

# Prevalence of Head and Neck Cancer with Emphasis on Socioeconomic Factors in A Tertiary Care Hospital: A Prospective Study

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## Abstract

**Background:** Globally, Head and Neck cancers rank seventh among the most common cancers. Few studies from India specifically addressed the socioeconomic factors and their relationship with Head and Neck malignancy. The present study will contribute to a better understanding of the disease and help plan more effective management in the future. The main objectives are to estimate the magnitude of Head and Neck malignancy among Head and Neck tumor patients attending a Tertiary Care Hospital, to assess the relationship between socioeconomic factors and the disease, and to identify factors influencing malignancy among the study subjects. **Material and Methods:** This is an observational, descriptive, cross-sectional study. 104 Head and neck tumor patients who attended the otorhinolaryngology OPD were questioned; the information was entered into a case report form, an Excel master sheet, and analyzed using IBM SPSS 20 statistical software. **Results:** Among 104 patients, 48 patients (46.20%) were diagnosed to have a malignant tumor, and 56 patients (53.80%) had a benign tumor. The highest number of head and neck cancer patients belonged to the age group of 41-60 years (43.75%), were males (52.08%), were from lower socioeconomic class (62.5%), belonged to nuclear family (64.58%), stayed in rural areas (79.17%), illiterate (41.67%), were farmers (47.92%), had occupational exposure (56.25%), had annual per capita income less than 15000 INR (62.50%), had cancer of neck glands (41.67%). Among the addicted patients (72.92%), 28.57% had a history of smoking. **Conclusion:** We concluded that analysis shows that age, gender, socioeconomic status, area of residence, occupational exposure, annual per capita family income, and addiction history are significant risk factors for the development of Head and neck cancer.

**Keywords:** Head and neck cancer, Tobacco use, Alcohol consumption, Betel nut chewing, Healthcare access.

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## INTRODUCTION

Globally, Head and Neck cancers rank seventh among the most common cancers, accounting for approximately 1500000 new cases and over 500000 deaths annually.<sup>[1]</sup> Overall, 57.5% of global Head and Neck cancers are reported in Asia, where India accounts for 30% of all cancers. In our country, over 200000 cases of Head and Neck cancers occur every year, amongst them 80000 oral cancers are diagnosed. Nearly two-thirds of oral cancers are due to prolonged retention of betel quid in the mucogingival sulcus.<sup>[2]</sup> Men are three times more likely to develop Head and Neck cancers than women. Squamous Cell Carcinoma comprises the maximum number of malignant cases.<sup>[3]</sup> Use of Tobacco and alcohol consumption are the major risk factors for lip, oral cavity, and pharyngeal cancers. Combined use of tobacco and alcohol is known to be the most damaging.<sup>[4]</sup> Human Papillomavirus (HPV) type 16 is also a risk factor for oropharyngeal cancers [5]. Other causes of specific Head and Neck cancers include the use of betel quid for a longer duration, which increases the risk of mouth cancers.<sup>[6]</sup> People working in the food, ceramic, textile, and construction industries have an increased risk of developing cancer of the

larynx.<sup>[7]</sup> Asian ancestry, occupational exposure to wood dust,<sup>[8]</sup> radiation exposure,<sup>[9]</sup> and Epstein Barr Virus,<sup>[10]</sup> increase the risk of nasopharyngeal cancers and cancers of the salivary gland. Higher incidence of Head and Neck cancers and lower survival among Asian and Pacific Islanders have been linked to lower socioeconomic status.<sup>[11]</sup> In India, treatment facilities are mostly restricted to urban areas of the country. Mortality in India due to Head and Neck cancers are nearly half of the incidence due to patients' negligence, availing alternate treatment modalities and late presentation for treatment. Prior studies have identified illiteracy and poverty as patient-associated factors for late diagnosis. Online review of the present literature on the topic

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showed that relatively few studies from India specifically address the socioeconomic factors and their relationship with Head and Neck malignancy. The present study will contribute to a better understanding of the disease and help plan more effective management in the future. The study aims to determine the proportion of head and neck malignancies among all head and neck tumor patients attending a tertiary care hospital, examine how various socioeconomic factors relate to the disease, and identify key determinants that influence the likelihood of malignancy in the study population.

## **MATERIALS AND METHODS**

**Type of Study:** The study is an observational, descriptive, sectional study design.

**Place of Study:** The study was conducted in the Department of Otorhinolaryngology at Murshidabad Medical College and Hospital, Berhampore, Murshidabad, West Bengal.

**Study Duration: January 2024 to December 2024**

**Study Population:** Patients with Head and Neck tumors attending the Otorhinolaryngology department during the study duration were the study population.

**Sample Size:** Inclusive sampling - I included all eligible patients who attended the OPD clinic during the study period and provided informed written consent.

### **Inclusion Criteria:**

Cases of clinically diagnosed Head and Neck tumors attending Otorhinolaryngology OPD that necessitate histopathological correlation irrespective of age and gender.

### **Exclusion Criteria:**

- Those who refused informed written consent.
- Those who lost to follow up for further management.
- Infective or non-neoplastic causes of neck swelling as determined by clinical examination and FNAC (Fine Needle Aspiration Cytology).

### **Study Tools:**

- Consent form
- Case report form
- Patient records
- FNAC reports
- OPD register
- Histopathological reports
- Imaging reports (USG/CT SCAN)

### **Study Techniques: The study was conducted in the following steps**

- Interview of the study subjects
- History taking
- Clinical examination
- Documentation of the records
- Analysis

### **Study Variables:**

- Age
- Gender
- Profession
- Educational qualification
- Income
- Housing

- Type of family
- Addiction
- Occupational exposure
- Socioeconomic status (using B.G. Prasad scale)

### **Data Collection Method:**

- Interview of the participants,
- Review of medical reports, and
- Filling up the case report form according to the information provided by them.

### **Study Procedure:**

- **Preparatory Phase:** Case report form was pretested on 5 Head and neck cancer patients, and necessary modifications were made before initiating the study. The pretested samples were not included in the analysis.
- **Data Collection Phase:** Data was collected at the Otorhinolaryngology OPD of Murshidabad Medical College and Hospital. Study participants were informed of the study's purpose, then clinically examined and interviewed, and the information obtained from them was entered into the case report form.
- **Data Compilation, Analysis, And Report Writing Phase:** Data was entered into an Excel master sheet and then analysed by IBM SPSS. 20 statistical software for a week, and the report was prepared. Data were described using simple proportions, and the chi-square test was used to assess significance.

**Quality Control:** Overview of supervision.

**Confidentiality:** Single Blinding Approach, where the Individual patients' identities were not disclosed. The data and reports obtained from the study participants were kept confidential, and only the researchers used the data.

**Ethical Considerations:** This study was conducted with the approval of the Institutional Ethics Committee (IEC) of Murshidabad Medical College and Hospital, and there was no conflict of interest on the part of the author or the guide.

**Statistical Analysis:** Data were entered into Excel and subsequently analysed using SPSS and GraphPad Prism. Continuous variables were summarized as means with standard deviations, while categorical variables were presented as counts and percentages. Comparisons between independent groups were performed using two-sample t-tests, and paired t-tests were applied for correlated (paired) data. Categorical data were compared using chi-square tests, with Fisher's exact test applied when expected cell counts were small. A p-value of  $\leq 0.05$  was considered statistically significant.

## **RESULTS**

A total of 104 patients with head and neck tumors attended the otorhinolaryngology OPD of a tertiary care hospital during the given time period. Among 104 patients, 48 patients (46.20%) were diagnosed with a malignant tumor, and 56 patients (53.80%) had a benign tumor. Subsequently, these 48 patients were studied. Of the 48 patients, three were in the 1-20 years age group, 12 in the 21-40 years age group, 12 in the 61-80 years age group, and 21 in the 41-60 years age group. Of the 48 patients, 23 were female, and 25 were male. Of the 48 patients, 30 were from the lower class, 8 from the lower-middle class, zero from the middle class, nine from the upper-middle class, and one from

the upper class. Out of the 48 patients, 17 were from joint families, and the remaining 31 were from nuclear families. Of the 48 patients, 38 were from rural areas, nine from semiurban regions, and one from a nuclear family. Of the 48 patients, 20 were illiterate, 18 were primary, and 10 had a middle-level education. Out of the 48 patients, 23 were farmers, 11 were homemakers, and 14 were semi-skilled workers. Of the 48 patients, 27 were occupationally exposed to fertilizers, pesticides, and carcinogens in the Biri factory, as well as to environmental carcinogens such as UV Rays, pollutants, and dust. Out of the 48 patients, 30 had annual per capita income less than 15000 INR, 8 had annual per capita income between 15000 and 49999 INR, 9 had annual per capita income between 50000 and 100000 INR, and 1 had annual per capita income greater than 1 lakh INR. Out of the 48 patients, 35 participants had an addiction history. Out of the 35 patients, five had a history of only tobacco chewing, 2 of only drinking alcohol, 10 of smoking only, 4 had a history of tobacco chewing and smoking, 5 had history of tobacco chewing and alcohol drinking, 7 had a history of drinking alcohol and smoking, and 2 had a history of chewing tobacco, drinking alcohol, and smoking. Out of 48 patients, 20 had cancer of the neck glands (which mostly include thyroid gland cancers), 5 had laryngeal cancer, 2 had pharyngeal cancer, 14 had cancer of the oral cavity, and 7 had cancer of the nose and paranasal sinus. Comparing the prevalence of cancer to the two major age groups of 1-40 years and 41-80 years, it is found that cancer was more prevalent among people of age 41-80 years (68.8%) and is significantly associated, as the p-value is <0.0001(<0.05). Comparing the prevalence of cancer to gender, it is found that cancer was more prevalent among males (52.08%) and is significantly associated, with a p-value of 0.008(<0.05). Comparing the prevalence of cancer to the two major socioeconomic classes of lower classes (combining lower middle class) and upper

classes (combining upper middle) due to inadequate data, it is found that cancer was more prevalent among people in lower classes (54.3%) and is significantly associated, as the p-value is 0.017(<0.05). Comparing the prevalence of cancer to the two

major family types of joint family and nuclear family, it is found that cancer was more prevalent among people of the nuclear family (47.7%) compared to the joint family. Still, the association was not significant, as p=0.685 (>0.05). Comparing the prevalence of cancer in the two major residence areas of rural area and urban area (combining semi-urban area) due to inadequate data, it is found that cancer was more prevalent among people in rural area (54.3%) compared to urban area, and is significantly associated as p value is 0.017(<0.05). Comparing the prevalence of cancer to the educational status of illiterates and literates, primary level education, and middle level education, it is found that cancer was more prevalent among illiterates (46.5%) compared to literates. Still, the association was not significant, as the p-value was 0.618 (>0.05). Comparing the prevalence of cancer to the major occupations of farmers, homemakers, and semi-skilled workers, it is found that cancer was more prevalent among farmers (53.5%). Still, the association was not significant, as the p-value was 0.250 (>0.05). Comparing the prevalence of cancer to occupational exposure, it is found that cancer was more prevalent among people who were exposed (57.4%) and is significantly associated, with a p-value of 0.036(<0.05). Comparing the prevalence of cancer to the two major categories of annual per capita income of less than 50000 and greater than or equal to 50000, it is found that cancer was more prevalent among lower income groups (54.3%) and is significantly associated, as the p-value is 0.017(<0.05). Comparing the prevalence of cancer to addiction, it is found that cancer was more prevalent among people with an addiction (57.4%) and is significantly associated, as the p-value is 0.005(<0.05).

**Table 1: Distribution of Head and Neck cancer patients according to age, gender, socioeconomic status, type of family, Residency, Educational qualification, occupation, and occupational exposure**

		Participants	Percentage	p-value
Age (Years)	01-20	3	6.25%	<.00001
	21-40	12	25%	
	41-60	21	43.75%	
	61-80	12	25%	
Gender	Female	23	47.92%	0.6818
	Male	25	52.08%	
Socioeconomic Status	Lower Class	30	62.50%	<.00001
	Lower Middle Class	8	16.67%	
	Upper Middle Class	9	18.75%	
	Upper Class	1	2.08%	
Family	Joint	17	35.42%	0.00424
	Nuclear	31	64.58%	
Residence	Rural	38	79.17%	<.00001
	Semiurban	9	18.75%	
	Urban	1	2.08%	
Education	Illiterate	20	41.67%	0.0278
	Primary	18	37.50%	
	Middle	10	20.83%	
Occupation	Farmer	23	47.92%	0.01046
	Housewife	11	22.92%	
	Semi-Skilled Worker	14	29.17%	
Occupational Exposure	Yes	27	56.25%	0.22246
	No	21	43.75%	

**Table 2: Clinical and Lifestyle-Based Distribution of Head and Neck Cancer Patients**

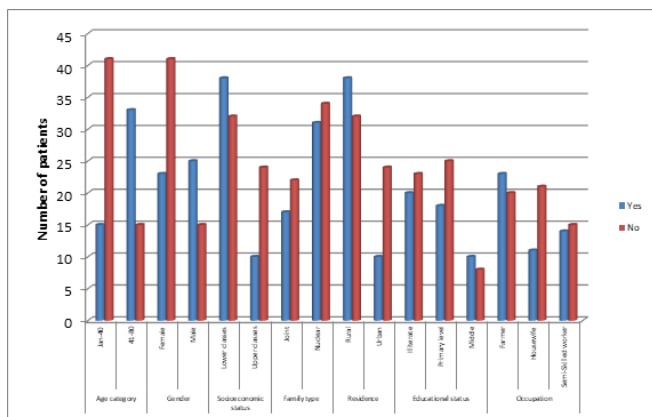
		Participants	Percentage	p-value
Income	<15000	30	62.50%	<00001
	15000-49999	8	16.67%	
	50000-100000	9	18.75%	
	>100000	1	2.08%	
Head and Neck cancer patients on the basis of presence of Addiction	Present	35	72.92%	<00001
	Absent	13	27.08%	
Head and Neck cancer patients on the basis of types of Addiction	Tobacco only	5	14.29%	.01108
	Alcohol only	2	5.71%	
	Smoking only	10	28.57%	
	Tobacco & Smoking	4	11.43%	
	Tobacco & Alcohol	5	14.29%	
	Alcohol & Smoking	7	20%	
	Tobacco, alcohol & smoking	2	5.71%	
	Other addiction	0	0%	
Site of lesion	Neck glands	20	41.67%	.0018.
	Larynx	5	10.42%	
	Pharynx	2	4.17%	
	Oral cavity	14	29.17%	
	Nose and paranasal sinuses	7	14.58%	

**Table 3: Distribution of Study Subjects by Cancer Prevalence and Demographic Factors**

		Yes	No	Total	P-value
Age category	01-40	15(26.8%)	41(73.2%)	56	<0.0001
	41-80	33(68.8%)	15(31.2%)	48	
Gender	Female	23(35.9%)	41(64.1%)	64	0.008
	Male	25(62.5%)	15(37.5%)	40	
Socioeconomic status	Lower classes	38(54.3%)	32(45.7%)	70	0.017
	Upper classes	10(29.4%)	24(70.6%)	34	
Family type	Joint	17(43.6%)	22(56.4%)	39	0.685
	Nuclear	31(47.7%)	34(52.3%)	65	
Residence	Rural	38(54.3%)	32(45.7%)	70	0.017
	Urban	10(29.4%)	24(70.6%)	34	
Educational status	Illiterate	20(46.5%)	23(53.3%)	43	0.618
	Primary level	18(41.9%)	25(58.1%)	43	
	Middle	10(55.6%)	8(44.4%)	18	
Occupation	Farmer	23(53.5%)	20(46.5%)	43	0.25
	Housewife	11(34.4%)	21(65.6%)	32	
	Semi-Skilled worker	14(48.3%)	15(51.7%)	29	

**Table 4: Distribution of study subjects according to prevalence of cancer and occupational exposure, income and Addiction history**

		Yes	No	Total	P-value
Occupational exposure	Yes	27(57.4%)	20(42.6%)	47	0.036
	No	21(36.8%)	36(63.2%)	57	
Income	<50000	38(54.3%)	32(45.7%)	70	0.017
	≥50000	10(29.4%)	24(70.6%)	34	
Addiction history	Present	35(57.4%)	26(42.6%)	61	0.005
	Absent	13(30.2%)	30(69.8%)	43	



**Figure 1: Cancer Prevalence across Demographic and Socioeconomic Characteristics**

## DISCUSSION

In the present study, the majority (43.75%) of the Head and neck cancer patients were in the age group of 41-60 years, followed by the age group of 21-40 years and 61-80 years (25%) each. In this study, age is found to be significantly associated with the development of head and neck cancers, which were more prevalent among people aged 41-80 years. (p=0.000). Similarly, studies showed the maximum number of malignant cases belonged to the age of more than 40 years, with a higher prevalence of head and neck cancers.<sup>[12]</sup> Another study conducted in West Bengal showed the highest percentage of Head and neck cancer patients in the age group of 60-70 years.<sup>[13]</sup> In our study, the majority (52.08%) of the Head and neck cancer patients were male. Male sex is significantly associated with the development of head and neck cancer. (p=0.008)

Other demographic studies showed men had a greater incidence of head and neck cancer compared to women.<sup>[14]</sup>

In the present study, a majority (62.5%) of the Head and neck cancer patients were from the lower class, followed by the upper middle class (18.75%) and the lower middle class (16.67%). Socioeconomic status is significantly associated with the development of head and neck cancer. (p=0.017)

In a study conducted in Andhra Pradesh, a greater number of subjects belonged to lower-middle and upper lower socio-economic classes. Still, no significant association with socioeconomic status was found.<sup>[14]</sup> Another study conducted in Kolkata showed that the majority of the study population belonged to lower-middle and lower socioeconomic classes.<sup>[13]</sup> Multiple studies have shown Head and Neck cancer to be associated with lower socioeconomic status.<sup>[15,16]</sup>

In our study, the majority (79.17%) of Head and neck cancer patients resided in rural areas, followed by 18.75% in semi-urban areas and 2.08% in urban areas. Area of residence is significantly associated with the development of head and neck cancer. (p=0.017).

A study conducted in Springfield, USA, showed results similar to those reported.<sup>[15]</sup> Whereas some studies showed the majority of the head and neck cancer patients were from urban areas,<sup>[13,14]</sup> in others, the location of residence was not significantly associated with the development of head and neck cancer.<sup>[14]</sup>

In the present study, a majority (56.25%) of the Head and neck cancer patients had occupational exposure to fertilizers, pesticides, carcinogens in biri factories, and environmental carcinogens like UV Rays, pollutants, dust, etc. Occupational exposure is significantly associated with the development of head and neck cancer. (p=0.036)

A study conducted by K. Swapna et al. showed similar findings.<sup>[14]</sup>

In our study, a majority (62.50%) of the Head and neck cancer patients had an annual per capita income of less than 15000 INR, followed by 18.75% having between 50000 and 100000 INR, then 16.67% having between 15000 and 49999 INR, and 2.08% having greater than 1 lakh INR. Annual per capita income is significantly associated with the development of head and neck cancer. (p=0.017)

Studies conducted in Gujarat and Tripura in India showed that the majority of the head and neck cancer patients had family income less than 5000 INR/month.

In the present study, a majority (72.92%) of the Head and neck cancer patients were addicted; among them, the maximum (28.57%) had a history of smoking, followed by 20% of the cancer patients who had a history of drinking alcohol and smoking simultaneously. Addiction history is significantly associated with the development of head and neck cancer. (p=0.005)

Studies showed that a maximum number of head and neck cancer patients had addiction history,<sup>[17]</sup> and smoking was the most prevalent risk factor for head and neck cancer.<sup>[16]</sup>

In our study, the majority (41.67%) of the Head and neck cancer patients had malignancy of neck glands, followed by 29.17% having oral cancer, 14.58% having cancer of the nose and paranasal sinus cancer, 10.42% having laryngeal

cancer, and 4.17% having pharyngeal cancer. A study conducted in Bihar showed that the majority (58.4%) of head and neck cancers occurred in the oral cavity, followed by hypopharynx, oropharynx, larynx, and nasopharynx.<sup>[18]</sup>

## CONCLUSION

We concluded that efforts should be made to create awareness about the harmful effects of Addiction among the relatively less educated sections of society. A lack of education makes standard printed warning labels ineffective, and improving education would also enhance quality of life by enabling active participation in avoiding harmful practices. Emphasis on early detection of disease to prevent further worsening of cases may be more easily achieved through a focused program, such as the National Cancer Registry Programme, which may, in the future, lead to a more comprehensive cancer care program involving multiple disciplines. The main challenge in India is to address socioeconomic impediments to improve the quality of life and to use limited resources to deliver the maximum benefit to a large number of people. Feedback to hospital administration was provided regarding the case distribution and their healthcare needs, which may aid in resource planning towards the management of these cases. In the future, screening and health education programs can be planned to raise awareness of Head and Neck Cancers among specific groups and the entire population.

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## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2021 May;71(3):209-49.
2. Kulkarni MR. Head and neck cancer burden in India. *Int J Head Neck Surg*. 2013 Jan;4(1):29-35.
3. Mody MD, Rocco JW, Yom SS, Haddad RI, Saba NF. Head and neck cancer. *The Lancet*. 2021 Dec 18;398(10318):2289-99.
4. Hashim D, Genden E, Posner M, Hashibe M, Boffetta P. Head and neck cancer prevention: from primary prevention to impact of clinicians on reducing burden. *Annals of Oncology*. 2019 May 1;30(5):744-56.
5. Elrefaey S, Massaro MA, Chiocca S, Chiesa F, Ansarin M. HPV in oropharyngeal cancer: the basics to know in clinical practice. *ACTA Otorhinolaryngologica Italica*. 2014 Oct;34(5):299.
6. Chen PH, Mahmood Q, Mariottini GL, Chiang TA, Lee KW. Adverse health effects of betel quid and the risk of oral and pharyngeal cancers. *BioMed Research International*. 2017;2017(1):3904098.
7. Boffetta P, Richiardi L, Berrino F, Estève J, Pisani P, Crosignani P, Raymond L, Zubiri L, Del Moral A, Lehmann W, Donato F. Occupation and larynx and hypopharynx cancer: an international case-control study in France, Italy, Spain, and Switzerland. *Cancer Causes & Control*. 2003 Apr;14(3):203-12.
8. Mimi CY, Yuan JM. Epidemiology of nasopharyngeal carcinoma. In *Seminars in Cancer Biology* 2002 Dec 1 (Vol. 12, No. 6, pp. 421-

- 429). Academic Press.
9. Horn-Ross PL, Ljung BM, Morrow M. Environmental factors and the risk of salivary gland cancer. *Epidemiology*. 1997 Jul 1;8(4):414-9.
  10. Chien YC, Chen JY, Liu MY, Yang HI, Hsu MM, Chen CJ, Yang CS. Serologic markers of Epstein–Barr virus infection and nasopharyngeal carcinoma in Taiwanese men. *New England Journal of Medicine*. 2001 Dec 27;345(26):1877-82.
  11. Chu KP, Shema S, Wu S, Gomez SL, Chang ET, Le QT. Head and neck cancer-specific survival based on socioeconomic status in Asians and Pacific Islanders. *Cancer*. 2011 May 1;117(9):1935-45.
  12. Ghosh S, Saha TN, Sen I. Epidemiological Profile of the Head-Neck Pathologies in a Peripheral Referral Institute. *Bengal Journal of Otolaryngology and Head Neck Surgery*. 2019 Aug 31;27(2):113-20.
  13. Kumar G, Panda N, Roy R, Bhattacharjee G. An observational study to assess the socioeconomic status and demographic profile of advanced cancer patients receiving palliative care in a tertiary-level cancer hospital of Eastern India. *Indian Journal of Palliative Care*. 2018 Oct;24(4):496.
  14. Swapna K, Sudhakar G. Demographic and Socio-economic study on head and Neck Cancer in Andhra Pradesh, India. *International Journal of Current Microbiology and Applied Science*. 2015] 4(6):878-83.
  15. Lawrence LA, Heuermann ML, Javadi P, Sharma A. Socioeconomic status and rurality among patients with head and neck cancer. *Otolaryngology–Head and Neck Surgery*. 2022 Jun;166(6):1028-37.
  16. Al-Dakkak I. Socioeconomic status and head and neck cancer. *Evidence-based dentistry*. 2010 Jun;11(2):57-8.
  17. Poonia P, Arora A, Sharma K. Addiction history among head-and-neck cancer patients: A study to determine the cause of cancer in patients who lack addiction history. *Journal of Pharmaceutical and BioSciences/Jul Sep*. 2023;11(3).
  18. Chauhan R, Trivedi V, Rani R, Singh U. A study of head and neck cancer patients with reference to tobacco use, gender, and subsite distribution. *South Asian journal of cancer*. 2022 Jan;11(01):046-51.