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SNAP SHOT OF EPIDEMIOLOGICAL PATTERN OF CERVICAL CANCER PATIENTS REPORTING TO A TERTIARY CANCER CARE CENTER IN NORTH KARNATAKA, INDIA

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ABSTRACT

Cervical Cancer (CC) has declined in the developed countries but the same has not been observed in the developing countries. India has 1,34,000 cases and the mortality is about 73,000. This retrospective study was carried out to understand the socio-demographic and clinico-pathologic results that would aid in identifying possible risk factors involved in cervical cancer patients attending to the tertiary cancer care hospital from the year 2001 to 2011 located in North Karnataka in the southern part of India. A total of 22,049 of cancer cases were reported and out of these 5,035 *i.e*., 41.52% were cervical cancer patients. The average age was 45 years and the median age was 50 years. Maximum number of patients was in the age group of 40-49 years. Majority of the patients were from the rural background with lower socio-economic status. This epidemiological study throws some light to the incidence of cervical cancer in this region and also the most likely risk factors involved. The increasing burden of CC among women requires immediate epidemiological investigations among the rural and urban population. This hospital based study gives an insight into the pattern and possible risk factors and to identify the high risk groups for CC.

KEY WORDS: Cervical Cancer, India, Epidemiology, Pattern, Screening.

INTRODUCTION

Cancer is a disease in which a cell or a group of cells divide and replicate uncontrollably into adjoining cells or tissues and then finally spread to other parts of the body other than the location at which they arise. About 12.7 million new cancer cases and 7.6 million cancer deaths were reported by Globocan in the year 2008. Among all female cancers breast cancer is the leading cause of cancer deaths with 1.38 million followed by colorectal cancers with 1.2 million and cervical cancer (CC) ranks third with 5,29,800 of the total new cancers worldwide (Jemal Bray *et al*., 2011). Globocan has estimated that India has the highest number of CC cases with 1,34,000 and mortality is about 73,000 which is one quarter (26.4%) of the global cancer burden. India has the highest cases of incidence and mortality of CC. Interestingly the number of mortality in India is almost equal to the number of incident rate in neighboring country China which has the second highest number of CC patients in the world. Whereas, considering the Age Standardized Rate (ASR) in the global scenario India is not among the top 20 country for CC because of its large population size. (Arbyn, Castellague *et al*., 2011). When the geographical areas were considered Asia, Latin America, and Sub-Saharan Africa have recorded the highest incidence for cervical cancer (Yang, Bray *et al.*, 2004). Whereas areas like N. America and N. Europe have decreased incidence considerably (Vizcaino, Moreno *et al.*, 2000).This can be attributed to geographic differences in population prevalences of Human Papilloma Virus (HPV) and also other co-factors; like use of long term birth control pills, high parity, increased number of sexual partners, smoking and also because of lack of screening programmes. The screening programmes have considerably decreased the incidence and mortality rates in developed countries but most women in developing countries have no screening programmes at all (Burger, Hollema *et al*., 1993, Kjellberg, Hallmans *et al*., 2000, Maleknejad, Rakhshan *et al*., 2006, Sankaranarayanan, Nene *et al.*, 2009, Hoste, Vossaert *et al*., 2013). Cervical Cancer (CC) develops in the tissues of the cervix of the female reproductive organ and is a serious female health problem affecting mostly middle aged women with about 80% occurring in developing countries (Sankaranarayanan, Budukh *et al*., 2001, Clifford, Smith *et al*., 2003, Arbyn, Castellsague *et al*., 2011). CC screening (Pap smear) has been introduced over the past 50 years and a significant decrease in its rate has been observed in the developed countries. The same is not true in developing countries because of lack of screening programmes which aid in the detection of precancerous lesion and also it

requires huge investments and improvement in the present screening policies, because of this dearth has led to untimely death among the middle aged women in their most valuable years of life. Although HPV vaccine offers a promising option for lowering the disease burden in the developing world, but the cost of vaccine is too high for economically weaker section of the society especially the rural poor (Goldie, Gaffikin *et al*., 2005, Sowjanya, Jain *et al*., 2005, Depuydt, Boulet *et al*., 2007).

Cancer can be better understood in a population by studying their epidemiology. Epidemiological studies at the sub population level has to be carried out so as to understand the cause, effects, their distribution and their incidence pattern as CC has the highest mortality rate in India (Candelaria, Cetina *et al*., 2005). This retrospective study was conducted among the patients visiting Karnataka Cancer Therapy and Research Institute (KCTRI) which is a tertiary cancer care hospital in North Karnataka in South India. The main reason to undertake this study was the proximity of the hospital for the patients from different parts of North Karnataka and also the prevalence rate for CC is high without any screening or awareness programmes in this region.

MATERIALS & METHODS

Study design and study population

The study conducted was a retrospective study for a period of eleven years from 2001 to 2011 from a tertiary cancer care hospital from North Karnataka in South India which is the only hospital which has consistently maintained the patient's data year wise. Case files for the collection of data were obtained from the medical records department of the hospital after obtaining Institutional Ethical Clearance.

Data Collection and Analysis

A total of 3,344 CC patients had visited the tertiary cancer care hospital and out of these patients had regular follow up were included and those patients who did not have regular follow up for less than six months were excluded from our study. Data regarding socio-demography status, rural and urban, food habits, BMI and Hemoglobin level were obtained on a preformed performa and the data was systematically tabulated on Excel spread sheet version 2007.

RESULTS

From the data collected from the year 2001 to 2011 it was analyzed that patient's had visited the tertiary cancer care hospital from different parts of North Karnataka (Fig 1). Their demographic results were in the age range of 20-90 years (Fig 2).

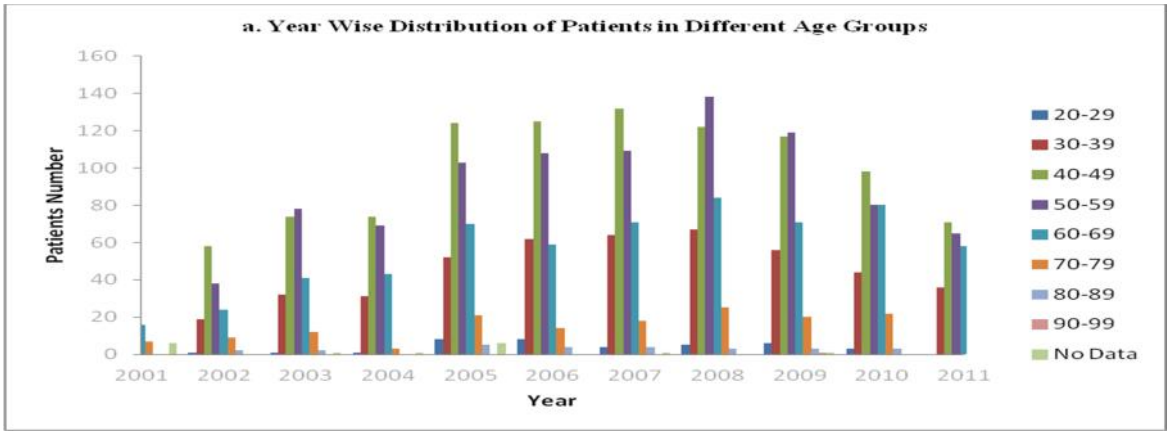

FIGURE 1: Year wise distribution of patients from 2001-2011

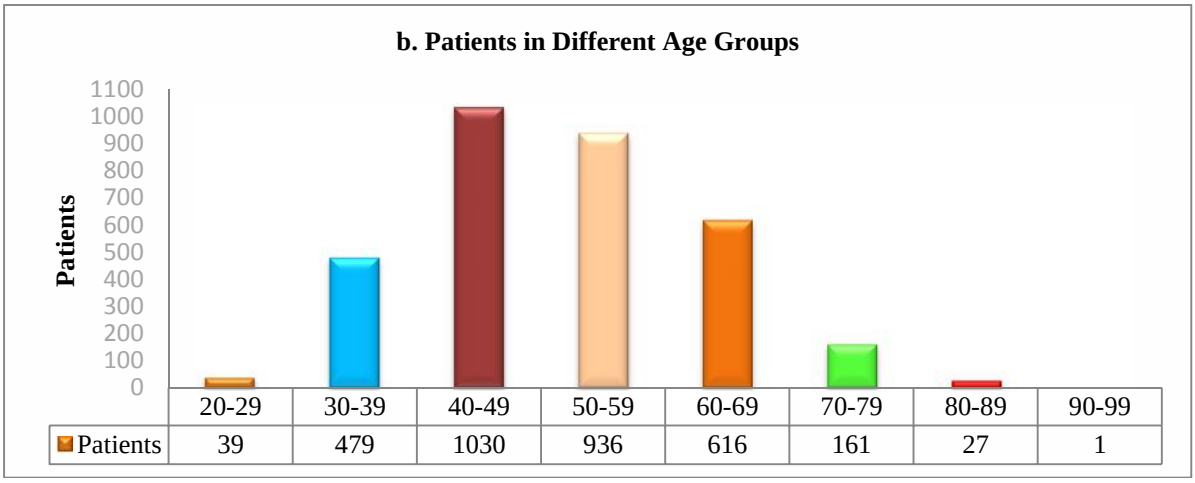

FIGURE 2: Age wise distribution of patients from 2001-2011

About 31.31% were in the age group of 40-49 years and 28.45% in the age group of 50-59 years. The average age was found to be 45 (SD 11.06) with a median of 50 years. According to their habitat most of the patients were from rural area 67.34% where as the urban were 32.56%. When the community was considered Christians were 0.26%, Muslims 2.03% and Hindus 97.66% (Table 1).

TABLE1: Year Wise distribution of cervical cancer patients based on religion and areas

Year		Religion			Area	
		Christian	Muslim	Hindu	Rural	Urban
2001	n	1	1	114	26	90
	%	0.86	0.86	98.2	22.41	77.58
2002	n	0	10	139	7	142
	%	0	6.7	93.28	4.6	95.30
2003	n	2	4	234	167	72
	%	0.83	1.6	97.5	69.58	30
2004	n	1	5	215	143	77
	%	0.45	2.26	97.28	34.84	64.70
2005	n	2	5	381	311	77
	%	0.51	1.28	98.19	80.15	19.84
2006	n	0	9	371	284	96
	%	0	2.36	97.63	74.73	25.26
2007	n	0	4	399	322	81
	%	0	0.99	99.00	79.90	20.09
2008	n	1	0	437	331	113
	%	0.2	0	99.31	74.54	25.45
2009	n	1	2	391	306	88
	%	0.25	0.50	99.23	77.66	22.33
2010	n	1	2	327	89	241
	%	0.30	0.60	99.09	26.96	73.03
2011	n	0	20	258	183	95
	%	0	7.1	92.80	65.82	34.17

Their hemoglobin level was accounted with normal Hb level 13.54% (12.3-15.3g/dl), mild anemia in 34.54% (10-11.5g/dl), moderate anemia in 43.19 %(7-9.9g/dl) and severe anemia 9.08 %(< 7g/dl) (Fig 3).

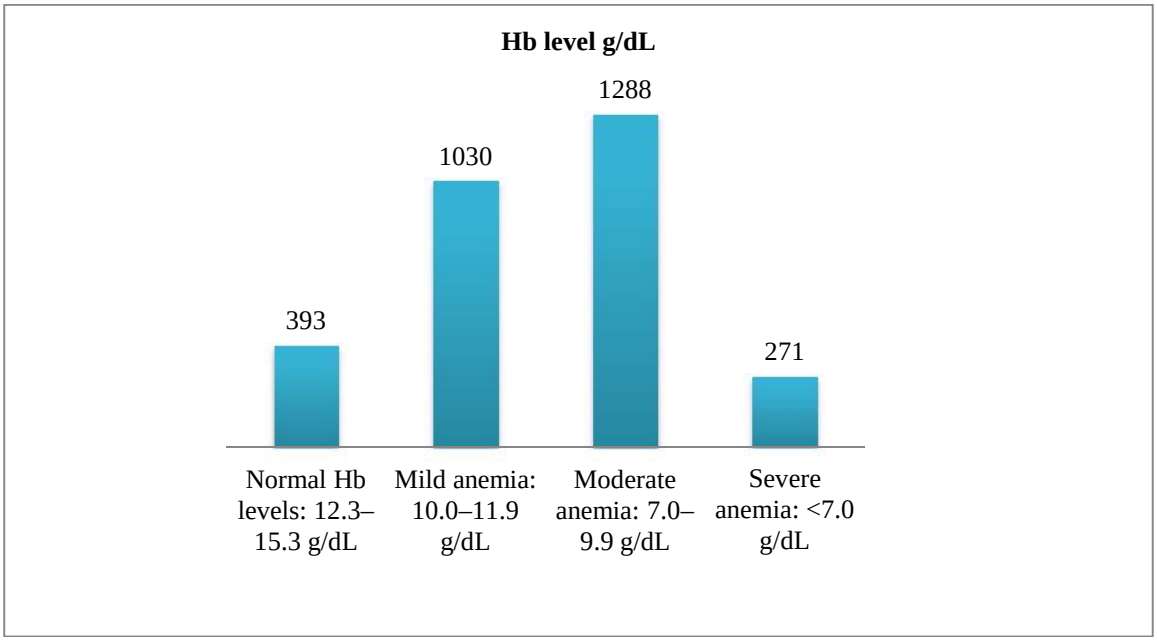

FIGURE 3: Patients Haemoglobin level

Food habits were considered with 51% being non-vegetarian and 49% being vegetarian. Considering their BMI 1,170 (35%) were under weight, 1,784 (53%) in the normal range, 336 (10%) were overweight and 83 (2%) were obese (Fig 4).

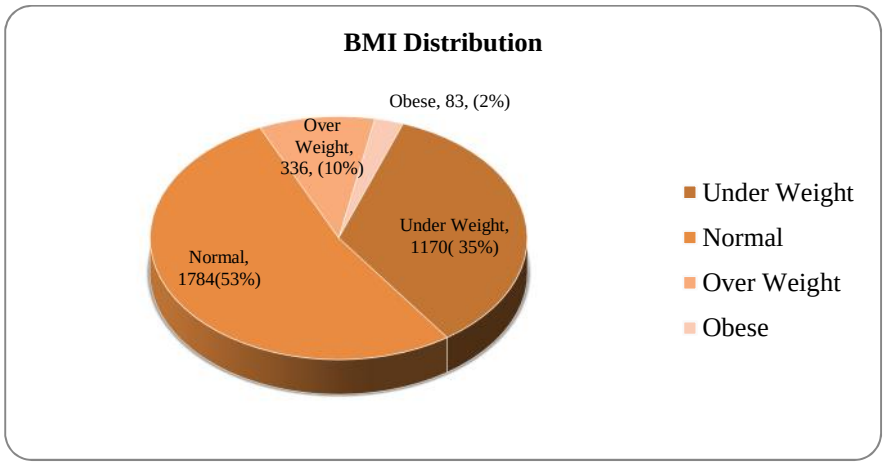

FIGURE 4: Patients BMI distribution from 2001-2011

DISCUSSION

The aim of this retrospective study was to understand the epidemiology of CC at the tertiary cancer care hospital in North Karnataka in South India. Epidemiology is the only way to study cancer in humans at the population level. It is a discipline with a well developed set of principles for study conduct, analysis and interpretation, epidemiology enables us to study gene environment interactions and to assess the effects of our interventions at the population level. CC ranks as the highest among all types of cancer and also as the top most cancer among women accounting to about half of all other types of cancer from the year 2001 to 2011. Age is a significant factor for HPV infection and it was seen that in our study the highest prevalence of CC was seen in the age group of 40-49 years with a percentage of 31.31% which coincides with the study done by (Swamy, Gomathy *et al*., 2012). Whereas, in other studies the prevalence of HPV was found in the age group of 20-24 years and also from 18-24 year olds (Coupé, Berkhof *et al*., 2008, Silva, Ribeiro *et al*., 2011). Also the patients enrolled in our study the age range was seen to be from 20-90 years whereas the study done by Pavani Sowjanya *et al*., the age range ,of women was found to be between 30-65 years. Accordingly in our study the median age was seen to be 50 years, but the study done elsewhere the median was to be 55 years (Sowjanya, Jain *et al.*, 2005). The reason for the above was explained by Mosha *et al*., 2009, who reports that CC among older women may be due to delayed progress from precancerous condition to cancerous stage (Mosha, Mahande *et al*., 2009).Where as among young women may be due to multiple sexual partners and also young women are less prone to develop immunity against the recent exposure to HPV virus (Argyri, Papaspyridakos *et al*., 2013). Most of the patients attending to the tertiary cancer care hospital were from rural population with 2,252 *i.e*., 67.34% and their urban population being 1089 *i.e*., 32.56% and the same has been observed by Sandeep Singh *et al*., 2012 with 54.80% in the rural areas compared to 45.19% of their urban areas (Sandeep 2012). The factors contributing to this increased number may be due to multiple sexual partners, poverty, low socio-economic status and also poor genital hygiene among the rural population. (Sen, Sankaranarayanan *et al*., 2002, Rajkumar, Franceschi *et al*., 2003). Population is mainly divided into different community and when these community were considered it was seen that Hindus were of 3,266 (97.66%), Muslims were 68 (2.03%), and Christians were 9 (0.2%) respectively. The study done by Michelle Kaku it was seen that Hindus were 71%, Muslims were 11% and Christians were 18% (Kaku, Mathew *et al*., 2008). The reason for this is explained by others that the increased number among Hindus may be due to decreased socio-demographic status, improper hygiene, multiple sexual partners and increased use of barrier contraceptives, but when the Muslims were considered it was seen that the practice of circumcision may be the reason for the decreased number (Paul, Tiwary *et al.*, 2011, Swamy, Gomathy *et al*., 2012). Anemia is caused when a person has low hemoglobin level than their normal blood level. Anemia is a major factor to be considered for the survival of patients and it is shown that decreased survival rate has been found in cancer of the cervix. Our results have also shown that majority about 90% of the patients are in the range of severe and moderate anemia. Low hemoglobin level decreases the level of prognosis, slow to respond to any therapeutic regimes and poor quality of life. Along with these bleeding was a major symptom with heavy loss of blood which is a major factor contributing to severe anemia among cervical cancer patients. Considering the hematological factors our results have shown that over 34.54 %(10-11.5g/dl) with mild anemia, 43.19% (7-9.9g/dl) with moderate anemia 9.08% (<7g/dl) with severe anemia and 13.54 %(12.3-15.3 g/dl) with normal hemoglobin level. Whereas according to the studies done by Mryna *et al.*, all the patients showed an hemoglobin level which is less than 12g/dl and the study done by Van Belle *et al*., showed that the hemoglobin level

was less than 10g/dl. (Van Belle and Cocquyt 2003, Candelaria, Cetina *et al*., 2005, Grotto, 2008).

No adequate results have been found with relevance to BMI in our study but according to Nora *et al*., (Kizer, Thaker *et al*., 2011), it was reported that patients with low BMI with cervical cancer was associated with adverse outcomes compared to normal weight and obese patients. Much studies has not been considering anthropometric factors like height and weight but it has also been observed that the association of obesity among white women and their decreased screening has been explored (Wee, Phillips et al. 2005).When the food habits were considered, it was difficult to understand the pattern of food intake since, India having a diverse food habits and there is a shift in the diet pattern from the rural to urban population. Among the Indian population not much importance has been given for the intake of food along with fruits and vegetables and also not much diet pattern has been observed among the rural and urban population. However, in our studies some of them were vegetarians irrespective of rural and urban population. Study reports that low weight and low intake of fruits and vegetables increases the risk of CC. Reports have also indicated that of inadequate diet plan and it is also seen that with habits like chewing pan with decreased body weight and fewer intake of nutritional foods may have led to the increased risk of cervical cancer (Rajkumar, Franceschi *et al*. 2003, Sinha, Anderson *et al*., 2003). In this retrospective study we could not analyze the number of life time sexual partners nor the age at first sexual intercourse in the patient's history because of the cultural barriers and also the social taboo to answer these questions however, it was noted that the life time risk of CC was high with increased number of sexual partners as reported by the study done elsewhere (Silva Ribeiro *et al*., 2011).

CONCLUSION

This is a hospital based study and it gives an insight into the pattern and also helps to identify the high risk groups for CC. Based on the data it is seen that the prevalence rate is consistently high throughout the year and our study highlights that cervical cancer as a major cause of cancer in North Karnataka. To know the accurate demographic profile increased survey has to be undertaken at the local Primary Health Centers since majority of the population are from the rural areas and there is a need to arrange stringent screening for cervical cancer for precise epidemiological studies. In India organized screening and vaccination programmes are not mandatory and population based screening and vaccination programmes require huge resources. The increasing burden of CC among women requires immediate epidemiological investigations of trends among rural, semi rural and urban population. The number of patients among the rural population is much higher when compared to their urban counterparts, and no such screening for cervical cancer has been undertaken among the rural females. There is an immediate need to create awareness among the rural population especially among the rural women about the importance of screening. The Government and the Non Government organizations has to mandatory strategize in organizing screening and vaccination programmes among the masses. Vaccination has to be given at the local primary health centers free of cost, and the women who have participated in these programmes has to be advised to attend the follow up programmes. The population has to be educated about the cause and effects of cervical cancer. Importance has to be given to maintain personal hygiene, healthy food and also in case of any symptoms to report to the nearest tertiary cancer care hospital for treatment at an earliest stage which could be life saving. Another thing noticed among women is prioritizing towards maintaining their family and neglecting their own personnel life. Visiting to health clinic needs time and money and the most adequate screening facility would be at a distant place to bridge the gap screening and vaccination programmes has to be arranged where they can be easily accessible (Sandeep 2012).

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