PREVALENCE AND RISK FACTORS ASSOCIATED WITH ORAL CANCER

Yandeti Srinivasulu1[1], Abdul Wahab[2], Senthil Murugan.P[3].

[1] *Department of Oral and Maxillofacial surgery ,Saveetha Dental College and Hospital,Saveetha Institute of Medical and Technical Sciences(SIMATS),Saveetha University,162, Poonamallee High Road,Chennai 600077, Tamil Nadu, India*
[2]*Professor,Department of Oral and Maxillofacial surgery , Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences(SIMATS), Saveetha University,162, Poonamallee High Road,Chennai 600077,Tamil Nadu, India.*
[3]*Associate Professor,Department of Oral and Maxillofacial surgery , Saveetha Dental College and Hospital,Saveetha Institute of Medical and Technical Sciences(SIMATS), Saveetha University, 162, Poonamallee High Road, Chennai 600077, Tamil Nadu, India.*
[1]*151804001.sdc@saveetha.com*
[2]*abdulwahab@saveetha.com*
[3]*senthilmuruganp.sdc@saveetha.com*.

ABSTRACT:

Oral cancer is one of the most common major debilitating diseases affecting the world community.It is one the most commonest form of cancer in south asia especially countries like India,pakistan,bangladesh are most affected.This occurs mainly due to habits like smoking,gutkha and paan chewing and areca nut.most of people affected were between age groups third and sixth decades,so they are also prone for the systemic diseases.this will further complicate both the treatment plan,treatment.added to this, their postoperative complications and prognosis all depends on comorbid conditions like systemic diseases.so the aim of the study is identify the prevalence and risk factors associated with oral cancer .This is an Retrospective study.In this study a total 86000 patients records were analysed and after fulfilling the inclusion and exclusion criteria,a total of 53 patients from Department of Oral Oncology , Saveetha Dental College, who were diagnosed as oral cancer were considered for this study.Subjective and objective observations are recorded that includes age, gender, habits and systemic diseases of oral cancer patients. Period of study is from June 2019 to March 2020.All the datas of the patients were reviewed by an external reviewer and were tabulated.Statistics done with Chi Square test using SPSS.The results obtained in this study indicates that habits 39% and systemic diseases 45% were associated with oral cancer.Habits and systemic diseases are strongly correlated with oral cancer, these are risk factors for prevalence of oral cancer. Within the limitations of the study there are significant risk factors like habits and systemic diseases that are associated with the causation of oral cancer which has direct implications on the severity of disease and this will also enable us to pave the way for providing better comprehensive treatment for oral cancer.

 Keywords:
 Habits ; Risk factors; Systemic diseases; Squamous cell carcinoma.

INTRODUCTION:

India is one of the countries having the highest incidence of oral cancer(Gupta and Ray, 2003). The term oral cancer includes a diverse group of tumors arising from the oral cavity, which also usually include cancers of lip, tongue, pharynx.The World Health Organisation reported that oral cancer has one of the highest mortality ratios amongst all malignancies. The vast majority of malignant neoplasms in the mouth are squamous cell carcinomas. The etiology of oral cancer is multifactorial.
 Lifestyle related habits such as smoking, drinking alcohol,chewing tobacco and pan masala,sweetening, colouring and flavouring agents,Arecanut slaked lime. In the South Asian regions,over one third of

tobacco consumed is smokeless(Hamada *et al.*, 1991). In India where tobacco chewing is used with betel nuts and reverse smoking practised in some parts, there is a striking incidence of oral cancer. Higher occurrence of cancer is observed in Oral Submucous Fibrosis patients and tobacco is considered to be an important risk factor for oral cancer among youths.Systemic diseases like Diabetes mellitus and hypertension are associated with oral squamous cell carcinoma in some percentage of patients.Dentistry comprises practices related to oral cavity. Oral diseases are a major problem among the general population and there are various procedures carried out to prevent and treat them(Patturaja and Pradeep,2016).Anxiety and fear are said to enhance pain during dental treatment of oral cancer patients.(Santhosh Kumar Mp, 2017).

The aim of the study is identify the prevalence and risk factors associated with oral cancer.

MATERIALS AND METHOD:

This retrospective study was conducted by collecting records of 86,000 patients from June 2019- April 2020 who had reported to Saveetha Dental College for treatments. Patients reporting to the Department of Oral and Maxillofacial Surgery/Oral Oncology with the diagnosis of Oral Cancer were shortlisted from the main records based on the inclusion/exclusion criteria.So final sample which contains 53 patients were enrolled for the study. Ethical committee approval was obtained from the Institutional Ethics Committee with the following ethical approval number. SDC/SIHEC/2020/DIASDATA/0619-0320.

The study population included patients who underwent treatment for Oral Cancer at Saveetha Dental College by means of Systematic Sampling.

- Inclusion Criteria- Patients of all age groups and gender with diagnosis of oral cancer were included.
- Exclusion Criteria- Patients with other problems like fractures and pathologies,and common dental problems were excluded from the study.

Duplicate patient records and incomplete data were excluded. Datas were reviewed by an external reviewer. Totally, n= 53 patients were included.Demographic data such as the patient's age, gender and their Habits and Systemic Diseases were also recorded. The data obtained were tabulated in Microsoft Excel 2016 (Microsoft office 10) and later exported to SPSS (Statistical Package for Social Sciences) for Windows version 20.0, SPSS Inc, Chicago IU, USA) and subjected to statistical analysis. Chi-square test was employed with a level of significance set at $p<0.05$.

RESULTS AND DISCUSSION:

The results obtained in this study indicated that habits 39% and systemic diseases 45% were associated with oral cancer. Oral cancer and habits cross tabulation showed that habits associated with Oral squamous cell carcinoma were (21) and without having habits were(32). (). The oral cancer and systemic diseases cross-tabulation showed that systemic diseases associated with oral squamous cell carcinoma were (24) without association of systemic diseases were (29).the gender age group ,habits and systemic diseases gender distributions were plotted in(figures 1,2,34,5) and the corresponding gender distribution and cross tabulation for association of oral cancer and habits and gender distribution ,cross tabulation and association of oral cancer and systemic diseases were plotted in (figures 6,7,8,9.)

The association between smoking and oral squamous cell carcinoma is well established in Literature(Wünsch Filho *et al.*, 2010). Regarding the co use of tobacco and alcohol observed that this synergism increases risk of oral squamous cell carcinoma by 10 times. Incidence of oral squamous cell carcinoma is more in males than females. The goal of the scientific research is to find the new biological markers which should be able to define the "tumor biological fingerprint" and to identify the molecular key players that are involved in oropharyngeal carcinogenesis(Marimuthu *et al.*, 2018).Bacterial endocarditis or infective endocarditis is a serious infection of the heart valves and endocardium that most

often is related to congenital and acquired cardiac defect and can commonly occur in patients with artificial heart valves(Kumar and Sneha, 2016).So if an extraction is needed for oral cancer patients with the above said conditions,more attention to be paid in Antibiotic prophylaxis.

Tobacco- all forms of tobacco , cigarette ,pipes,cigars,smokeless tobacco have been implicated in the development of oral cancer(Cinciripini, Wetter and McClure, 1997). While tobacco confers the highest risk of oral cancer ,tobacco use is responsible for 90% of oral cancer death in males in addition to this, the chewing products such as betel nuts, pan, gutkha ,naswar and areca increases the risk for oral cancer. It is important for dental students to enable diagnosis and management of HIV/AIDS patients with oral cancer to have a more positive attitude toward these patients. Furthermore, as their knowledge improves, dental students may understand methods of infection control and how to prevent HIV transmission(Rahman and Mp, 2017).Surgical alterations in the position of the bony facial skeleton will inevitably affect the soft tissues(Jain *et al.*, 2019).

Alcohol- alcohol use is second in independent major risk factors for development of oral cancer. For non-smokers it is most important risk factor ,above 30 ml of alcohol per day increases the risk linearly with the amount of the alcohol consumed(Rodriguez *et al.*, 2004).A major issue related to the present bio medical waste management system is that many hospitals dispose their waste in an improper way, which contributes to spread of serious diseases such as hepatitis and human immunodeficiency virus (Kumar and Rahman, 2017) .Botulinum, is a protein and lethal neurotoxin is one of the most potent biological substances known which is used in bioterrorism as well . It is the first toxin used for therapeutic purposes(S. K. Mp, 2017).This sometimes may help in treating oral cancer patients adjunctively.

Poor nutrition- dietary deficiency is particularly of Vitamin A,VitaminC,VitaminE,Iron,Selenium folate, and other trace elements have been linked to increased risk of oral cancer. Maxillofacial trauma is any physical trauma to the facial region, is commonly encountered by maxillofacial surgeons,and is often associated with high morbidity(Abhinav *et al.*, 2019) if this happened for oral cancer patients particularly post surgery,it may lead to so many complications starting from difficult intubation to difficult Open Reduction and Internal Fixation.One of the most common postoperative complications after the extraction of teeth is a condition known as dry socket(Jesudasan, Wahab and Sekhar, 2015).

Ultraviolet light- solar radiation is a major risk factor for the cancer of the lip. The vast majority of the lip cancer occurs on the lower lip and many patients have outdoor occupation where Sun exposure is increased. Pharmacological agents have also been used in the recent past as adjuvants during various surgical procedures to aid in the reduction of blood loss. Among these, tranexamic acid has been proven to efficiently reduce bleeding(Christabel *et al.*, 2016).

Candidiasis - ectodermal dystrophy is an autosomal recessive disease associated with the Limited t-lymphocyte defect seems to favour the growth of the candida albicans and predispose to chronic mucositis and oral cancer.Oral submucous fibrosis is an insidious, chronic, dis-
abling disease that affects the entire oral cavity, sometimes pharynx and rarely larynx(Patil *et al.*, 2017).

 Diabetes: The molecular basis for the association of diabetes mellitus with oral squamous cell carcinoma from epidemiological studies may involve insulin receptor substrate and focal adhesion kinase. Patients having dental fear tend to go to the dentist only when they experience pain, thereby increasing the chance that their visit to the dentist will involve pain. This, in turn, results in exacerbation of their anxiety. It was found that dental anxiety was ranked fifth among the most commonly feared situations(Sweta, Abhinav and Ramesh, 2019).
Free radicals-Free radicals such as reactive oxygen species and reactive nitrogen species can act as both initiators and promoters in carcinogenesis .

Family history- Head and neck cancer patients show an increased susceptibility to chromosome damage by mutagens A simple ranula can be treated by marsupialization or sclerotherapy or complete excision of the associated salivary gland(Packiri, Gurunathan and Selvarasu, 2017).Painless Dental extraction is the most common procedure carried out by dentists, and it is a common model for evaluating the efficacy of analgesics for acute dental pain relief(Rao and Kumar, 2018).Another study used cDNA and identified genes such as keratin 17 and 19,laminin 5,connexin 26 and vascular endothelial growth factor as the differently explained factors in head and neck squamous cell carcinoma tissues. In the present study showed that 39% of Habits and systemic diseases of 45% were associated with oral cancer. The well differentiated squamous cell carcinoma showed that patients were having habits of (21) and without having habits (32). The squamous cell carcinoma associated with systemic diseases are (24) and not associated with systemic diseases are (29).

In our study we observed that there is a correlation between habit and systemic diseases which act as a risk factor for oral cancer. Shalini Gupta et al said that tobacco and alcohol are major risk factors associated with all cancers.

CONCLUSION:

This study is of shorter duration with limited population. So to ascertain the findings of our study, we have to do further studies in the future with larger sample size and longer duration.This can be helpful to find more information regarding prevalence and risk factors associated with causation of oral cancer and identify preventive measures to be taken which will reduce its prevalence. Within the limitations of the study, the risk factors like habits and systemic diseases have significant associations with oral cancer .

AUTHORS CONTRIBUTION:

Yandeti Srinivasulu carried out the retrospective study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Abdul Wahab PU aided in conception of the topic, participated in the study design, statistical analysis and supervised in preparation of the manuscript. Senthil Murugan P participated in the selection of the topic,study design,statistics and coordinated in developing the manuscript. All the authors had equally contributed in developing the manuscript.

CONFLICT OF INTEREST: No conflict of interest

REFERENCES:

[1] Abhinav, R. P. et al. (2019) 'The Patterns and Etiology of Maxillofacial Trauma in South India', Annals of maxillofacial surgery, 9(1), pp. 114–117.

[2] Christabel, A. et al. (2016) 'Comparison of pterygomaxillary dysjunction with tuberosity separation in isolated Le Fort I osteotomies: a prospective, multi-centre, triple-blind, randomized controlled trial', International journal of oral and maxillofacial surgery, 45(2), pp. 180–185.

[3] Cinciripini, P. M., Wetter, D. W. and McClure, J. B. (1997) 'Scheduled reduced smoking: effects on smoking abstinence and potential mechanisms of action', Addictive behaviors, 22(6), pp. 759–767.

[4] Gupta, P. C. and Ray, C. S. (2003) 'Smokeless tobacco and health in India and South Asia', Respirology , 8(4), pp. 419–431.

[5]   Hamada, G. S. et al. (1991) 'Comparative epidemiology of oral cancer in Brazil and India', The Tokai journal of experimental and clinical medicine, 16(1), pp. 63–72.

[6]   Jain, S. V. et al. (2019) 'Evaluation of Three-Dimensional Changes in Pharyngeal Airway Following Isolated Lefort One Osteotomy for the Correction of Vertical Maxillary Excess: A Prospective Study', Journal of Maxillofacial and Oral Surgery, pp. 139–146. doi: 10.1007/s12663-018-1113-4.

[7]   Jesudasan, J. S., Wahab, P. U. A. and Sekhar, M. R. M. (2015) '… of 0.2% chlorhexidine gel and a eugenol-based paste on postoperative alveolar osteitis in patients having third molars extracted: a randomised controlled clinical trial', British Journal of Oral and. Elsevier. Available at: https://www.sciencedirect.com/science/article/pii/S0266435615002314.

[8]   Kumar, S. and Rahman, R. (2017) 'KNOWLEDGE, AWARENESS, AND PRACTICES REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG UNDERGRADUATE DENTAL STUDENTS', Asian Journal of Pharmaceutical and Clinical Research, p. 341. doi: 10.22159/ajpcr.2017.v10i8.19101.

[9]   Kumar, S. and Sneha, S. (2016) 'KNOWLEDGE AND AWARENESS REGARDING ANTIBIOTIC PROPHYLAXIS FOR INFECTIVE ENDOCARDITIS AMONG UNDERGRADUATE DENTAL STUDENTS', Asian Journal of Pharmaceutical and Clinical Research, p. 154. doi: 10.22159/ajpcr.2016.v9s2.13405.

[10]   Marimuthu, M. et al. (2018) 'Canonical Wnt pathway gene expression and their clinical correlation in oral squamous cell carcinoma', Indian journal of dental research: official publication of Indian Society for Dental Research, 29(3), pp. 291–297.

[11]   Mp, S. K. (2017) 'Relationship between dental anxiety and pain experience during dental extractions', Asian J Pharm Clin Res, 10(3), pp. 458–461.

[12]   Mp, S. K. (2017) 'The emerging role of botulinum toxin in the treatment of orofacial disorders: Literature update', Asian J Pharm Clin Res. https://innovareacademics.org/journals/index.php/ajpcr/article/download/16914/12228.

[13]   Packiri, S., Gurunathan, D. and Selvarasu, K. (2017) 'Management of Paediatric Oral Ranula: A Systematic Review', Journal of clinical and diagnostic research: JCDR, 11(9), pp. ZE06–ZE09.

[14]   Patil, S. B. et al. (2017) 'Comparison of Extended Nasolabial Flap Versus Buccal Fat Pad Graft in the Surgical Management of Oral Submucous Fibrosis: A Prospective Pilot Study', Journal of Maxillofacial and Oral Surgery, pp. 312–321. doi: 10.1007/s12663-016-0975-6.

[15]   Patturaja, K. and Pradeep, D. (2016) 'Awareness of Basic Dental Procedure among General Population', Research Journal of Pharmacy and Technology. A & V Publications, 9(9), pp. 1349–1351.

[16]   Rahman, R. and Mp, S. K. (2017) 'KNOWLEDGE, ATTITUDE, AND AWARENESS OF DENTAL UNDERGRADUATE STUDENTS REGARDING HUMAN IMMUNODEFICIENCY VIRUS/ACQUIRED …', Asian J Pharm Clin Res.. https://innovareacademics.org/journals/index.php/ajpcr/article/download/17277/10802.

[17]   Rao, T. D. and Kumar, M. P. (2018) 'Analgesic Efficacy of Paracetamol Vs Ketorolac after Dental Extractions', Research Journal of Pharmacy and Technology. A & V Publications, 11(8), pp. 3375–3379.

[18]   Rodriguez, T. et al. (2004) 'Risk factors for oral and pharyngeal cancer in young adults', Oral oncology, 40(2), pp. 207–213.

[19]   Sweta, V. R., Abhinav, R. P. and Ramesh, A. (2019) 'Role of Virtual Reality in Pain Perception of Patients Following the Administration of Local Anesthesia', Annals of maxillofacial surgery, 9(1), pp. 110–113.

[20] Wünsch Filho, V. et al. (2010) 'Tabagismo e câncer no Brasil: evidências e perspectivas', Revista brasileira de epidemiologia = Brazilian journal of epidemiology. Associação Brasileira de Saúde Coletiva, 13(2), pp. 175–187.
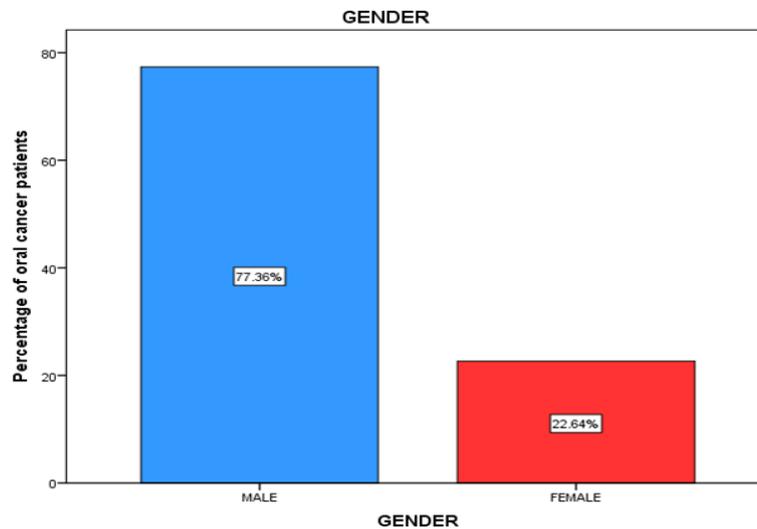

Figure 1:Bar graph depicts the gender distribution of patients with oral cancer in this study. Where X axis represents the gender and Y axis represents number of oral cancer patients.From the graph it is evident that the incidence of males (77.4%)was more compared to females (22.6%) which indicates Male predilection.
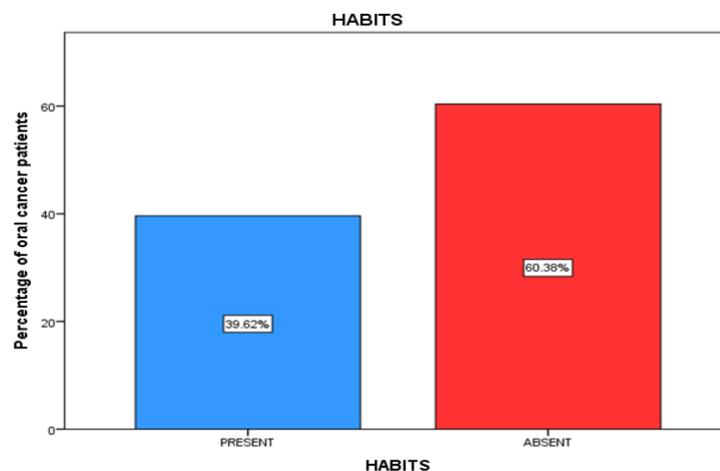
Figure2 :Bar diagram showing the frequency distribution of habits in patients in this study. Where X axis represents the gender and Y axis represents number of oral cancer patients.Incidence of presence of habits (60.4%) in oral cancer patients were more compared to absence of habits (39.6%) .
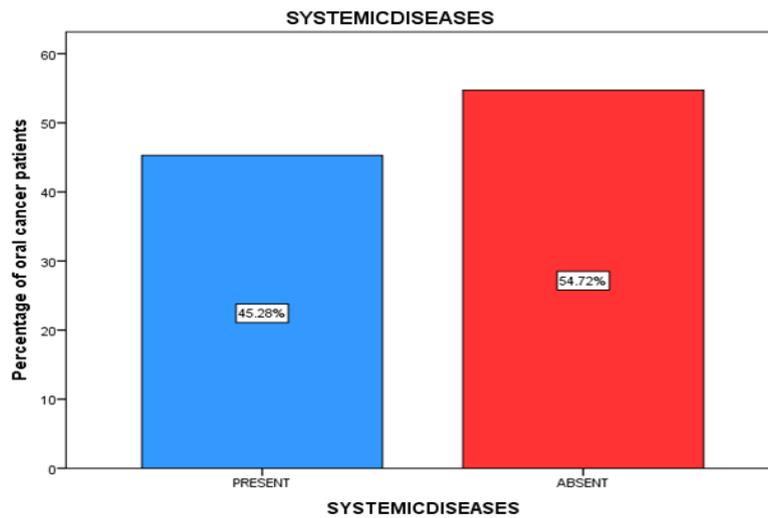
Figure3 :Bar diagram showing the frequency distribution of systemicDiseases in patients in this study.Where X axis represents the gender and Y axis represents number of oral cancer patients.Incidence of presence of systemic diseases (45.3%) in oral cancer patients is low.
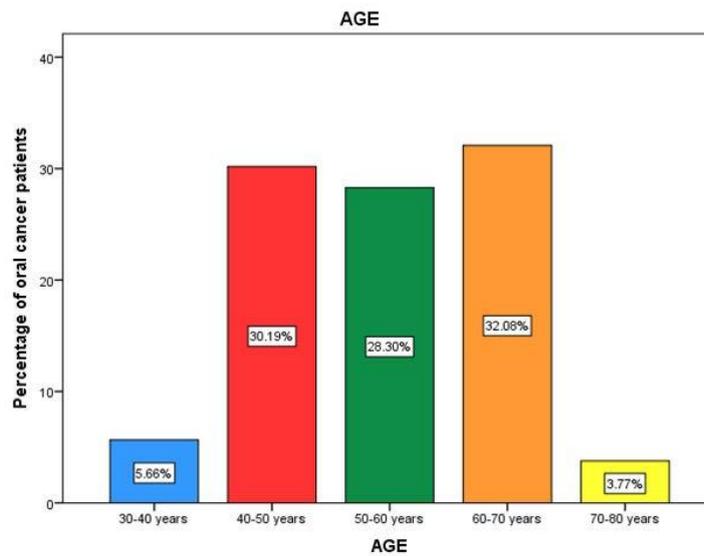

Figure 4:Bar diagram depicting the age distribution of patients in five age groups where Blue bar represents percentage of patients in that group.X axis indicates the age group and Y axis indicates the number of oral cancer patients.From the table,it is evident that incidence of oral cancer is more prevalent in the 60-70years age group[32.08%] when compared to other age groups.
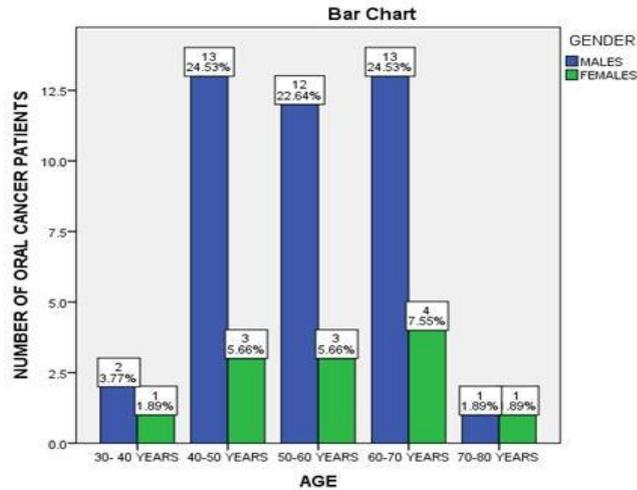
Figure 5:Bar diagram depicting the Gender distribution of patients in five age group.X axis indicates the age group and Y axis indicates the number of male/female oral cancer patients. From the table,it is evident that incidence of oral cancer is more prevalent in males among 40-70years age groups when compared to other age groups.
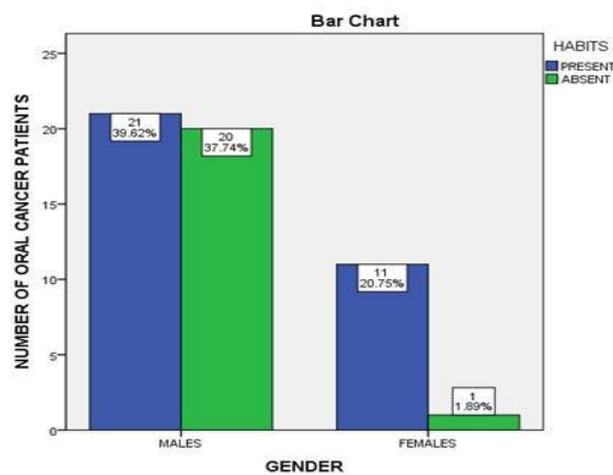

Figure 6 .Bar diagram showing the association of gender with presence or absence of habits.X axis represents the gender and Y axis represents number of oral cancer patients affected by habits.Pearson chi square p value - 0.012 [< 0.05])hence statistically significant.There is a statistically significant association between gender and habits which indicates that the habits were more prevalent among males.
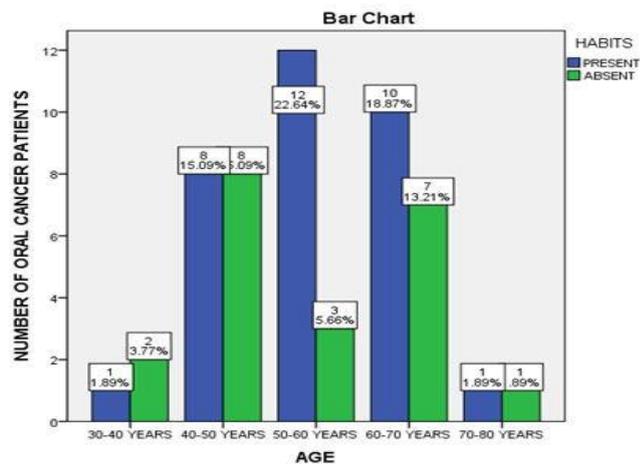
Figure 7.Bar diagram showing the association Age with Presence or Absence of habits.X axis represents the age group and Y axis represents number of oral cancer patients affected by habits.From the table,it is found that association of habits with oral cancer is more among patients with 50-60 years and 60-70 year when compared to other age groups.Pearson chi square p value - 0.385 [> 0.05])hence statistically not significant.Even though there is no significant association between age and habits,presence of habits in oral cancer patients is more prevalent in 50-70 years age group.
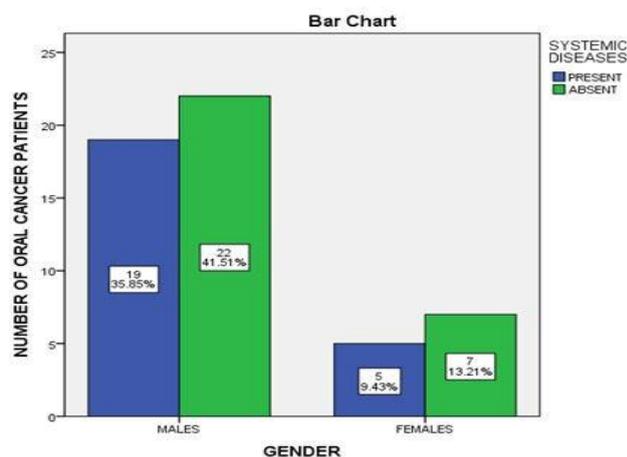

Figure 8 .Bar diagram showing the association of Gender with Presence or Absence of systemic diseases.X axis represents the gender and Y axis represents number of oral cancer patients affected by systemic diseases. Pearson chi square p value - 0.775 [> 0.05])hence statistically not significant.Even though there is no significant association between gender and systemic diseases,the presence of systemic diseases in oral cancer patients is more prevalent in males when compared to females.
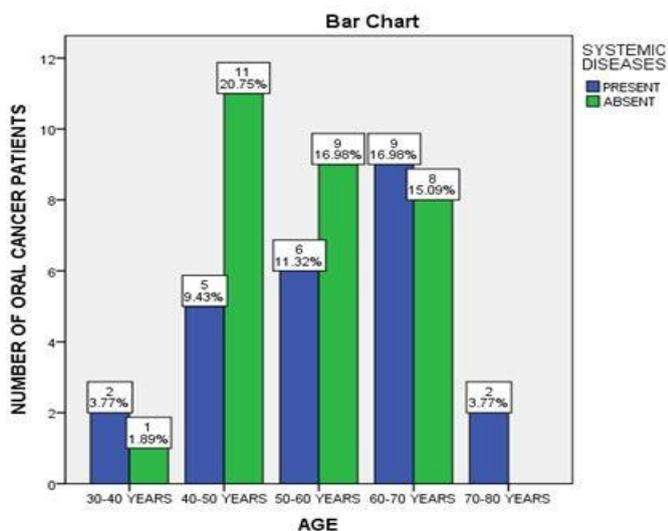
Figure 9.Bar diagram showing the association Age with Presence or Absence of systemic diseases.X axis represents the age group and Y axis represents number of oral cancer patients affected by systemic diseases.From the table,it is found that association of systemic diseases with oral cancer is more among patients with 60-70 year when compared to other age groups.Pearson chi square p value - 0.307 [> 0.05])hence statistically not significant.Even though there is no significant association between age group and systemic diseases,the presence of systemic diseases in oral cancer patients is more prevalent in 60-70 years age group.