has a sizable contribution to the total number of deaths. The World Health Organization (WHO) documents that cancer rates are set to increase at an alarming rate globally and it is projected by the WHO that cancer burden would increase to 20 million by 2020 with 70% in the developing world. (http://www.who.int/mediacentre/factsheetsfs297/en/(s)).

The incidence of cancer is increasing in developing countries as deaths from infectious diseases and childhood mortality is decreasing. As a result, longevity increases. However, this leads to higher incidence of cancer at older ages. It is estimated that there are 2 million cancer patients in India with 0.7 million new cases each year. However, many of these cases of cancer could be tackled to a large extent by simple cost effective methods that emphasize on primordial, primary and tertiary levels of prevention. The promotion of preventive measures could be done by giving impetus to public awareness activities and early detection and screening programmes. Many investigations done in developed countries show a strong association between early reporting for screening and treatment in the community.

An investigation was undertaken by Puri et al (2010) to assess the knowledge, attitude and practices in the community pertaining to various aspects of cancer so that higher authorities could use the data as baseline for further interventional studies. The knowledge about cancer and other aspects related to cancer was low in slum dwellers as compared to urban population. A wide gap in the awareness was found between the slum dwellers and the urban community. More than 80% of the respondents were aware of the term cancer and also the symptoms of the disease. The results were in corroboration to the study done in urban slum dwellers in New Delhi (Seth et al., 2005), where also a large number of subjects could tell at least one sign of cancer. The study indicated that educational programmes should be developed to promote adherence to recommended screening guidelines. For the program to be effective, the educational campaigns need to be in vernacular and elaborated scientifically. Raychaudhuri and Mondal (2012) made use of Powerpoint presentations prepared in the Bengali language on Cancer in general and Cervical Cancer in particular to communicate with the urban and rural slum dwellers of Shaktigarh and Kawakhali in the districts of Jalpaiguri and Darjeeling, North Bengal, respectively. They were educated about symptoms of cervical cancer, personal hygiene and prevention measures. Their opinion on PAP

Test and HPV vaccination were also sought. The study also highlighted the comparative status of knowledge between slum dwellers of urban and rural North Bengal.

Dhamija et al. (1993) undertook a survey on knowledge, attitude and practice (KAP) study prior to initiation of cytological screening. A total number of 1411women were interviewed by random sampling. Subjects for the analysis consisted of a group of women who had reported previous gynaecological problems related to cervical cancer. The study brought out that younger women had better awareness and knowledge about cervical cancer and related information. Literacy status and exposure to family planning were influential in creating awareness about cancer cervix. In the present investigation, it was evident that younger women selected by random sampling, followed the practice of contraception after birth of two children which also gave them some information on healthy, disease free life style.

A study in Kerala, India (Varghese et al., 1999) confirmed the importance of genital hygiene in the fight against infections that have a role in the development of cervical dysplasia and cancer. Many women could not afford sanitary pads, while adequate facilities for washing after coitus are often unavailable. Health education, satisfactory living standards and the empowerment of women are prerequisites for reducing the incidence of cervical dysplasia.

An investigation was carried out with a view to establish the prevalence of cancer cervix in a rural Muslim community in the State of Jammu & Kashmir, in India. For this, a community based screening for cancer cervix was conducted on married women aged 20-65 years. Following provision of information to promote awareness on Pap smear and its role in prevention of cervical cancer, 270 women were screened for cancer cervix by the conventional technique. Of the 270 subjects, the majority were married before 19 years of age (81.1%) and 42.5% delivered their first child within a year or two. Multiparity was seen to the tune of 51.3%.There was no evidence of cervical dysplasia or cancer cervix among the screened population. According to these authors (Yasmeen et al., 2010) despite the presence of risk factors of high parity , early age of marriage, and early childbirth after marriage, absence of cervical dysplasia and malignancy emphasizes the fact that socio-cultural factors like absence of promiscuity and male circumcision , play an important role in the low prevalence of cancer cervix.

Joy et al. (2011) conducted a study among the female educated youths from India, Nepal and Srilanka and concluded that the awareness of cervical cancer was 66% in India, 58.8% in Nepal and 57.7% in Srilanka. However, the concerned subjects had lesser knowledge of risk factors. According to these authors, despite the advent of HPV vaccine there has been no major improvement in awareness among the undergraduate female students of these countries. In a study carried out in Kolkata, 41% of college students included in the survey , were aware of a link between sexual activity and cervical cancer (Saha et al., 2010) .

A community based study on the prevalence of risk factors of cancer cervix in married women of a rural area of West Bengal was carried out by Dasgupta et al. (2002).This was a community based, cross-sectional type observational study conducted in East Govindopur village, Singur Block in Hoogly district of West Bengal, undertaken during October 2000 to January 2001. 103 married women of reproductive age group were included in the study and respondents were interviewed directly to collect the data. The factor of early marriage was found to be predominant in the said investigation since 59.3% of the population consummated marriage before they attained the age of 18.

Dasgupta et al. (2002) also reported poor genital hygiene of the cases studied. Two third of the study population used one or more methods of contraception while only 7.7% were using barrier methods of contraception. It has been documented that there was a slightly reduced incidence of cancer cervix in women using barrier contraceptives and higher incidence in those using oral contraceptive pills (Dasgupta et al., 2002). These authors concluded that various risk factors of cancer cervix e.g., early marriage, increased parity and early marriage, low literacy, poor genital hygiene and symptoms of reproductive tract infection were highly prevalent among subjects under study. In the present investigation, the younger women practiced barrier method of contraception, the older women, on the other hand depended on oral pills.

A recent study of the risk factors for cancer cervix in a speciality hospital in Kolkata was carried out by Mitra (2009). The study was done on 133 cancer cervix patients along with a control group of 88 women, to know the risk factors for cancer cervix actually relevant in the particular study area. Each subject was interviewed by a pretested questionnaire and relevant records were examined. Some important risk factors were identified in the study-Early age at sexual debut, higher number of child births, low spacing between consecutive deliveries and non use of sanitary napkin during menstrual period. Percentage of low age (up to 19 years) at first sexual intercourse is significantly higher among the cases (94.7%) than that among the controls (71.4). It has been observed that most of the cases (70.3%) had average spacing between two children of 2 years or less, but most of the controls (52.5%) were having average spacing of 3-4 years. Use of sanitary napkin during menstrual period were observed among only 3.8% of cases, whereas, 47.7% of the controls were in the habit of using sanitary napkin. The cancer cervix patients had a significantly higher age range than the control subjects, indicating that age may be a risk factor. The present authors Raychaudhuri and Mondal (2012), observed that repeated use of cloth, washed after every use during menstruation was the usual practice. As a result, poor genital hygiene could be a serious factor in the population studied. Use of barrier contraception was found to be observed in the women of younger ages indicating a better method of family planning. However, some subjects from both urban as well as rural populations revealed symptoms of reproductive tract infection which could also be a serious risk factor of cervical cancer. The review of Indian reports highlights more minutely the categories and causes which exacerbate the incidence of cervical cancer in a low income country.

Conclusion

It is clear from the above discussion that there is a serious dearth of screening facilities and HPV vaccination in low and middle income countries including India. This is in stark contrast to careful design of such activities by the government in high income countries. However this is one part of the story since there is a serious lack of knowledge and attitude among the concerned population regarding the importance of early detection of cervical cancer as well as its rate of mortality. The rural-urban divide also comes out prominently in the low and middle income countries. India, which has got the second largest population in the world, has been specially mentioned to highlight this absence of KAP towards cervical cancer as well as presence of rural-urban divide. Hence a two pronged approach is necessary to eradicate the menace of cervical cancer through better and more coordinated government action on one hand and targeted campaign of government and NGOs among the concerned population for increasing awareness on the other.

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References

Asthana, S., Satyanarayana, L (2007). Prevention and control of uterine cervical cancer: current strategies. *Indian J Community Medicine*, **32**, 233-4.

Dasgupta A, Naskar NN, Ram R, Deb S(2002). A community based study on the prevalence of risk factors of cancer cervix in married women of a rural area of West Bengal. *Indian J Community Medicine*, **27**, 35-8.

Dhamija S, Sehgal A, Luthra UK, Sehgal K (1993). Factors associated with awareness and knowledge of cervical cancer in a community: implication for health education programmes in developing countries. *J R Soc Health*, **113**, 184-6.

Ghotbi N, Anai A (2012). Assessment of knowledge and attitude of female students towards cervical cancer prevention at an international university in Japan. *Asian Pacific J Cancer Prev*, **13**, 897-900.

Hoque M, Hoque E, Kader SB (2008). Evaluation of cervical cancer screening program at a rural community of South Africa. *East Afr. J Public Health*, **5**, 111-6.

Jemal A, Thomas A, Qualls CR, Key CR(2002). Cancer statistics 2002. *Cancer J Clin*, **52**, 23-47

Joy T, Sathian B, Bhattarai C, Chacko J (2011). Awareness of cervix cancer risk factors in educated youth: A crosssectional, questionnaire based survey in India, Nepal and Sri Lanka. *Asian Pac J Cancer Prev,* **12**, 1707-12.

Kim Y T (2009). Current status of cervical cancer and HPV infection in Korea. *J Gynecol Oncol*, **20**, 1-7.

Lea JS, Sheets EE, Wenham RM (2002). Stage IIIB-IVB cervical adenocarcinoma : prognostic factors and survival. *Gynecol Oncol*, **84**, 115-9.

Liu S, Semenciw R, Probert A, Mao Y (2001). Cervical cancer in Canada: changing patterns in incidence and mortality. I*nt J Genaecol Cancer*, **11**, 24-31.

Lowy DR, Solomon D, Hildeshein A, Schiller JT, Schiffman M (2008). Human papiloma virus infection and the primary and secondary prevention of cervical cancer. *Cancer,* **113**, , 1980-93.

Mathew A, George PS (2009). Trends in incidence and mortality rates of squamous cell carcinoma and adeno carcinoma of Cervix-world wide. *Asian Pac J Cancer Prev*, **10**, 645-50.

McFarlene-Anderson N, Bazuaye PE, Jackson MD, Smikle M, Fletcher HM (2008). Cervical dysplasia and cancer and the use of hormonal contraceptives in Jamaican women. *BMC Women's Health*, **8**, 9-10.

Mitra S (2009). Study of the risk factors for cancer cervix in a speciality hospital in Kolkata. *J of Community Medicine*, **5**, 1-5.

Mutyba T, Mmiro FA, Weiderpass E (2006). Knowledge, attitudes and practices on cervical cancer screening among the medical workers of Mulago hospital, Uganda. *BMC Med Edu*, **1**, 6-13.

Nandakumar A, Anantha N, Venugopal TC (1995). Incidence, mortality and survival in cancer of the cervix in Bangalore. India. *Br J Cancer*, **71**, 1348-52

Phongsavan K, Phengsavanh A, Wahlström R, Marions L (2010). Women's perception of cervical cancer and its prevention in rural Laos. *Int J Gynecol Cancer*, **20**, 821-6.

Puri S, Mangat C, Bhatia V, Kaur AP, Kohli DR (2010). Knowledge of cancer and its risk factors in Chandigarh, India. *Internet J of Epidemiology,* **8**, 1-7.

Raychaudhuri S, Mandal S (2012). Socio-demographic and behavioral risk factors for cervical cancer and knowledge, attitude and practice in rural and urban areas of North Bengal, India. *Asian Pac J Cancer Prev,* **13**, 1093-6.

Ruffin MT, Gorenflo Dw, Woodman B (2000). Predictors of screening for breast, cervical, colorectal, and prostatic cancer among community based primary care practices. *J Am Board Fam Pract*, **13**, 1-10.

Saha A, ChaudhuryN, Bhowmik P, et al (2010). Awareness of cervical cancer among female students of premier colleges in Kolkata, India. *Asian Pac J Cancer Prev*, **11**, 1085-90.

Sankaranarayanan R, Bhatia N, Gravitt PE, et al (2008). prevention of cervical cancer in the asia pacific region: progress and challenges on hpv vaccination and screening. *Vaccine,* **26**, M43-M52.

Seth T, Kotwal A, Thakur R, Singh P, Kochupillai V (2005). Common cancers in India: Knowledge, attitude and behavoiur of urban slum dwellers in New Delhi. *Public Health,* **119**, 87-96.

Smith HO, Tiffany MF, Qualls CR, Key CR (2000). The rising incidence of adenocarcinoma relative to squamous cell carcinoma of the uterine cervix in the United States-a 24 year population based study. *Gynecol Oncol*, **78**, 97-105

Stockton D, Cooper P, Lansdale RL (1997). Changing incidence of invasive adenocarcinoma of the uterine cervix in East Anglia. *J.Med Screen*, 4, 40-3.

Terefe Y, Gaym A (2008). Knowledge, attitude and practice of screening for carcinoma of the cervix among reproductive health clients at three teaching hospitals, Addis Ababa, Ethiopia. *Ethiopian J Of Reproductive Health*, **2**, 14-7.

Tran NT, Choe SI, Taylor R, et al (2011). Knowledge, Attitude and Practice (KAP) concerning cervical cancer and screening among rural and urban women in six provinces of the Democratic People's Republic of Korea. *Asian Pac J Cancer Prev*, **12**, 3029-33.

Varghese C, Amma N S, Chitrathara K, et al (1999). Risk factors for cervical dysplasia in Kerala, India. *Bull WHO*, **77**, 281-3.

Vu LTH, Bui D (2012). Prevalence of cervical Human Papilloma Virus infection among married women in Vietnam, 2011.

Asian Pac J Cancer Prev, **13**, 37-40.
Qurieshi MA, Manzoor NA, AsiyaW, Ahmad SZ (2010). Community based screening of cervical cancer in a low prevalence area of India: a cross sectional study. *Asian Pac J Cancer Prevention*, **11**, 231-4.
Zhang HY, Tiggelaar SM, Sahasrabuddhe VV, et al (2012). HPV prevalence and cervical intraepithelial neoplasia among HIV infected women in Yunnan province, China. A pilot study. *Asian Pac J Cancer Prev,* **13**, 91-6.