Original Article

Assessment of the prevalence of types of head and neck cancer in a tertiary cancer center at Madurai, Tamil Nadu: A cross-sectional study

SathiyaPriya S[1], Girish R. Shavi[2], Ranganath Sanga[3], Shankar S[2], Lalithambigai Gunasekaran[2], Rahila C[2], Santhakumari S[4]

[1]Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, [2]Department of Public Health Dentistry, Vivekanandha Dental College and Hospital for Women, Tiruchengode, Tamil Nadu, [3]Department of Public Health Dentistry, Care Dental College, Guntur, Andhra Pardesh, [4]Department of Public Health Dentistry, Vinayaka mission Dental College, Salem, Tamil Nadu, India

For correspondence: Dr. SathiyaPriya S, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai -600 089, Tamil Nadu, India. E-mail: drsathyabds87@gmail.com

ABSTRACT

Aim: The aim of the study was to assess the prevalence of types of head and neck cancer in Madurai, Tamil Nadu.

Objectives: The objectives of the study were to assess the prevalence of types of head and neck cancer in Madurai, Tamil Nadu using a questionnaire.

Materials and Methods: A descriptive cross-sectional study was carried out for two months among 300 head and neck cancer patients at a tertiary cancer center in Madurai. A convenience sampling technique was used. The data were collected using a pretested, self-structured questionnaire. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0 software.

Results: Of 300 head and neck cancer patients, the mean age of the patients was about 51.04 ± 16.49 years. The majority of the patients were male (80%), employed (85%), and literate (65%). Among the head and neck cancer patients, 65% were tobacco users and 42.4% were alcohol consumers. Squamous cell carcinoma was the most common type of head and neck cancer, and 79.7% were diagnosed at an advanced stage of said cancer, such as stages III and IV.

Conclusion: Lack of knowledge and awareness is a major cause of increasing prevalence of head and neck cancer in our country. It is most important to increase the knowledge and awareness of early symptom recognition and its seriousness among the general population.

KEY WORDS: Head and neck cancer, prevalence, stage of cancer, tobacco habits

INTRODUCTION

Our world is heading toward various types of noncommunicable diseases, which is termed as modern epidemics.[1] Among these modern epidemics, cancer is a major cause of morbidity and mortality in both developing and developed nations.[2] The global burden of cancer worldwide was estimated by The GLOBOCAN 2018 which shows that 18.1 million new cancer cases (17.0 million excluding nonmelanoma skin cancer) and 9.6 million cancer deaths (9.5 million excluding nonmelanoma skin cancer) have occurred in 2018.[3] Despite the fact that the burden of cancer is higher in the developing world, it may still be considered as just 'a tip of iceberg', masking the true incidence.[4]

Among the cancers, head and neck cancers (HNCs) are emerging as major public health problems.[5] It is the seventh most common nonskin cancer worldwide with an estimated 700,000 new cases diagnosed annually.[6] In India, HNCs are the second most common cancers in the Indian population with 0.47 million cases diagnosed per year in India alone, estimated by National Institute of Cancer Prevention and Research.[7] The incidence of HNCs seems to be 22 per 100,000 population in India, which accounts for about 30% of all types of cancers in the country.[8,9] HNC is the most common cancer among the males in India and the fifth most common among the females.[10,11]

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

Cite this article as: SathiyaPriya S, Shavi GR, Sanga R, Shankar S, Gunasekaran L, Rahila C, *et al*. Assessment of the prevalence of types of head and neck cancer in a tertiary cancer center at Madurai, Tamil Nadu: A cross-sectional study. J Can Res Ther 2024;20:959-65.

Submitted: 06-Oct-2022
Revised: 10-Dec-2022
Accepted: 14-Dec-2022
Published: 22-Jan-2024

Access this article online
Website: https://journals.lww.com/cancerjournal
DOI: 10.4103/jcrt.jcrt_2081_22
Quick Response Code:

The HNCs are caused by certain environmental and lifestyle risk factors like tobacco and alcohol consumption. More recently, a new disease has emerged related to several strains of human papillomavirus (HPV 16,18).[12,13] A common risk factor worldwide is substance abuse particularly among the South Asian population; there exists a large volume of literature which links betel nut and quids (Paan and Chaaliya), areca, chewable tobacco (guthka), smokeless tobacco (Naswar), and smoke tobacco (Bidi, Hookah, and Sheesha) with development of cancer, as the main causative agent.[14] The study aimed to assess the prevalence of types of HNC in the tertiary care hospital at Madurai, Tamil Nadu.

AIM AND OBJECTIVES

Aim

To assess the prevalence of types of HNC in the tertiary care hospital at Madurai, Tamil Nadu.

Objectives

To assess the prevalence of types of HNC in the tertiary care hospital at Madurai, Tamil Nadu using a questionnaire.

MATERIALS AND METHODS

Study design

The present study was a descriptive cross-sectional study conducted at the tertiary cancer center, Madurai, Tamil Nadu.

The study was systematically scheduled to cover the estimated HNC patients after informing and obtaining consent from the Dean, Vice-Principal, and Head of the Departments of oncology at the tertiary cancer center. The study lasted two months, from September to October 2018. A detailed protocol explaining the purpose and procedure of the study was submitted and approved by the Institutional Ethics Committee. A written informed consent (bilingual) assuring confidentiality was obtained from the HNC patients willing to participate in the study. A pilot study was carried out in the tertiary care center to determine the feasibility and practicality. The reliability was assessed, and the Cohen's Kappa coefficient was found to be 0.86.

Inclusion criteria

- Patients who were confirmed with a diagnosis of HNC.
- HNC patients who were attending outpatient and inpatient wards in the Oncology departments at the tertiary care hospital, Madurai.

Exclusion criteria

- Patients who were not willing to participate and did not sign the informed consent form.
- Patients who were aged less than 18 years.
- The patients who cannot speak are mentally challenged.

Data collection

A total of 300 HNC patients participated in the study. The sample size was recruited by using a convenience sampling technique. The data were collected using a pretested, self-structured questionnaire which includes socio-demographics of HNC patients, personal habits, clinical details of the patient and knowledge, and attitude toward cancer. The baseline characteristics of the study subjects were analyzed using Statistical Package for the Social Science (SPSS) software 20.0 version (SPSS Inc., Chicago, USA).

RESULTS

Of 300 HNC patients, the mean age group of the study participants was about 51.04 ± 16.49 and the age group of 41 to 60 years (51%) is more than the other groups. HNC prevalence was most common among males (80%) compared to females (20%). Since the tertiary care cancer center is situated in Madurai, the residents with HNC receive more treatments (31.7%), and the patients residing all over the districts from South Tamil Nadu benefitted. HNC was most common among Hindu people at about 88.7% compared to other religions like Christian (7%) and Muslims (4.3%). The patients living with a nuclear family (< four members) are more (79.1%) than the joint family (> four members). The literacy levels of the HNC patients were illiterate (35%), completed primary school (19%), middle school (26%), high school (16%), and graduate (3.3%), respectively. The majority of the participants were employed as elementary workers (53%), craft and related trade workers (29%), skilled agricultural and fishery workers (3%), and unemployed, about 15%. Regarding the socioeconomic class, more than half of the participants were from the lower middle (62.3%) and the others were of low socioeconomic class (37.7%) [Table 1].

In the present study, more than half of the study participants are having tobacco-related habits like smoking (34.3%), smokeless tobacco (17.3%), both smoking and smokeless form (13.3%), and only 35% of the HNC patients were not using any form of tobacco. Regarding the smoking status of the HNC patients, 45.3% were past smokers, 2.3% were current smokers, and 52.3% never smoked. Of smokeless tobacco chewers, 30.7% were past chewers and 69.3% were nonchewers. The most common material used for the smoking and smokeless form of tobacco were the Beedi (37.3%) and Pan (27.3%), respectively. Among the alcohol users, 57.7% were never drunk and the rest of the participants were social drinkers (2.7%), moderate drinkers (12.7), and previous heavy drinkers (27%). Of the 300 HNC patients, 60% of the participants stopped their habit after they were diagnosed with cancer, and almost 99.3% of them were aware that the practice of using tobacco and alcohol are the risk factors for HNC. Nearly all the participants (100%) were seeking dental visits only during emergency conditions [Table 2].

In the present study, the most common type of HNC is squamous cell carcinoma which accounts for about 71.3% than the other

Table 1: Frequency distribution of the sociodemographic characteristics of the head and neck cancer patients

Variables	Options	Frequency (*n*)	Percentage (%)
Age group	≤20 years	21	7.0
	21-40 years	50	16.7
	41-60 years	154	51.3
	61-80 years	66	22.0
	≥81 years	9	3.0
Gender	Male	240	80.0
	Female	60	20.0
Place	Madurai	95	31.7
	Sivagangai	12	4.0
	Trichy	5	1.7
	Ramanathapuram	29	9.7
	Theni	13	4.3
	Dindigul	63	21.0
	Tuticorin	15	5.0
	Erode	8	2.7
	Palani	9	3.0
	Karur	12	4.0
	Viruthunagar	31	10.3
	Pudukottai	5	1.7
	Sivakasi	3	1.0
Religion	Hindu	266	88.7
	Christian	21	7.0
	Muslim	13	4.3
Number of family members	2	119	39.7
	3	41	13.7
	4	77	25.7
	5	38	12.7
	6	22	7.3
	7	3	1.0
Level of education	Illiterate	105	35.0
	Primary school certificate	59	19.7
	Middle school certificate	78	26.0
	High school certificate	48	16.0
	Graduate	10	3.3
Occupation of the patient	Unemployed	45	15.0
	Elementary Occupation	159	53.0
	Plant and machine operators and assemblers	0	0
	Craft and related trade workers	87	29.0
	Skilled agricultural and fishery workers	9	3.0
	Skilled workers and shop and market sales workers	0	0
	Clerks	0	0
	Technicians and associate professionals	0	0
	Professionals	0	0
	Legislators, Senior Officials, and Managers	0	0
Socioeconomic status	Lower class	113	37.7
	Lower middle class	187	62.3
	Middle class	0	0
	Upper middle class	0	0
	Upper class	0	0

types of cancers like non-Hodgkin's (1.3%) and Hodgkin's lymphoma (3%), adenocarcinoma (7.3%), GilioBlastoma (2.3%), adenoid cystic carcinoma (2.3%), aplastic glicoma (2.3%), olfactory neuroblastoma (2.3%), synovial sarcoma (2.7%), anaplastic carcinoma (2.3%), odentogenic kerato cyst (2%), and ependymoma (0.7%). Among the site of cancer, the occurrence of cancer is seen in both the intraoral and extraoral areas, which accounts for about 55% and 45%, respectively. The majority of the patients are reporting to the health care center only during the advanced stage of HNCs like Stage III (58%) and Stage IV (21.7%) when compared with initial stages like Stage I (3.3%) and Stage II (17%). The main symptoms of the HNC patients in the present study were the common symptoms (51.3%) which include ulcer, lump, swelling, and pain in the head and neck region followed by the rare symptoms (48.7%) include difficulty in breathing, speaking, opening mouth, swallowing, bleeding from the nose or mouth, fits, and cold. Regarding the treatments of HNC patients, they are receiving different types of treatment modalities which include single therapy of about 34.2% (Only Chemotherapy, Only Radiotherapy, Only Surgery) and combined therapies of 48% (Radiotherapy and Chemotherapy, Radiotherapy and Surgery, Chemotherapy, Radiotherapy and Surgery, Surgery and Chemotherapy) [Table 3].

On assessing the knowledge and belief toward the signs and symptoms of HNC among the patients, the few risk factors

Table 2: Frequency distribution of the harmful habits of the head and neck cancer patients

Variables	Options	Frequency (*n*)	Percentage (%)
Tobacco Habits	No habits	105	35.0
	Smoking	103	34.3
	Smokeless	52	17.3
	Both	40	13.3
Smoking Status	Never smoked	157	52.3
	Past smoker	136	45.3
	Current smoker	7	2.3
Material used for smoking habit	Nonsmokers	157	52.3
	Beedi	112	37.3
	Cigarette	31	10.3
Smokeless Status	Never chewed	208	69.3
	Past chewer	92	30.7
	Current chewer	0	0
Material used for smokeless habit	Nonchewer	208	69.3
	Pan	82	27.3
	Beetle nut	10	3.3
Alcohol status	Never drunk	173	57.7
	Social drinking	8	2.7
	Moderate drinking	38	12.7
	Previous heavy drinker	81	27.0
Did you stop your habit after you are diagnosed with cancer?	Yes	180	60.0
	No	23	7.7
Do you think habits of using tobacco and alcohol are being the risk factor for Head and Neck Cancer?	Yes	298	99.3
	No	2	0.7
How often do you visit your dentist?	Every 6 month	0	0
	Every 6-12 months	0	0
	Every 1-5 years	0	0
	Emergency only	300	100
	Never	0	0

of cancer which they were aware of like people aged more than 50 years (27.7%), smoking tobacco (57%), drink alcohol heavily (42%), and painless symptoms (1.3) are more likely to cause cancer. In our present study, there is an overall lack of awareness, knowledge, and many negative beliefs about HNC symptoms persist among HNC patients [Table 4].

DISCUSSION

In our present study, the majority of the patients are middle-aged of 41-60 years (51.3%). The males had higher predominance of the HNC (80%) in our study similar with the studies done by Ganesh R *et al.*,[1] Addala L *et al.*,[2] this high proportion of HNC among males may be due to the high prevalence of tobacco consumption among males than females.[1,2]

Tobacco is deadly in any form and its use already has become responsible for more than 6 million deaths worldwide each year.[7] In our study, 65% of the HNC patients used tobacco relates in the form of smoking, chewing tobacco, or both and 35% of them never used tobacco products in their life. Of all the tobacco users, 47.6% of them were past and current smokers and 30.7% were past smokeless tobacco users. Beedi (37.3%) and betel quid chewing or pan (27.3%) were the most commonly used smoking and smokeless form of tobacco among the study participants because of its low cost and easy accessibility. The habit of alcohol consumption on a regular basis is an important risk factor for HNC.[7] In the present study, most of the participants like 57.7% were nondrinkers and others were social drinkers (2.7%), moderate drinkers (12.7%), and previous heavy drinkers (27%). They were not aware that the alcohol consumption would lead to HNC. In our present study, the most common type of HNC is the squamous cell carcinoma which accounts for about 71.3% than the other types of cancers. Similarly, the prevalence of squamous cell carcinoma was more than other types of cancer and it is the sixth leading cancer by incidence worldwide.[4,15]

In our study participants, intraoral sites of HNC are more in number, of which the most common site was the buccal mucosa (19.3%) followed by the tongue (14%) and lower lip (7.3%). This was similar with the reports of Iype *et al.*,[16] Kuriakose *et al.*,[17] and Bhattacharyya P *et al.*,[18] and also stated that the constant contact with the quid while chewing can be one of the reasons for the higher prevalence of cancer in buccal mucosa and tongue. The most common symptoms of the HNC reported in our present study were the ulcer (23.7%), problem with the teeth (16.3%), swelling (13%), and lump (7.1%) and others were rare symptoms. In the study of Chaturvedi P,[19] the common symptoms were ulcer and pain (49.6%), a nonhealing ulcer and pain were the most common early presenting symptoms of oral cancer and also he revealed that if the patients were aware of these symptoms they would consider them serious enough to perform a self-examination.

One of the important prognostic factors in HNC is the stage at disease, in the present study more than half of the patients

Table 3: Frequency distribution of clinical details of the head and neck cancer

Variables	Options	Frequency (*n*)	Percentage (%)
Diagnosis	Non-Hodgkin's Lymphoma	4	1.3
	Squamous Cell Carcinoma	214	71.3
	Hodgkin's Lymphoma	9	3.0
	Adenocarcinoma	22	7.3
	GilioBlastoma	7	2.3
	Adenoid Cystic Carcinoma	7	2.3
	Aplastic Glicoma	7	2.3
	Olfactory Neurblastoma	7	2.3
	Synovial Sarcoma	8	2.7
	Anaplastic Carcinoma	7	2.3
	Odentogenic Kerato Cyst	6	2.0
	Ependymoma	2	0.7
Site of Cancer	Neck	16	5.3
	Nasal cavity	14	4.7
	Larynx	12	4.0
	Head occipital region	2	0.7
	Head parietal region	9	3.0
	Buccal mucosa	58	19.3
	Pharynx	20	6.7
	Tongue	42	14.0
	Mandible	13	4.3
	Frontal region	9	3.0
	Lower lip	22	7.3
	Face	8	2.7
	Brain	11	3.7
	Thyroid	9	3.0
	Upper lip	4	1.3
	Hard palate	9	3.0
	Maxilla	5	1.7
	Nasopharynx	7	2.3
	Frontal sinus	3	1.0
	Retromolar region	3	1.0
	Supraglottis	15	5.0
	Lower alveolus	5	1.7
	Floor of the mouth	4	1.3
Stage of cancer	Stage I	10	3.3
	Stage II	51	17.0
	Stage III	174	58.0
	Stage IV	65	21.7
Main symptom of the patients	Lump in the neck	11	3.7
	Difficult in swallowing foods	30	10.0
	Bleeding from the nose or mouth	8	2.7
	Problem with the teeth	49	16.3
	Pain in the head region	23	7.7
	Lump in the head region	2	0.7
	Swelling	39	13.0
	Bleeding while coughing	7	2.3
	Fits	19	6.3
	Ulcer	71	23.7
	Lump in the head and face	8	2.7
	Difficulty in speaking	10	3.3
	Difficult in opening mouth	3	1.0
	cold and breathing trouble	20	6.7
Treatment	Only Chemotherapy	60	20.0
	Only Radiotherapy	16	5.3
	Only Surgery	26	8.7
	Radiotherapy and Chemotherapy	72	24.0
	Radiotherapy and Surgery	18	6.0
	Chemotherapy, Radiotherapy, and Surgery	47	15.7
	Surgery and Chemotherapy	11	3.7
	Not yet started	50	16.7

reported at an advanced stage of disease with Stage III (58%) and Stage IV (21.7%), respectively, because of their delayed health seeking behavior. Since most of the patients were diagnosed at advanced stages, they have received the combined therapy of treatment rather than single therapy in our present study. There is no uniform protocol for management; the affordability and availability of cancer treatment show broad disparities.[5] Majority of patients with HNC in our population

Table 4: Knowledge and belief of the patients regarding the signs and symptoms of head and neck cancer

Questions	True *n* (%)	False *n* (%)	Don't know *n* (%)
You are more likely to get mouth cancer if you:			
a) Are aged more than 50 years	83 (27.7)	80 (26.7)	137 (45.7)
b) Smoke tobacco	171 (57)	0 (0)	129 (43)
c) Drink strong tea	1 (0.3)	0 (0)	299 (99.7)
d) Drink strong 'filter' coffee	1 (0.3)	0 (0)	299 (99.7)
e) Drink decaffeinated coffee	1 (0.3)	0 (0)	299 (99.7)
f) Chew tobacco	165 (55)	0 (0)	135 (45)
g) Drink alcohol heavily	126 (42)	1 (0.3)	173 (57.7)
h) Wear dentures	0 (0)	4 (1.3)	296 (98.7)
i) Eat hazel nuts	0 (0)	4 (1.3)	296 (98.7)
j) Overeat	0 (0)	4 (1.3)	296 (98.7)
k) Are a woman	0 (0)	4 (1.3)	296 (98.7)
l) Are a man	0 (0)	4 (1.3)	296 (98.7)
m) Have lost all your teeth	0 (0)	4 (1.3)	296 (98.7)
n) Are u aware of HPV causes cancer	0 (0)	4 (1.3)	296 (98.7)
A check-up for mouth cancer is:			
a) Painless	4 (1.3)	4 (1.3)	292 (97.3)
b) Not required if you wear a denture	0 (0)	4 (1.3)	296 (98.7)
The signs of mouth cancer:			
a) A white patch in your mouth	0 (0)	4 (1.3)	296 (98.7)
b) An ulcer that does not heal	0 (0)	4 (1.3)	296 (98.7)
c) A red patch in the mouth	0 (0)	4 (1.3)	296 (98.7)
d) Dizziness	0 (0)	0 (0)	300 (100)
e) Stomach ache	0 (0)	0 (0)	300 (100)
f) A painless ulcer.	0 (0)	0 (0)	300 (100)
g) A yellow patch in the mouth	0 (0)	0 (0)	300 (100)
h) A rash on the face	0 (0)	0 (0)	300 (100)
i) Feeling ill or unwell	0 (0)	0 (0)	300 (100)
General questions:			
a) Mouth cancer affects tongue only	0 (0)	5 (1.7)	295 (98.3)
b) If you smoke or drink heavily then the chances of getting head and neck cancer are greater	5 (1.7)	0 (0)	295 (98.3)
c) If your dentist finds head and neck cancer early then it is easy to treat	9 (3)	0 (0)	291 (97)

presented with locally advanced or advanced staged (Stage III and Stage IV), so an aggressive form of treatment by surgery followed by external beam radiotherapy was imperative.[11] The similar findings were observed with the studies done by Krishnatreya M *et al*.[11] and Agarwal AK *et al*.[20] However, another Indian study in the past reported that the 50% of the patients present in early stages of HNC.[21]

There is a lack of awareness seen among the patients regarding the knowledge about the HNC. They were only aware of the fact that the deleterious habits like smoking and chewing tobacco, alcohol would cause HNC but they did not know the common signs, symptoms, and the sites of HNC. Although they knew that the adverse habits would lead to HNC, but still they were using it in the past until they were diagnosed with the disease. The patients revealed the reason for their known adverse habits was that their friends and co-workers who smoke more often and drink regularly are not getting any type of health problems and living a normal life. So, they were not aware that every person has different tolerance, immunity, genetic, and other risk factors which influence the HNC.

CONCLUSION

In our population, low literacy level and lack of awareness was common among the lower socio-economic class. Lack of knowledge and awareness is one of the major cause of increasing prevalence of HNC in our country. It is most important to increase the knowledge and awareness among the general population for early identification of the HNC.

Human subjects

Consent was obtained by all participants in this study.

Animal subjects

This study did not involve animal subjects or tissue.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Ganesh R, John J, Saravanan S. Socio demographic profile of oral cancer patients residing in Tamil Nadu – A hospital based study. Indian J Cancer 2013;50:9-13.
2. Addala L, Pentapati CK, Reddy Thavanati PK, Anjaneyulu V, Sadhnani MD. Risk factor profiles of head and neck cancer patients of Andhra Pradesh, India. Indian J Cancer 2012;49:215-9.
3. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global Cancer Statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2018;68:394-424.

4. Mishra A, Meherotra R. Head and neck cancer: Global burden and regional trends in India. Asian Pac J Cancer Prev 2014;15:537-50.
5. Kulkarni MR. Head and Neck Cancer burden in India. Int J Head Neck Surg 2013;4:29-35.
6. Nieminen M, Aro K, Jouhi L, Bäck L, Mäkitie A, Atula T. Causes for delay before specialist consultation in head and neck cancer. Acta Oncologica 2018;57:1677-86.
7. Singh SP, Eisenberg R, Hoffman G. An overview and comparative evaluation of head and neck cancer risk factors in India and Australia. Int J Otolaryngol Head Neck Surg 2018;7:254-67.
8. Coelho KR. Challenges of the oral cancer burden in India. J Cancer Epidemiol 2012:10:1-17.
9. Sankaranarayanan R, Ramadas K, Thomas, G. Effect of screening on oral cancer mortality in Kerala, India: A cluster randomised controlled trial. Lancet 2005;365:1927-33.
10. Joshi P, Dutta S, Chaturvedi P, Nair S. Head and neck cancers in developing countries. Rambam Maimonides Med J 2014;5:e0009.
11. Krishnatreya M, Rahman T, Kataki AC, Sharma JD, Nandy P, Baishya N. Pre-treatment performance status and stage at diagnosis in patients with head and neck cancers. Asian Pac J Cancer Prev 2014;15:8479-82.
12. Fathima KH, Durai JS, Shantaraman K. Hospital cancer registry in a tertiary care hospital in South Tamilnadu – A comparative analysis of 2016 annual data with a decade old data on cancer incidence. J Dent Med Sci 2018;17:28-33
13. Kreimer A, Clifford G, Boyle P, Franceschi S. Human papillomavirus types in head and neck squamous cell carcinomas worldwide: A systematic review. Cancer Epidemiol Biomarkers Prev 2005;14:467-75.
14. Shoaib M, Ahmed SA, Waqar SM, Abbasi Z, Yusuf FH. Perspective on health seeking behavior of patients with oropharyngeal cancers from a Pakistani Background. J Ayub Med Coll Abbottabad 2016;28:830-1.
15. Priya SS, Shavi GR, Sanga R, Shankar S, Lalithambigai G, Rahila C, *et al*. Assessment of the perceived stress and burden of family caregivers of the head-and-neck cancer patients at a tertiary care cancer center: A cross-sectional study. J Can Res Ther 2021;17:1039-46.
16. Iype EM, Pandey M, Mathew A, Thomas G, Sebastian P, Nair MK. Squamous cell carcinoma of the tongue among young Indian adults. Neoplasia 2001;3:273-7.
17. Kuriakose M, Sankaranarayanan R, Nair MK. Comparison of oral squamous cell carcinoma in younger and older patients in India. Eur J Cancer Oral Oncol 1992;28:113-20.
18. Bhattacharyya P, Mukherjee D, Barman S, Dey TK, Biswas J. Factors responsible for the diagnostic delay in oral cancer patients: A hospital based sociodemographic study in Kolkata. Bengal J Otolaryngol Head Neck Surg 2016;24:141-7.
19. Chaturvedi P. Head and neck surgery. J Cancer Res Ther 2009;5:143.
20. Agarwal AK, Sethi A, Sareen D, Dhingra S. Treatment delay in oral and oropharyngeal cancer in our population: The role of socio-economic factors and health-seeking behaviour. Indian J Otolaryngol Head Neck Surg 2011;63:145-50.
21. Sankaranarayan R. Oral cancer in India: An epidemiologic and clinical review. Oral Surg Oral Med Oral Pathol 1990;69:325–30.