

Statistical Analysis of Sociodemographic Characteristics and Knowledge of Risk Factors of Cancer among Cancer Patients of Kalaburagi City, Karnataka State

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Abstract:

Cancer is a leading global health issue, with significant variations in incidence and outcomes across different regions. In Karnataka, cancer poses a major public health challenge, marked by a high incidence rate and considerable mortality. This study aims to explore the sociodemographic characteristics of cancer patients attending cancer care hospitals in Kalaburagi city, focusing on identifying patterns related to gender distribution, literacy status, and other demographic factors. A cross-sectional study design was used, involving the administration of a structured questionnaire to 500 randomly selected cancer patients from Cancer Care Hospitals in Kalaburagi city. Data were analysed for statistical examination of the collected information. The results revealed significant disparities in cancer incidence among different sociodemographic groups, with females representing 58% of the sample and males 42%. Additionally, 53.8% of the patients were identified as illiterate, while 60.4 % were unemployed and 65% of participants had an annual income between 1 lakh and 3 lakhs, underscoring the impact of education, employment and annual income on cancer outcomes. The study also assessed knowledge of risk factors of cancer among cancer patients. 80.2% reported smoking or tobacco use as one of the major risk factors of cancer. Excessive alcohol consumption was reported by 54.4% of patients, notably more among males (71%) compared to females (42.4%). None of the patients attributed their cancer to genetic factors. Odds ratio analysis indicates a strong association between cancer risk and tobacco use (OR = 8.15), and alcohol consumption (OR = 97.51). A higher cancer risk is also associated with a BMI ≤ 25 (OR = 1.93), while age shows a modest and non-significant effect (OR = 1.23). The results underscore the need for targeted public health interventions and educational programs to address disparities and improve cancer management in the region.

Keywords: Cancer, Sociodemographic Characteristics, Literacy Status, Risk Factors, Odds Ratio.

Date of Submission: 11-11-2024

Date of acceptance: 23-12-2024

I. INTRODUCTION

Cancer is one of the leading causes of morbidity and mortality worldwide, with an estimated 19.3 million new cases and nearly 10 million cancer-related deaths reported in 2020 [10]. The global burden of cancer is expected to rise significantly in the coming decades, particularly in low- and middle-income countries where healthcare resources are limited, and early detection and treatment options are less accessible [2]. While advancements in cancer diagnosis and treatment have improved survival rates in high-income countries, cancer remains a critical public health challenge, disproportionately affecting vulnerable populations globally.

In India, cancer incidence is steadily increasing, with an estimated 1.39 million new cases and over 850,000 deaths reported in 2023 [9]. The most common cancers in India are breast, cervical, and oral cancers, with varying prevalence based on geographic regions and sociodemographic factors.

In rural and semi-urban areas, including some parts of Karnataka, cancer awareness, early diagnosis, and access to treatment continue to be substantial barriers to effective cancer control [6].

Karnataka, one of the most populous states in southern India, has also experienced an increasing cancer burden. According to the Karnataka Cancer Registry, over 78,000 new cancer cases were diagnosed in 2023, with breast and cervical cancers leading the statistics for females, while lung and oral cancers were more common among males [8]. Kalaburagi, a district in northeastern Karnataka, is no exception to this rising trend.

The district's socioeconomically disadvantaged population faces challenges related to healthcare access, literacy, and employment, further exacerbating disparities in cancer care and outcomes.

Focusing specifically on Kalaburagi city, cancer cases have been rising in recent years. According to the District Health Office (DHO) of Kalaburagi, the city recorded over 2,000 new cancer cases and 1,200 cancer-related deaths in 2023 [4]. Kalaburagi's population is largely rural and economically underprivileged, with limited access to specialized cancer care facilities. As a result, many patients are diagnosed at advanced stages of the disease, contributing to higher mortality rates.

Sociodemographic characteristics, including educational attainment, employment status, and income, play a crucial role in cancer diagnosis, treatment, and survival. Research has demonstrated that lower educational levels are often associated with delays in cancer diagnosis and poorer health outcomes [11]. Additionally, socioeconomic factors such as income and employment status can significantly affect access to cancer care and treatment options [7]. Gender disparities are also evident, with variations in cancer types and survival rates observed between males and females [3].

Understanding the knowledge of cancer risk factors among patients is crucial for developing targeted public health interventions. Risk factors such as smoking, alcohol consumption, poor diet, and lack of physical activity have been well-documented in the literature as significant contributors to cancer development [12]. Smoking is a leading cause of cancer, with tobacco use associated with various malignancies, including lung and oral cancers [5]. Excessive alcohol consumption has also been linked to an increased risk of several cancers, including liver and breast cancer [1].

This study focuses on analysing the sociodemographic characteristics of cancer patients from two major cancer care centers in Kalaburagi city. The primary objective is to evaluate the gender distribution, literacy status, and employment patterns among 500 randomly selected cancer patients. By identifying the disparities in cancer care based on sociodemographic factors, this research aims to inform public health interventions that can improve cancer management and patient outcomes in Kalaburagi city.

II. DATA COLLECTION AND METHODOLOGY

2.1 Study Design and Population:

This cross-sectional study was conducted at two Cancer Care Hospitals in Kalaburagi city. A total of 500 cancer patients were randomly selected from outpatient and inpatient departments over a 3-month period. Data were collected using a structured questionnaire designed to capture sociodemographic information and cancer-related details.

2.2 Sampling and Data Collection:

Participants were selected using a random sampling technique to ensure a representative sample. Each participant was given a structured questionnaire to collect data on their age, gender, marital status, educational attainment, occupation, income, risk factor of cancer, type of cancer, and stage at diagnosis. Informed consent was obtained from all participants prior to their involvement in the study.

2.3 Data Analysis:

Descriptive statistics were used to summarize the sociodemographic characteristics of the patients, using percentage proportions and Chi-square test was conducted to explore associations between sociodemographic factors of cancer patients. Furthermore, odds ratios (ORs) were calculated to quantify the strength of associations between risk factors and gender.

III. RESULT AND DISCUSSION

The study sample consisted of 500 study subjects with cancer, out of which there were 290 females and 210 males.

Table 1: Age and Genderwise distribution of cancer patients

Gender	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Age group in years						
20-29	10	2	09	1.8	19	3.8
30-39	39	7.8	52	10.4	91	18.2
40-49	59	11.8	73	14.6	132	26.4
50-59	50	10.0	96	19.2	146	29.2
60 and above	52	10.4	60	12.0	112	22.4
Total	210	42	290	58	500	100
Chi-square value with 4 degrees of freedom at 5 % level of significance						5.808
P-value						0.214

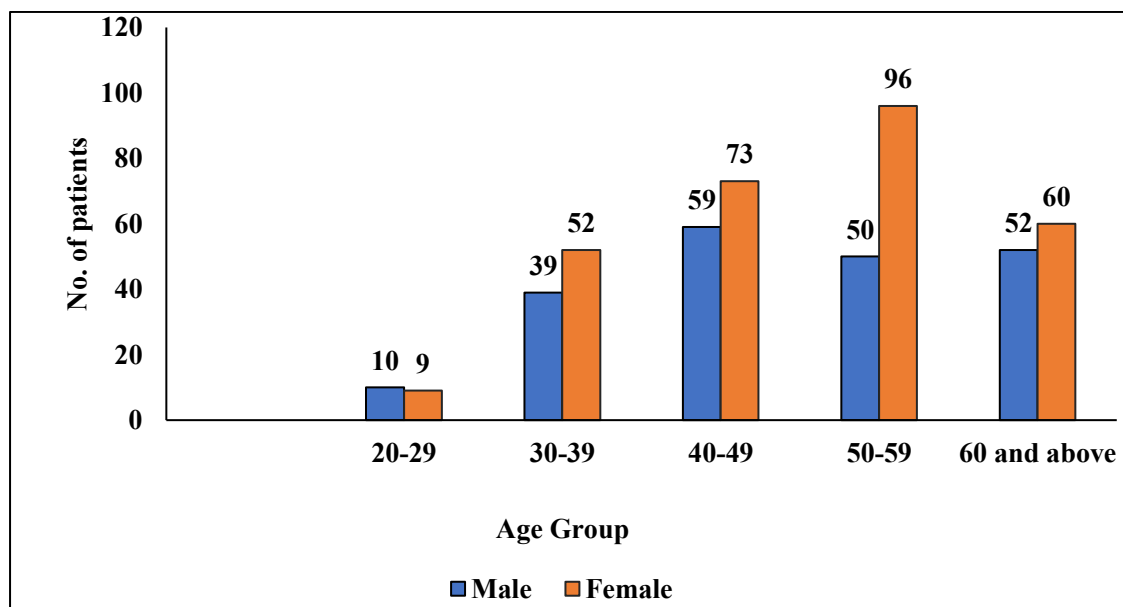


Fig 1: Age and Genderwise distribution of Cancer patients

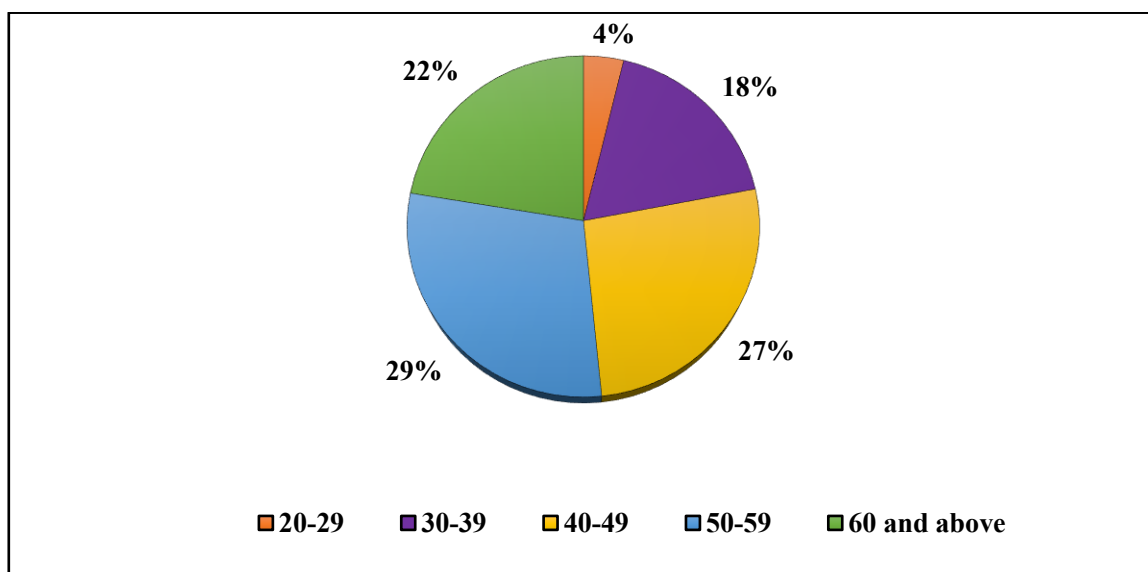


Fig 2: Age-wise distribution of cancer patients

Out of the total sample, highest proportion of males (11.8%) was from the age group of 40-49 years, while highest proportion for females (19.2 %) was observed for the 50-59 years age group, followed by males belonging to the age group of 50-59 and 60 and above (10% , 10.4 %) and females in the age group of 40-49 years(14.6 %). The lowest proportion of overall cancer patients (3.8 %) was in the age group 20-29 years.

Chi-square test was conducted for testing the hypotheses that there is no association between age and gender of cancer patients. The p-value 0.214 indicates that the result is not significant. Hence, we conclude that there is no significant association between age and gender of cancer patients.

Table -2: Distribution of cancer patients according to literacy status

Gender	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Illiterate	87	17.4	182	36.4	269	53.8
Primary	54	10.8	42	8.4	96	19.2
Secondary	52	10.4	49	9.8	101	20.2
Graduation, Post-graduation and Professional Graduate (B.E/MCA/MB A/MBBS)	17	3.4	17	3.4	34	6.8
Total	210	42	290	58	500	100
Chi-square value with 3 degrees of freedom at 5 % level of significance						22.926
P-value						0.000142*

* Indicates that the result is significant.

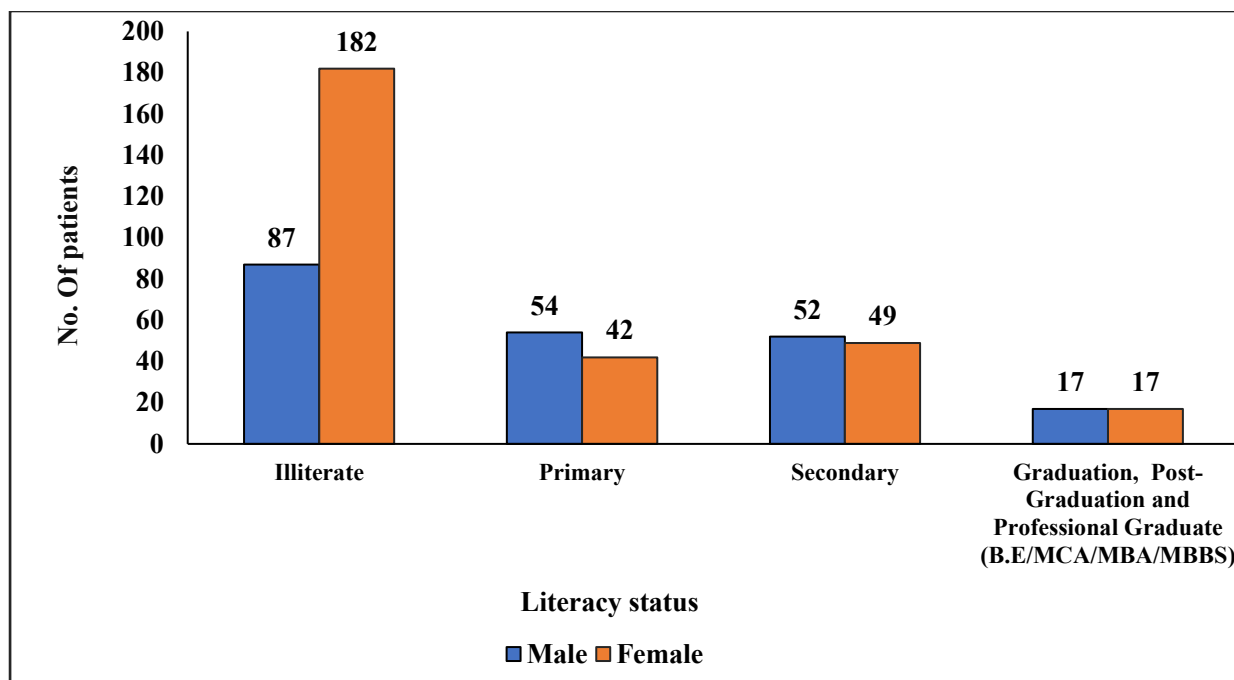


Fig 3: Distribution of Cancer patients according to gender and literacy status

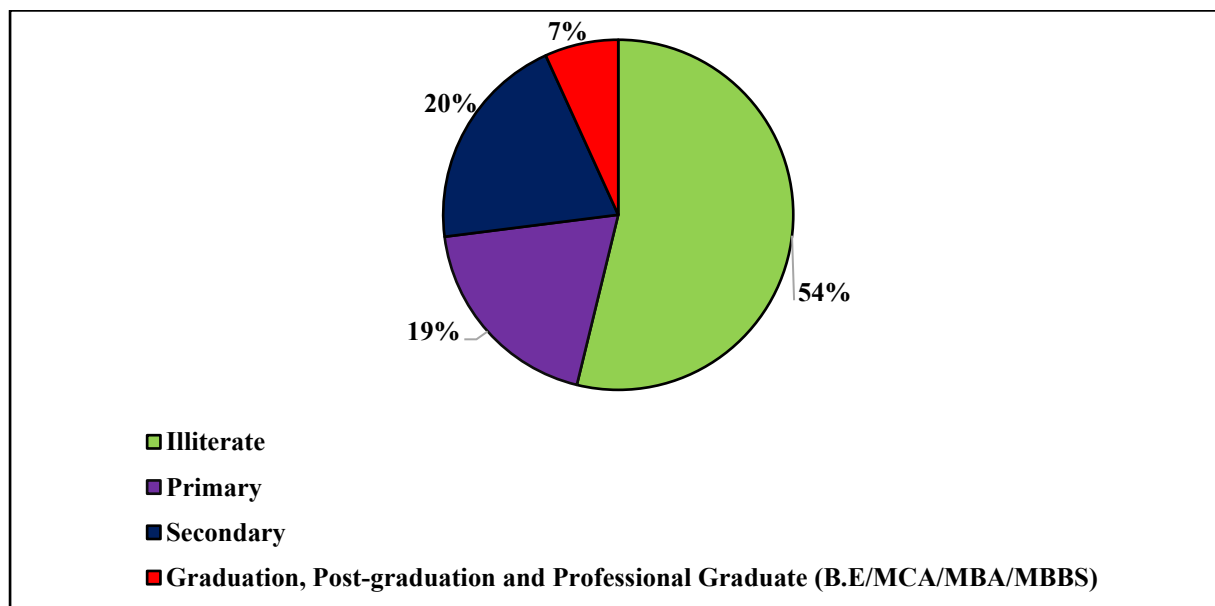


Fig 4: Distribution of Cancer Patients according to literacy status

Among the 500 cancer patients, Illiteracy was predominant among cancer patients, accounting for 53.8% of the total sample, with a higher proportion among females (36.4%) compared to males (17.4%). Primary and secondary education levels were observed in 19.2% and 20.2% of patients, respectively, with males showing slightly higher proportions than females in these categories. Only 6.8% of patients had higher education (graduation or professional degrees), with equal proportions among males and females (3.4% each). These findings highlight a significant gender disparity in educational attainment among cancer patients, emphasizing the need for targeted interventions to address educational inequalities

Chi-square test was conducted for testing the hypotheses that there is no association between literacy status and genderwise distribution of cancer patients. The p-value is 0.000142 which indicates that the result is significant. Hence, we conclude that there is a significant association between gender and literacy status of cancer patients.

Table 3: Distribution of cancer patients according to employment status

Gender	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Unemployed	51	10.2	251	50.2	302	60.4
Employee (govt. private)	66	13.2	24	4.8	90	18
Business	48	9.6	8	1.6	56	11.2
Retired & Agriculturist	45	9	7	1.4	52	10.4
Total	210	42	290	58	500	100
Chi-square value with 3 degrees of freedom at 5 % level of significance					200.730	
P-value					0.0001*	

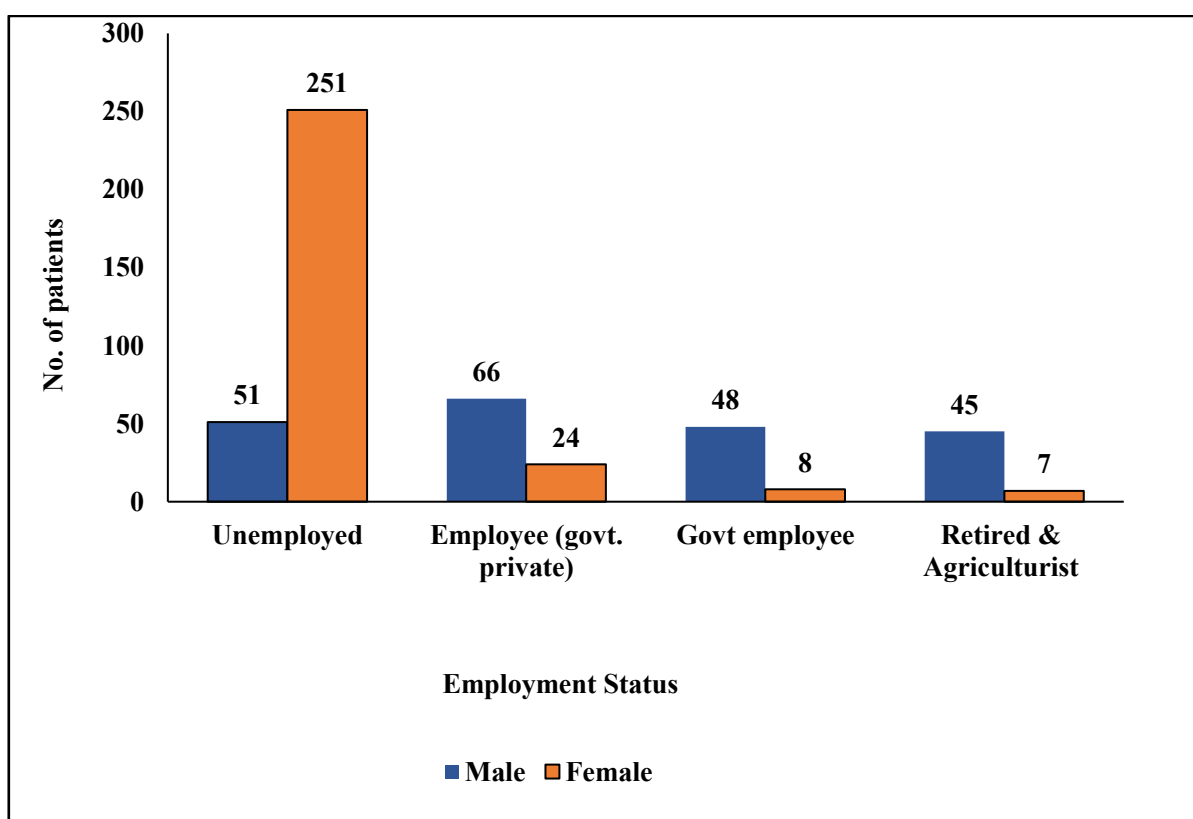


Fig 5: Distribution of Cancer patients according to gender and Employment status

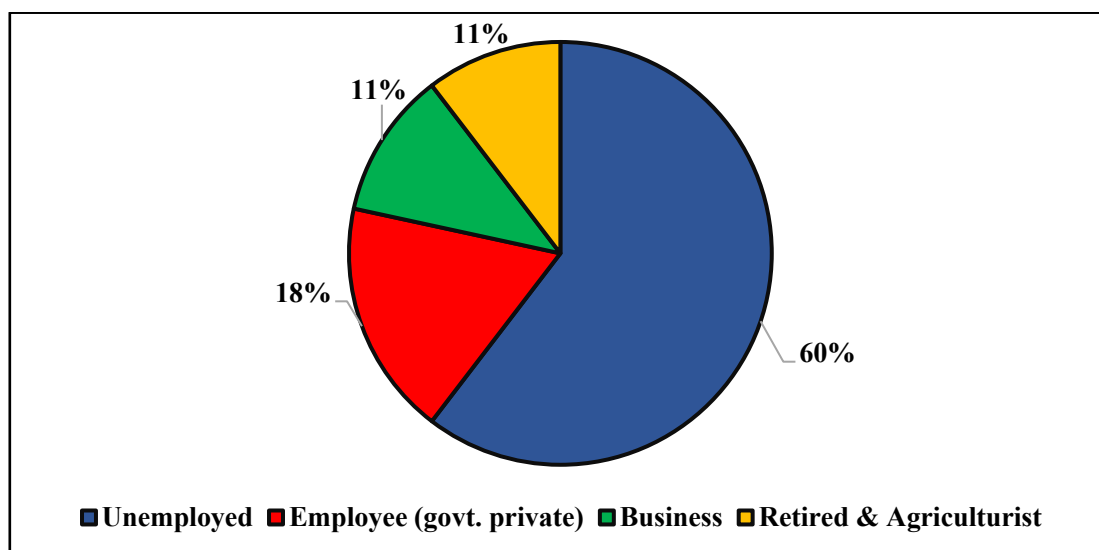


Fig 6: Distribution of Cancer patients according to Employment status

Among 500 cancer patients, unemployment was the most prevalent category, accounting for 60.4% of the total population, with a significantly higher proportion among females (50.2%) compared to males (10.2%). Employment in government or private sectors was the second highest category, observed in 18% of the total population, with males (13.2%) significantly outnumbering females (4.8%). Business activities accounted for 11.2% of the total population, with males (9.6%) far exceeding females (1.6%). Retired individuals and agriculturists made up the lowest proportion (10.4%), again dominated by males (9%) compared to females (1.4%). The findings highlight stark gender disparities in employment status, with females predominantly unemployed, underscoring the need for socio-economic support interventions for cancer patients.

Chi-square test was conducted for testing the hypotheses that there is no association between employment status and genderwise distribution of cancer patients. The p-value 0.0001 indicates that the result is significant and we conclude that there is a significant association between employment status and gender of cancer patients.

Table 4 : Distribution of cancer patients according to Annual income status

Gender	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Less than 1 lakh	21	4.2	42	8.4	63	12.6
1 lakh -3 lakhs	126	25.2	199	39.8	325	65
3-6 lakhs	45	9	44	8.8	89	17.8
6 lakhs and above	18	3.6	5	1	23	4.6
Total	210	42	290	58	500	100%
Chi-square value with 3 degrees of freedom at 5 % level of significance						18.428
P-value						0.0001*

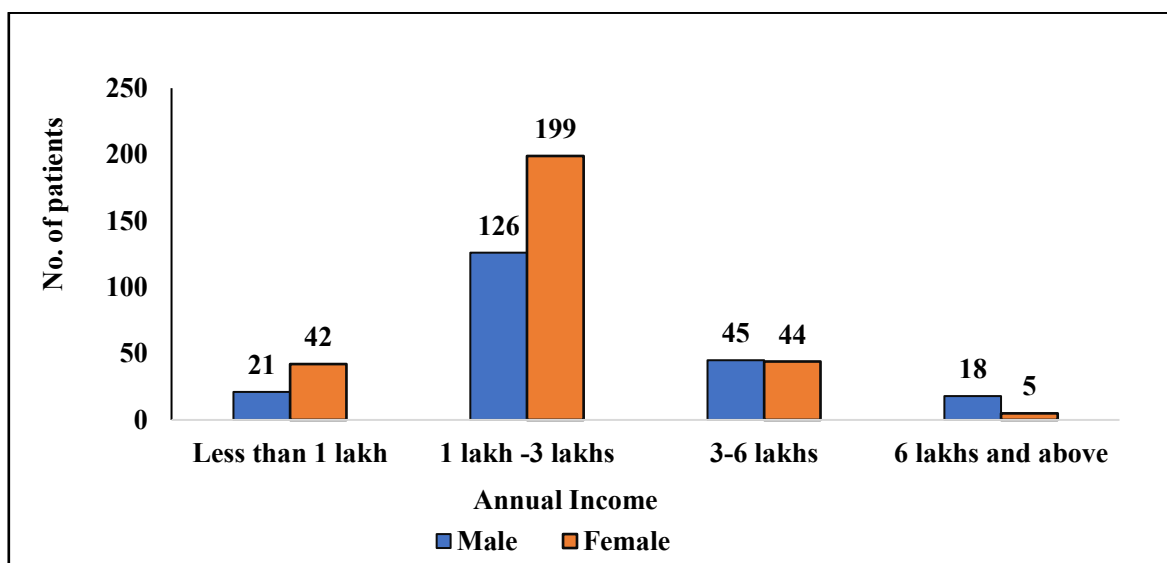


Fig 7: Distribution of Cancer patient according to Annual income Status

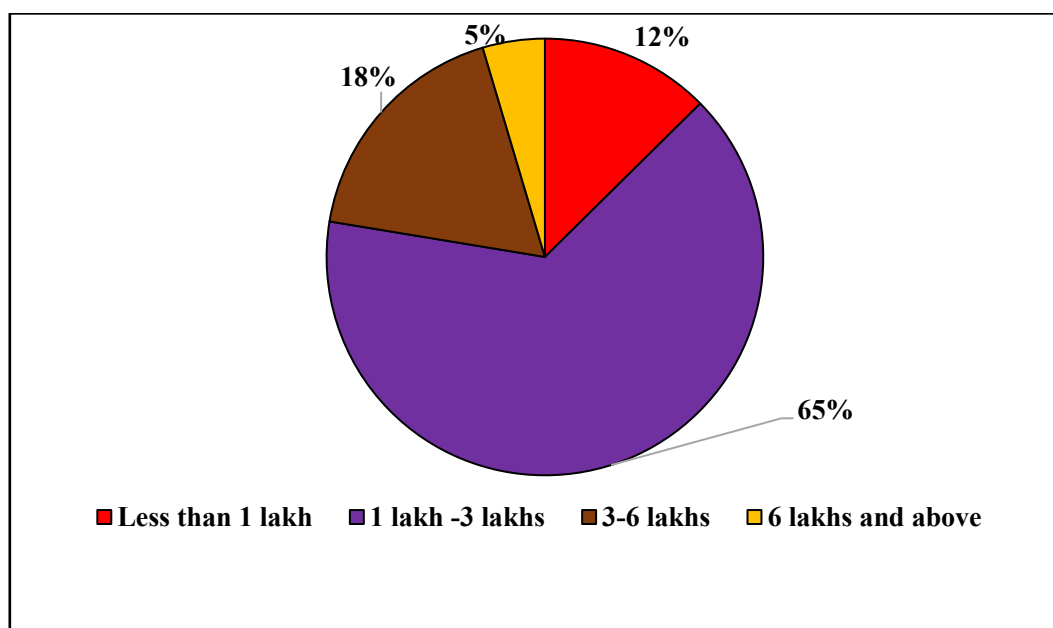


Fig 8: Distribution of cancer patient according to annual income

The distribution of cancer patients by annual income reveals that the highest proportion of males (25.2%) and females (39.8%) belonged to the income group of ₹1–3 lakhs, making it the most represented income category overall (65%). This was followed by the income group of ₹3–6 lakhs, comprising 9% of males and 8.8% of females, accounting for 17.8% of the total. The lowest proportion was observed in the income group of ₹6 lakhs and above, with 3.6% of males and 1% of females, contributing to only 4.6% of the total.

Chi-square test was conducted for testing the hypotheses that there is no association between Annual income and genderwise distribution of cancer patients. The p-value 0.0001 indicated that the result is significant and it is concluded that there is a significant association between Annual income and gender of cancer patients.

Table 5: Knowledge of risk factors of cancer

Risk factors	Male (N= 210)		Female (N = 290)		Total (N= 500)	
	Number	Percentage	Number	Percentage	Number	Percentage
Smoking /Tobacco use	194	45.11	207	34.96	401	39.23
Excessive alcohol consumption	149	34.65	123	20.77	272	26.61
lack of physical activity	14	3.25	50	8.44	64	6.26
Poor diet	73	16.97	212	35.81	285	27.88
Genetics factors	0	0	0	0	0	0
Total	430	100	592	100	1022	100

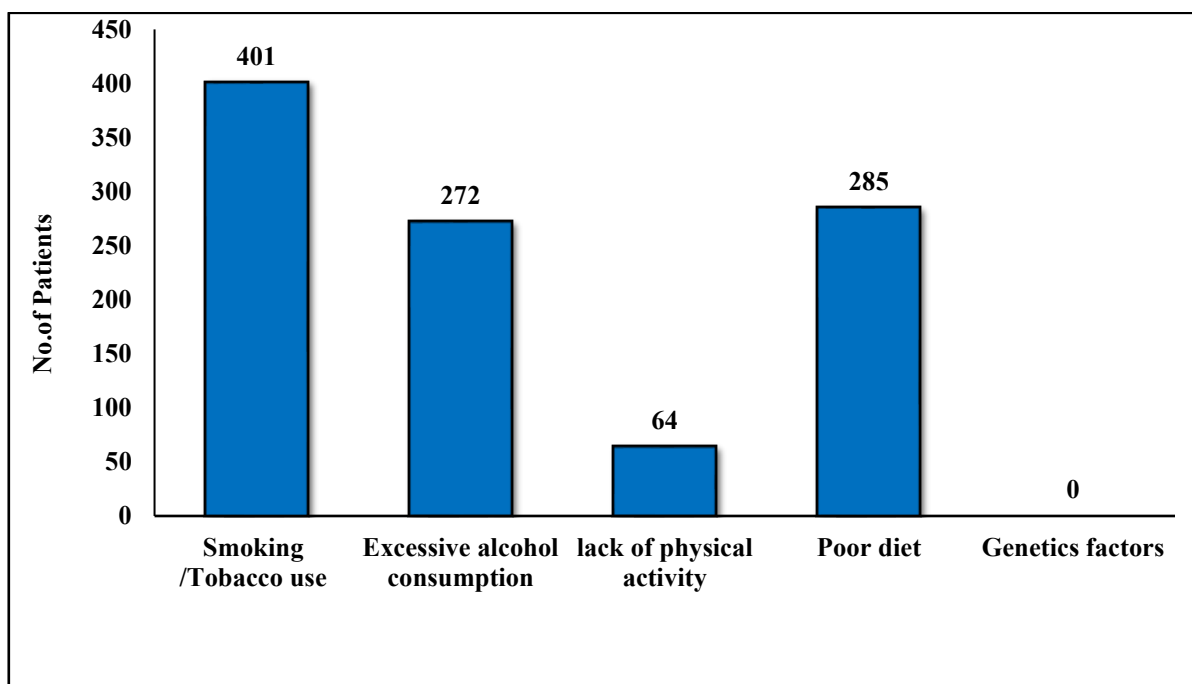


Fig 9: Knowledge of risk factors

The result of Table 5 reveals that the maximum number of males (45.11 %) opined that smoking/tobacco use are the leading risk factors for cancer, while 34.96 % and 35.81 % of women are of the opinion that smoking/tobacco use and poor diet respectively, are the main risk factors causing cancer, followed by 34.65 % of male and 20.77 % of female have expressed that excessive alcohol consumption is also one of the risk factors of cancer. Only few (6.26%) are of the opinion that lack of physical activity is also one of the risk factors of cancer. Notably none of the patients considered genetic factors as one of the risk factors of cancer. These findings highlight significant gender differences in lifestyle-related cancer risk factors, indicating the need for gender-specific public health interventions.

Table 6: Odds-ratio and 95 % confidence interval for risk factors of cancer patients

Factors	Characteristics	Male	Female	Total	Odds ratio	95 % CI (L, U)
Age Group	20-49 years	108	134	242	1.23	(0.8637, 1.7592)
	50 and above	102	156	258		
BMI	≤25 (Underweight and normal weight)	133	137	270	1.9290	(1.3415, 2.7738)
	>25 (Overweight)	77	153	230		
Consumption of Tobacco products	Yes	185	138	323	8.151	(5.059, 13.133)
	No	25	152	177		
Smoking habit	Yes	131	0	131	961.025	(59.1347, 15618.0528)
	No	79	290	369		
Alcoholic drinks	Yes	106	3	109	97.506	(30.287, 313.916)
	No	104	287	391		

This study investigates the association between various risk factors and cancer among 500 patients, examining the impact of age, BMI, tobacco use, smoking, and alcohol consumption. The analysis reveals significant variations in cancer risk associated with these factors. The study assessed the odds ratio (OR) and 95% confidence interval (CI) for cancer risk factors across male and female patients. For age, the 20-49 years group exhibited a slightly elevated OR of 1.23; however, the CI (0.8637-1.7592) suggests no statistically significant difference compared to those aged 50 and above. A significant association was observed between BMI and cancer risk, with patients having a BMI of ≤25 showing a higher OR of 1.9290 (CI: 1.3415-2.7738). Tobacco use was strongly correlated with cancer, with users having an OR of 8.151 (CI: 5.059-13.133). Smoking demonstrated an exceptionally high risk, especially among males. Additionally, alcohol consumption was a significant risk factor, with an OR of 97.506 (CI: 30.287-313.916). These findings underscore the substantial impact of modifiable lifestyle factors, particularly tobacco use, smoking, and alcohol consumption, on cancer risk, with males being disproportionately affected.

IV. CONCLUSION

This study provides a detailed examination of the sociodemographic characteristics of cancer patients attending Cancer Care Hospitals in Kalaburagi City. The findings illustrate significant sociodemographic disparities among the patient population, including variations in literacy levels, employment and annual income. These differences suggest that sociodemographic factors play a crucial role in shaping cancer incidence and access to care.

The results underscore the need for targeted educational initiatives to raise awareness about cancer risks and promote preventive measures. Additionally, there is a clear call for the development and implementation of public health policies that focus on increasing cancer screening and early detection efforts. By addressing these sociodemographic influences, public health strategies can be better tailored to meet the needs of diverse populations and potentially reduce cancer incidence and improve patient outcomes in the region.

V. REFERENCES

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