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Original Article

Socio-Demographic, Somatic and Disease Profile of Cancer Patients in Tertiary Care Centres of a City in Karnataka, India

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ABSTRACT

Introduction: Cancer is a complex disease caused due to multiple genetic changes leading to uncontrolled proliferation of cells with metastatic ability. Various external and internal factors along with changes in lifestyle have an implication on cancer. The major objective was to study the socio-economic, functional and somatic status of cancer patients and the risk factors associated with the disease. **Methods:** A descriptive cross-sectional study was conducted in three cancer hospitals of Mysuru, India between the months of September 2014 to November 2015 to recruit 152 (90 M, 62 F) histopathologically confirmed cancer patients. Pre-tested questionnaire was used to elicit data on socio-demography, disease history, anthropometry and risk factors associated with cancer. The ECOG tool was used to assess the functional status. **Results:** Among the subjects, men predominantly had head and neck and gastrointestinal cancers which could be due to higher substance abuse whereas, most of the women were overweight or obese with a mean BMI of 24.31±5.10 and had gender specific cancers such as breast, cervix, endometrium and ovary. The disease was diagnosed earlier in females than in males due to higher visibility of symptomatology. Men had severe muscle depletion as reflected by low MUAC values (25.73 cm ±3.70). The functional status was affected irrespective of the type of cancer or the gender. **Conclusion:** The study indicates that factors such as low socio-economic status, poor nutritional status, food intake and health habits prevalent among the cancer patients are associated with the stage and type of the disease at diagnosis.
Key words: Alcohol, Cancer, India, Mysuru, Risk factors, Tobacco.

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INTRODUCTION

The burden of cancer has increased in the past few decades in India. Being a developing country, India is growing rapidly and remarkable changes have been observed in the lifestyle, dietary patterns and socio-economic status (SES).[1] Among the various factors; tobacco smoking, alcohol, obesity and raised blood pressure have been the most harmful adult risk factors for non-communicable diseases in India.[2] Lifestyle risk factors vary for each cancer type. For example, use of tobacco, betel quid chewing, alcohol, low fruits and vegetables intake etc are lifestyle risk factors for oral cancer[3] whereas, age, family history, diet high in saturated fat, high body mass index etc are lifestyle risk factors for breast cancer.[4]

Overweight and obesity on the other hand is clearly linked to cancers of breast in post-menopausal women, colon, rectum, endometrium, oesophagus, kidney and pancreas and; might also increase the risk of cancers of gall bladder, liver, non-Hodgkin's lymphoma, multiple myeloma, cervix, ovary and prostate cancer.[5] According to the American Cancer Society, excess body weight is reported to contribute to 8% of all cancer prevalence and 7% of all cancer deaths in the United States. On the contrary, intentional weight loss can reduce the risk of cancer.[5]

The cancer sites considered to be associated with the use of tobacco are lips, tongue, mouth, pharynx, oesophagus, larynx, lungs and urinary bladder. According to the report on the Hospital Based Cancer Registries (HBCRs): 2012-14 – Bangalore, India, Oesophagus (16.9%), lung (16.7%) and hypopharynx (16.4%) in men and; mouth (47.9%) and oesophagus (22.8%) in women contributed to the relative proportion of tobacco related cancers.[6]

In addition, SES also plays an equally important role in the aetiology and management of cancer. Patients belonging to lower SES have limited access to health care services, increased risk of occupational hazards, higher chance of involving in risky sexual activity, smoking, poor diet and lesser access to healthy protective foods such as fruits and vegetables. A good social environment provides decision making abilities, personal care, healthy lifestyle and healthy eating habits.[7] Other factors such as stage of cancer at diagnosis, cancer cachexia, treatment associated Nutrition Impact Symptoms (NIS) and poor

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nutritional status have a negative impact on the functional status of cancer patients.[8-9]

Recent data of the Population Based Cancer Registries (PBCRs), India, on cancer prevalence reported lung, mouth, oesophagus and stomach in men and; breast and cervix in women as the leading cancer sites.[10] According to the National Cancer Registry Programme (NCRP) report 2012-14 on the tobacco related cancers, lung cancer followed by cancers of the oesophagus and mouth were leading sites in both the genders across the country.[11]

The PBCR-Bangalore, India, reported lung, stomach, prostrate, oesophagus and brain as leading sites for cancer in men and; breast, cervix uteri, ovary, thyroid and mouth as leading sites in women.[12] Meanwhile, the data on the HBCR - Bangalore, India, reported oesophagus, lung, hypopharynx, tongue and stomach as leading cancer sites in men, of which, most of them are tobacco related cancers. Cancers of the cervix, breast, mouth, ovary and oesophagus were leading sites in women.[13] A marked difference can be observed in the reports of PBCRs and HBCRs in the same region. The PBCRs and HBCRs are limited to reports and trends of selected regions of the country and do not cover district-wise data. The data is further limited to trends only in Bangalore due to lack of Regional Cancer Centres facility. Moreover, wide differences exist in the lifestyle and environment between Bangalore and other regions of Karnataka. Hence, there is a need to study the trends in the Mysuru region and also for the local regional cancer centres to tie up with the National bodies to contribute data on the region specific trends.

Data on the socio-demographic, anthropometric and functional status of cancer patients receiving tertiary care in the Mysuru population is scarce. Thus, it was proposed to study these parameters in patients attending selected cancer hospitals of Mysuru, Karnataka, India.

MATERIALS AND METHODS

Data collection

This descriptive cross-sectional study was conducted in selected cancer hospitals of Mysuru city viz., Krishna Rajendra Hospital, Preethi Cancer Hospital and HCG-Bharath Hospital and Institute of Oncology between the months of September 2014 to November 2015. Subjects meeting the inclusion criteria were considered and 152 subjects (90 men and 62 women) were recruited during the study period.

Approval from Institutional Human Ethics Committee (IHEC-UOM No. 45 Res/2014-15, dated 07-08-2014) and permission from the respective hospitals were obtained to conduct the study. Patients of all age and both genders, with histopathologically confirmed cancers of all stages who expressed willingness to participate were included in the study. Patients who were critically ill or on enteral or parenteral feeding were excluded from the study. The purpose and importance of the study were explained to the participants and an informed consent was obtained in English or the local language i.e., Kannada. A pre-tested questionnaire was used to elicit information on the socio-demographic profile, disease profile, anthropometry, functional status and risk factors associated with cancer. Anthropometric data included height, weight, body mass index (BMI), mid upper arm circumference (MUAC), mid-upper arm muscle circumference (MUAMC) and triceps skinfold (TSF). The height was recorded using a stadiometer and weight using an analogue bathroom scale with frequent standardization. The MUAC was recorded using a non-elastic measuring tape. The TSF was recorded using a Lange skinfold caliper (Beta technology incorporated, Cambridge, Maryland). The Asian classification of BMI was used as reference values and were as follows; <18.5: underweight, 18.5-23: normal, 23-27.5: overweight, >27.5: obese.[14] The reference values for TSF were obtained from National Health Examination Survey, United States, 2007-2010[15] for all racial and ethnic groups aged over 20years and MUAC values from National Health Examination Survey, United States, 2011-2014 for Non-Hispanic Asians aged above 20years.[16] The reference values and the results were classified as "severe fat/muscle depletion" (<25th percentile), "mild to moderate fat/muscle depletion" (25th – 50th percentile) and "Within acceptable range for MUAC/TSF" (>50th percentile values). The reference values for men are <29.0, 29.0-30.9 and >30.9cm respectively for MUAC and <9.9, 9.9-13.4 and >13.4mm respectively for TSF whereas; <25.5, 25.5-27.9 and >27.9cm respectively for MUAC and <18.0, 18.0-23.5 and >23.5mm respectively for TSF for women. Functional status was assessed according to the Eastern Co-operative Oncology Group (ECOG) classification.[17] The SES was evaluated using the modified Kuppuswamy's Scale with a revised income parameter for 2014.[18]

Data analysis

The data was subjected to statistical analysis using SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). The Chi-square Phi and Cramer's V test for nominal data and Somer's D test for ordinal data were employed to compare between gender and variables such as socio-demographic profile, disease profile, risk factors, factors influencing unhealthy habits and functional status. The age group and stage of cancer were cross tabulated. The anthropometric data was expressed as mean ± SD and t-test was applied to compare results of the anthropometric profile.

RESULTS

Socio-demographic profile

Among the 152 subjects, 90 (59.2%) were men and 62 (40.8%) were women. The socio-demographic data including marital status, religion, family type, locality and SES is given in Table 1.

Majority of the study population were married, followed Hinduism and lived in a nuclear family. The patients seeking treatment in Mysuru city were mainly non-localites residing in rural areas due to lack of facilities to treat cancer. Most of the subjects travelled from districts across Mysuru city such as Mysuru (rural), Kodagu, Hassan, Chamarajanagar and Mandya for treatment. The patients belonged majorly to upper lower class of SES (men-57.8% and women - 61.3%). There was no significant difference in the SES, locality, family type and religion between the genders, however a significant difference (P<0.001) was observed in the marital status with higher number of widows among women. A significantly higher number of non-localite men (P=0.030) were receiving treatment in these hospitals.

Disease profile

The disease profile of the study population is given in Table 2. Family heredity is one of the risk factors for cancer. Twenty six participants had a family history of cancer; however the type of cancer diagnosed in the individual varied from the cancers existing in the family. The duration of diagnosis of the disease was mostly between 1-5 years with the disease being diagnosed at later stages (Stage III and IV). Majority of the patients (>30% of men and women) received chemotherapy followed by CT/RT after surgery and chemo-radiotherapy. The presence of co-morbidities such as diabetes, cardiovascular diseases, hypertension was observed in 39.73% (n=151) of the subjects (Table 2). There was no significant difference observed (P>0.05) in the family heredity of the disease, disease diagnosis, treatment and co-morbidities between the genders in the study population.

Types of cancers

The data was grouped into three major categories of cancers viz., HNC, GIC and OC for the ease in comparing the results. The frequency of major category of cancers among the genders is given in Figure 1.

Among men, HNC (n=40) and GIC (n=27) were more predominant of which oesophageal cancer (n=9) was the most common type followed by cancers of the stomach, lungs and base of tongue (n=7) whereas,

Table 1: Socio-demographic profile

Demographic data (n=152)	Men (%)	Women (%)	X^2	P value
(Men=90, Women=62)			29.629	**<0.001**
Marital status (M, W)				
Married (81, 33)	90	53.2		
Unmarried (4, 4)	4.4	6.5		
Widower (5, 23)	5.6	37.1		
Divorced (0, 2)	0	3.2		
Religion (M, W)			2.157	0.541
Hindu (77, 57)	85.6	91.9		
Muslim (9, 4)	10.0	6.5		
Christian (2, 1)	2.2	1.6		
Others (2, 0)	2.2	0		
Family type (M, W)			0.182	0.670
Nuclear (75, 50)	83.3	80.6		
Joint (15, 12)	16.7	19.4		
Type of locality (M, W)			1.378	0.502
Urban (27, 24)	30.0	38.7		
Rural (62, 37)	68.9	59.7		
Resettlement colony (0, 0)	0	0		
Slums (1, 1)	1.1	1.6		
Mobile (0, 0)	0	0		
Residence (M, W)			4.693	**0.030**
Localites (24, 27)	26.7	43.5		
Non-localites (66, 35)	73.3	56.5		
Socio-economic status (M, W)			6.729	0.151
	2.2	1.6		
Upper class (2, 1)	11.1	9.7		
Upper middle class (10, 6)	20.0	8.1		
Lower middle class (18, 5)	57.8	61.3		
Upper lower class (52, 38)	8.9	19.4		
Lower class (8, 12)				

M-Men, W-Women

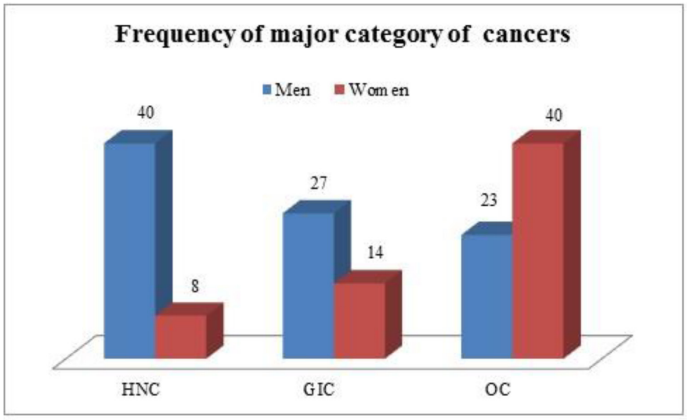

Figure 1: The frequency of major category of cancers between genders HNC-Head and Neck Cancer, GIC- Gastrointestinal cancer, OC-Other cancers.

OC (n=40) were mostly seen in women wherein cancers of the breast (n=15), cervix (n=10) and ovary (n=8) were higher and breast cancer was the most reported cancer. The types of cancers differed significantly (P<0.001) and correlated strongly between the genders [X^2 (2) = 25.759, V=0.412].

Table 2: Disease profile

Disease profile	Men (%)	Women (%)	X^2	P value
Family heredity of disease (n=151) (M, W)			0.088	0.767
Yes (16, 10)	18	16.1		
No (73, 52)	82	83.9		
Disease diagnosis (M, W)			-	-
<1year (29, 18)	32.2	29.0		
1-5years (56, 41)	62.2	66.2		
>5years (5, 3)	5.6	4.8		
Treatment (M, W)			10.174	0.070
Treatment not initiated (2, 0)	2.2	0		
Chemotherapy (25, 26)	27.8	41.9		
Radiotherapy (9, 5)	10.0	8.1		
CRT (27, 8)	30.0	12.9		
Surgery + no treatment (0, 1)	0	1.6		
CT/RT after surgery (27, 22)	30.0	35.5		
Co-morbidities (n=151) (M, W)			17.463	0.065
No co-morbities (59, 32)				
HTN (3, 10)	66.3	51.6		
DM (4, 3)	3.4	16.1		
CVD (3, 0)	4.5	4.8		
Thyroid (1, 2)	3.4	0		
HTN + DM (4, 3)	1.1	3.2		
HTN + CVD (1, 1)	4.5	4.8		
CVD + HTN + DM (0, 2)	1.1	1.6		
DM + Thyroid (0, 1)	0	3.2		
HTN + CVD + Renal disease (0, 1)	0	1.6		
Other co-morbidities* (14, 7)	0	1.6		
	15.7	11.3		

* Other co-morbidities included liver disease, urolithiasis, cholelithiasis, Tuberculosis, piles, AIDS, osteoarthritis, prostatomegaly, hysterectomy, nephropathy, gastritis, obese, splenomegaly, paralysis, peptic ulcer; HTN-hypertension, DM-Diabetes mellitus, CVD-Cardiovascular disease, CT-Chemotherapy, RT – Radiotherapy, CRT-Chemo-radiotherapy; M-Men, W-Women

In the study population, 41 different types of cancers were observed. HNCs included mostly the squamous cell carcinomas of the post-cricoid, tonsils, base of tongue, nasopharynx, larynx, pyriform fossa, posterior pharyngeal wall, floor of mouth, tongue, gingivobuccal sulcus, neck, maxilla, hypopharynx, epiglottis, supraglottis, thyroid and retromolar-trigone. GICs included cancers of the esophagus, colorectum, stomach, rectum, liver, bile duct and colon. The OCs observed were gender specific cancers in women viz, endometrial cancer, breast cancer, cervical cancer, ovarian cancer and men viz, testicular cancer and prostate cancer; cancers of the lymphoid and haematopoietic system such as Hodgkin's and non-Hodgkin's lymphoma, myeloma and leukemia and; different histologic cancer types of brain and nervous system such as astrocytoma, glioma, ependymoma and the parieto-occipital region. Sarcoma, cancer of the bladder and lung were also observed in the study population.

Comparison of age group and Stage of Cancer

The age group of the subjects was tabulated with the stage of cancer to observe the stage at which the disease was diagnosed. The age group of the subjects and the stages of cancer are given in Table 3.

Table 3: The age group of the subjects and stage of cancer

Gender			Stage of Cancer					Total (n=152)
			Stage 1	Stage 2	Stage 3	Stage 4	Unknown	
Men	Age group	<20	1	0	0	1	0	2
		20-29	0	0	1	0	0	1
		30-39	1	0	2	1	1	5
		40-49	1	1	3	3	1	9
		50-59	2	3	7	15	6	33
		60-69	3	1	5	11	5	25
		70-79	0	1	2	5	2	10
		>80	1	0	1	3	0	5
	Total		9	6	21	39	15	90
Women	Age group	<20	0	0	0	0	1	1
		20-29	0	0	2	0	1	3
		30-39	1	1	0	3	0	5
		40-49	3	4	4	3	5	19
		50-59	1	1	4	4	2	12
		60-69	1	2	6	7	2	18
		70-79	0	0	0	2	2	4
	Total		6	8	16	19	13	62

The disease occurrence was higher in the age groups between 40-69 years (40-49 yrs in women, n=19; 50-59 yrs in males, n=33) and was observed to be earlier in women than in men. This observation could be due to greater visibility of the symptomatology in breast and cervical cancer. It was observed that 23.33% and 43.33% of men; 25.80% and 30.64% of women were in Stage III and Stage IV respectively, signifying diagnosis of the disease at terminal stage and lately in men.

Anthropometric profile of the study population

The average height of men and women was 165cm [t (78) =-12.129, P<0.001] and 154cm [t (56) =-8.108, P<0.001] respectively and was significantly lower than the standards for Indians viz, 173cm for reference man and 161cm for reference woman. The average weight in men and women was 54 kg [t(78)=-4.858, P<0.001] and 58 kg [t(56)=1.414, p=0.163] respectively as compared to standards viz., 60 kg for reference man and 55 kg for reference woman.[19]

The anthropometric profile of the study population is depicted in Table 4. The mean BMI of women was significantly higher (p<0.001) than the BMI of men. Male subjects were predominantly underweight with BMI <18.5 kg/m^2 (n=34) and women were overweight with BMI ranging between 23-27.5 kg/m^2 (n=22). A higher BMI in women (n=34; 22-overweight and 12-obese) could be related to gender specific cancers such as cancers of the ovary, breast, cervix and endometrium which is a major risk factor. Men (83.6%) had severe muscle depletion than women (32.7%). The MUAC values (25.73 cm ±3.70) were lesser than the 25th percentile of anthropometric data for Non-Hispanic Asians. Both men (54.2%) and women (46.2%) had severe fat depletion (<9.9 mm for men and <18.0 mm for women) as indicated by the TSF values.

Functional status of the study population

The ECOG is a specific tool used to assess the functional status in cancer subjects. As per this classification, the results obtained were as follows: "normal activity" was observed in 3.8% of men and 14.1% of women; more than 40% of the subjects (51.2% - men, 42.1% - women) reported "presence of symptoms but nearly fully ambulatory"; 30% of men and 26.3% of women reported to be "On bed less than 50% of daytime", while 15-17.5% of the subjects reported to be "On bed more than 50% of daytime". Although, a higher percentage of women had normal activity, there was no significant difference (P=0.153) observed between the genders [X^2 (3) = 5.265]. The functional status was affected irrespective of the type of cancer or the gender. However, stage of cancer had no effect since majority of the subjects with stage IV of the disease (42.6%) had symptoms but were fully ambulant.

Major risk factors for cancer

The most common risk factors for cancer include tobacco smoking and chewing, alcohol, betelnut chewing and nose snuff. Risk factors for cancer in the study population are given in Table 5.

The number of years of substance abuse such as alcohol (n=35), tobacco smoking (n=61), tobacco chewing (n=9), betelnut chewing (n=2) and nose snuff (n=1) were 32.46±10.90, 34.93±14.272, 21.56±14.081, 40.50±14.849 and 20±0years respectively. HNCs were seen mostly in men and can be related to habits such as beedi and cigarette smoking (49.10%, n=55 and; 10.71%, n=12 respectively) which was not observed in women. The respondents were asked if they smoked while drinking alcohol. Among men (n=88), 29.9% smoked while consuming alcohol, 15% did not smoke while consuming alcohol, 27.6% smoked but did not consume alcohol and 25.3% did not have the habit of smoking or drinking alcohol. However, women were not involved in any of the unhealthy habits except tobacco chewing. Therefore, HNCs and GICs can be linked to tobacco smoking and alcohol intake which is very well known and documented by several research studies. There was a significant difference between the gender and habits such as beedi smoking (P=0.0001, V=0.637), cigarette smoking (P=0.003), alcohol intake (P=0.0001, V=0.513), tea (P=0.01) and smoking while drinking alcohol (P=0.0001, V=0.725) which can increase the risk

Table 4: Anthropometric profile

Parameters	Men (mean± SD)	Women (mean± SD)	t value	P value
Height in cm (n=136)	164.84±5.97	153.60±6.89	10.147	**<0.001**
Weight in Kg (n=136)	53.65±11.61	57.65±14.19	-1.807	0.073
MUAMC in cms	22.67±2.73	21.54±2.87	2.208	**<0.001**
MUAC in cm (n=125)(M, W)	25.73±3.70	27.11±4.27	-1.923	0.057
Severe muscle depletion (65, 33)	83.6%	32.7%		
Mild to moderate muscle depletion (5, 12)	12.3%	42.3%		
Within acceptable range (3, 7)	4.1%	25.0%		
TSF in mm (n=124) (M, W)	9.84±5.0	17.73±8.46	-6.005	**<0.001**
Severe fat depletion (39, 24)	54.2%	46.2%		
Mild to moderate fat depletion (14, 15)	19.4%	28.8%		
Within acceptable range (19, 13)	26.4%	25.0%		
BMI (n=136) (M, W)	19.69±3.87	24.31±5.10	-5.997	**0.029**
<18.5 (underweight) (34, 6)	43.0%	10.5%		
18.5–23 (normal) (28, 17)	35.4%	29.8%		
23–27.5 (overweight) (13, 22)	16.5%	38.6%		
>27.5 (obesity) (4, 12)	5.1%	21.1%		

Note: Reference values of all the parameters are quoted in the text; MUAMC-Mid arm muscle circumference; MUAC-Mid arm circumference; TSF- Triceps Skinfold; BMI-Body mass index; M-Men, W-Women

Table 5: Risk factors for cancer

Risk factors (n=149) (M, W)	Men (%)	Women (%)	X^2	P value
Tobacco chewing (4, 7)	4.5	11.5	2.530	0.112
Beedi smoking (55, 0)	62.5	0	60.432	0.0001
Cigarette smoking (12, 0)	13.6	0	9.047	0.003
Alcohol (41, 0)	46.6	0	39.210	0.0001
Tea (69, 36)	78.4	59	6.511	0.01
Coffee (42, 32)	47.7	52.5	0.323	0.570
Betel nut chewing without tobacco (3, 3)	3.4	4.9	0.212	0.645
Nose snuff (1, 0)	1.1	0	0.698	0.404
Smoking while drinking alcohol (n=148) (26, 0)	29.9	0	77.690	0.0001

M-Men, W-Women

Table 6: Factors influencing unhealthy habits

Factors (n=148, M=87, W=61) (M, W)	Men (%)	Women (%)	X^2 (P value)
No alcohol/tobacco (19, 56)	21.8	91.8	75.688
Self-interest (1, 2)	1.1	3.3	(<0.001)
Relieve from stress (1, 0)	1.1	0	
Peer influence (14, 2)	16.1	3.3	
Self Interest + relieve from stress (7, 0)	8.0	0	
Self-interest + Boost self-confidence (1, 0)	1.1	0	
Peer pressure + self-interest (11, 1)	12.6	1.6	
Peer pressure + Relieve from stress (24, 0)	27.6	0	
Peer pressure + feel more adult (1, 0)	1.1	0	
All factors (8, 0)	9.2	0	

M-Men, W-Women

of HNC and GIC cancer. Consumption of coffee, betel nut chewing without addition of tobacco, nose snuff and tobacco chewing did not differ significantly between the genders.

The reasons cited by the participants for indulgence in the reported health habits are given in Table 6. In the study population (n=148), majority of the subjects (50.67%) were not involved in the habits of smoking, tobacco and betelnut chewing; and alcohol consumption. Among the 49.33% of subjects who reported to indulge in these habits, the major reasons cited were "peer influence", "relief from stress" and "feeling more adult". A significant difference (P<0.001, V=0.715) was observed in factors influencing unhealthy habits between the genders, since most of the women did not indulge in these habits.

DISCUSSION

This is the first cross sectional study conducted in Mysuru, reporting the socio-demographic, somatic and disease profile of cancer patients in tertiary care. The findings suggest various patient characteristics viz.,

age, literacy level, economic status, risk factors of cancer, influence the stage of cancer at diagnosis and functional status.

Despite the increase in incidence of various types of cancer and advancement of medical care in India, majority of the subjects were found to be diagnosed in the later stages of cancer. It may be inferred that many more cases would be under-reported due to factors such as low awareness, poor access to medical services, poverty, socio-cultural factors and absence of screening programs.

A NCRP report in 2001, on the patterns of cancer in Mysuru district reported that 648 patients (0.024%) received treatment in cancer hospitals in an estimated population of 26,20,527. The leading cancer sites among men were oesophagus, lungs, hypopharynx, stomach, mouth, larynx and tongue and; in women were cervix, breast, oesophagus, ovary and mouth.[20] The trends in types of cancer remain similar as observed in our study with a higher number of aerodigestive tract cancers in men and gender specific cancers in women. In this study, the number of breast cancer cases was observed to be higher than cervical cancer, which may be due to the convenient sampling method adopted.[21] A lower incidence of cervical cancer in the study population could also be because of lower exposure to carcinogens such as Human Papilloma Virus. Our results are comparable to the three year report of the PBCRs (2012-14) by NCRP where breast cancer has been the leading site followed by cervix among women.[10] The results are also comparable to the HBCRs survey conducted by NCRP in Bangalore which reported leading sites of cancers of cervix uteri, breast, mouth, ovary and oesophagus in women and cancers of hypopharynx, oesophagus, lung, tongue and mouth in men by rank.[13] The NCRP report on Head and Neck cancers reported greater incidence of HNCs between the age group of 45-69 years in men and women as observed in our study.[22] Majority of the participants belonged to lower SES. The disease was diagnosed at an advanced stage in majority of the study population and was detected earlier in women than in men due to greater visibility of symptomatology in the case of breast and cervical cancer.

In our study, the somatic status was greatly affected in HNC and GIC due to decreased food intake. Poor somatic status can be accounted to low SES observed in majority of subjects due to limited access to healthy protective foods. Overall, poor SES and somatic status, treatment side effects and presence of cancer cachexia had an effect on the overall functional status in cancer subjects.

The functional status was affected higher in men than in women which is highly dependent on the type of cancer. For example, patients affected with HNC and GIC have trouble in consuming or digesting the food which affects their nutritional status. Poor nutritional status will directly affect the functionality. Furthermore, presence of NIS associated with treatment along with cancer cachexia has a negative impact on the functional status.

Tobacco and alcohol related cancers were higher in men whereas lifestyle related cancers were higher in women with a significant difference ($P<0.05$). Peer influence had a higher association with unhealthy habits such as consumption of alcohol and smoking which was higher in men than in women. Knowledge on dietary restriction of nutrients such as fat, reduced consumption of tea and importance of physical activity will help in the management of lifestyle related cancers and control of tobacco and alcohol supply can prevent the increasing rates of HNC and GIC in men. The results on health habits were comparable to the World Health Organization (WHO) report on the Global tobacco epidemic - country profile of India, 2015 which reported 24.3% and 10.3% of tobacco smoking and cigarette smoking in men and 2.9% and 0.8% in women, respectively.[23] Among men, 36.60% consumed alcohol; and women did not indulge in the habit of consuming alcohol. The WHO Global Status Report on Alcohol and Health 2014 of India reported a per capita consumption in 2010 to be 32.1 (in litres of pure alcohol) in men and 10.6 (in litres of pure alcohol) in women aged above 15 yrs. The per capita consumption of alcohol has increased from 1.6 (in litres of pure alcohol) in 2003-2005 to 2.2 (in litres of pure alcohol) in 2008-2010.[24] Also, alcohol consumption along with smoking increases the risk of HNC. Heavy drinkers have an increased risk of cancers of the mouth, throat, oesophagus, larynx and liver. Cigarette smoking and use of alcohol are the modifiable risk factors for preventing HNC. A case-control study of combined effect of tobacco and alcohol on laryngeal cancer risk suggested that there was an increased multiplicative risk of cancer with use of cigarette smoking and alcohol intake. Use of alcohol also potentiated tobacco-related carcinogenesis which was an independent risk factor.[25-26]

Though there are initiatives taken up by the Government to impart awareness on the harmful effects, tobacco and alcohol related cancers are on the rise in the country. Therefore, a more stringent protocol has to be adopted to ban or control the supply and access to tobacco and alcohol. Since, peer influence has an effect on unhealthy habits; the same can be adopted in controlling the risk factors associated with cancer among men by conducting peer group counseling at villages and for addicts at Rehabilitation centres. Awareness should be created regarding the importance of diet, health habits and physical activity in the prevention and management of lifestyle related cancers.

CONCLUSION

This study is a first attempt to understand the descriptive epidemiology of cancer patients in Mysuru attending a tertiary setting. Understanding individual patient factors such as socio-demography, nutritional status, food and health habits, behavioural characteristics and healthcare factors associated with advanced stage at diagnosis is essential for targeted effective public health interventions to promote prompt health seeking, diagnosis at early stage and improved survival from cancer. The study provides insights about the range of factors such as SES, habits, lifestyle and somatic status likely to be associated with stage and type of cancer at diagnosis. The results may be useful as baseline data for planning large scale region - based population studies to identify the causes, undertake suitable screening and treatment options.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

BMI: Body mass index; **ECOG:** Eastern Co-operative Oncology Group; **GIC:** Gastrointestinal cancers; **HNC:** Head and neck cancers; **HBCRs:** Hospital Based Cancer Registries; **MUAC:** Mid upper arm circumference; **MUAMC:** Mid-upper arm muscle circumference; **NCRP:** National Cancer Registry Programme; **NIS:** Nutrition Impact Symptoms; **OC:** other cancers; **PBCRs:** Population Based Cancer Registries; **SES:** Socio-economic status; **TSF:** Triceps skinfold; **WHO:** World Health Organization.

SUMMARY

Various factors have an implication on Cancer. In our study, it was observed that poor food intake, SES, somatic status along with treatment side effects had a negative impact on the functional status irrespective

of the type of cancer or the gender. Habits such as tobacco smoking and chewing, alcohol intake and poor physical activity are modifiable risk factors of cancer which can be prevented by imparting knowledge and awareness. The study provides an insight on the trends and various factors that influence the disease which might be useful as baseline data for planning large scale regional studies.

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