KNOWLEDGE AWARENESS AND ATTITUDE TOWARDS ORAL MANIFESTATIONS OF VIRAL INFECTIONS AMONG DENTAL STUDENTS- A QUESTIONNAIRE BASED STUDY

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ABSTRACT

A virus is composed of nucleic acid either DNA or RNA, surrounded by a protein coat.It requires a living cell to multiply. A viral infection can lead to a spectrum of symptoms from asymptomatic to severe disease.Worldwide,5% of health-care-related infections are being transmitted. Dentists are considered being a high risk group for cross-infection.Therefore it is important that dental students have adequate knowledge and awareness of viral infections.The aim of the study is to evaluate the knowledge, awareness and attitude about oral manifestations of viral infections among dental students.A self explanatory questionnaire comprising 20 questions was presented to 205 students. The questionnaire enquired about oral manifestations of different viral infections and their precautionary infection control measures .Out of 205 students 86.34% were males and 13.66% were females,189 of them knew that the most common oral manifestation in HIV patients is candidiasis.92.6%agreed that a dentist could get Herpetic paronychia.When asked if treatment of patients with viral infections required special clinics 68.1% responded yes.Our study showed that the dental undergraduate students had adequate knowledge on oral manifestations of viral diseases but lacking knowledge about infection control protocol for the various diseases. Hence students should improve their attitude towards them in their dental practice.

KEY WORDS: HIV; HSV; HPV; Herpes; infection control; oral squamous cell carcinoma; viral infections.

INTRODUCTION

The human oral cavity is home to a rich microbial flora, including bacteria, fungi and viruses. Oral tissues are constantly exposed to these microbes, which form a complex ecological community that influences oral and systemic health(Aas *et al.*, 2005). Viruses are generally more difficult to detect among pathogenic microbes, atleast with traditional methods such as vitro cultivation.

A number of viruses have been found in the oral cavity, some of which include Herpes simplex virus 1 (HSV-1) causes gingivostomatitis and the virus can subsequently enter a dormant state in the trigeminal ganglion. Blood borne viruses such as a Human immunodeficiency virus (HIV) can enter the mouth via gingival cervicular fluid(Grinde and Olsen, 2010). Oral manifestations of cytomegalovirus are rare and are observed in immunocompromised patients, such as those with HIV. The most common oral

manifestations include oral ulcers or major salivary gland diseases(Gifrina Jayaraj, Sherlin, *et al.*, 2015) Similarly, the mumps virus is known to infect the salivary glands and can be found in saliva of affected individuals. Human papilloma virus (HPV) is responsible for several oral conditions, including condylomas and has also been implicated in head and neck squamous cell carcinoma and potentially malignant disorders (Gifrina Jayaraj, Ramani, *et al.*, 2015; Asai and Nakashima, 2018, Ramasubramanian et al. 2013).HPV is considered a prime suspect in the etiology of oral squamous cell carcinoma because of their ability to immortalize oral keratinocytes by bringing transformation of epithelial cells(Gifrina Jayaraj, Ramani, *et al.*, 2015; Sridharan, Ramani and Patankar, 2017; Shree *et al.*, 2019). Tongue is considered to be the principal head and neck cancer site for oral squamous cell carcinoma associated with HPV(Viveka et al. 2016; Thangaraj et al. 2016)

A viral disease of oral cavity is the infectious type of pathology affecting oral tissues. Viral diseases may either occur due to cellular destruction or consequence of immune reaction following viral proteins(Santosh and Muddana, 2020). Oral manifestations of viral infections may present as (1) preliminary sign of disease (2) important co-symptom of viral disease, or (3) only sign observed in viral disease. They often cause a plethora of symptomatic and asymptomatic infections in the oral cavity with clinical features ranging from no change to epithelial ulcerations,benign soft tissue growth and malignancy(Fatahzadeh, 2017).

Infection is one of the most crucial problems in health care services world wide. It is considered one of the most important causes of morbidity and mortality associated with clinical, diagnostic and therapeutic procedures(Alharbi *et al.*, 2019). During dental procedures, transmission of infections could occur either through direct contact with blood, saliva or contaminated instruments, anesthetic needles or splash exposure of the mucous membranes, droplets and aerosols(Ravichandran and Brundha, 2016). By using safety precautions at work and implementing infection control guidelines, accidental exposure can be avoided(Rahman *et al.*, 2013).

Oral health influences overall health and quality of life. The majority of viral infections tend to have oral manifestations, and general dentists majorly focus on the management of dental and periodontal diseases(Baiju *et al.*, 2017). With changes in life expectancy of people and lifestyles, as well as a rapid advancement in biomedical sciences, it is essential for dentists to have adequate knowledge about the diagnosis, clinical features, treatment and infection control precautions to be taken during the treatment of viral infections.

Previously our team conducted numerous clinical trials, case reports on various oral diseases and dental aids and laboratory in-vitro studies (G. Jayaraj *et al.*, 2015; Jangid *et al.*, 2015; Sherlin *et al.*, 2015; Gheena and Ezhilarasan, 2019; Sridharan *et al.*, 2019) (Sivaramakrishnan and Ramani, 2015; Swathy, Gheena and Varsha, 2015; Gupta and Ramani, 2016; Hannah *et al.*, 2018)over the past five years. Now we are focussing on epidemiological surveys. The idea for this survey stemmed from the current interest in our community owing to the pandemic situation of the deadly Corona virus - Covid-19.The purpose of this study is to investigate knowledge, attitude and awareness about oral manifestations of the numerous viral infections among dental students in order to assess their acumen towards the preventive measures taken while handling patients with blood borne viral diseases.

MATERIALS AND METHODS

A survey was conducted among dental students in Saveetha Dental College, a total of 205 students participated in the study. The students were given a self explanatory questionnaire comprising 20 questions. The questionnaire consisted of questions which enquired about oral manifestation of viral infections, and the precautionary infection control measures. Questions were specifically asked about a few benign and malignant diseases caused by viruses and their dental related problems. The study's limitation is that the participant had to rely on his/her memory to recall accurately their knowledge about the subject. Results were obtained as data charts from Google forms which were used to conduct the

survey. The data obtained was analysed using SPSS software. Association between various parameters was done using chi square test and p<0.05 was considered statistically significant.

RESULTS AND DISCUSSION

205 students participated in the survey 86.34% were males and 13.66% were females. [figure-1].166 out of 205 students use all protective measures to prevent themselves from infection, 25 of them said they use only protective clothing and 13 said that they use only eyewear [figure-2]. According to [figure-3] 88% of them said that HPV has no visible signs.92.6% were aware that tongue is the principle head and neck cancer site[figure-4].182 students said that herpes labialis is caused by HSV-2 [figure-5].192 out students responded that they were concerned about getting infected[figure-6].182 of them were aware that Hepatitis-B has the highest transmission rate through saliva[figure-7]. 86.3% said that Hepatitis-B is more communicable than HIV[figure-8] and 151 of them said that Herpetic conjunctivitis occurs due to self inoculation in children[figure-9].176 students said that Herpetic gingivostomatitis presents as vesicles [figure-10]. 92.6%agreed that a dentist could get Herpetic paronychia [figure-11] and 189 of them knew that the most common oral manifestation in HIV patients is candidiasis [figure-12] and 98% knew that Kaposi sarcoma was associated with HIV[figure-13].104 of them responded that erythroplakia where as only 54 of them knew that hairy leukoplakia was most commonly seen in HIV patients [figure-14].

According to 167of the students infectious mononucleosis is caused due to Epstein Barr virus[figure-15] and 114 of them responded that it was otherwise called kissing disease[figure-16].

As per [figure-17] 80 students responded that Coxsackie virus causes both hand, foot, mouth disease and herpangina. 120 of them responded that chicken pox causes vesicles with erythematous halo in the oral cavity[figure-18] and 136 of the students said that Koplik's spots were seen in measles[figure-19]. 109 students said that Ramsay-Hunt syndrome is caused due to EBV[figure-20]When asked if treatment of patients with viral infections required special clinics 68.1% responded yes[figure-21]. A statistical analysis was done to check the association between gender and protective measures to prevent infection. Pearson's chi-square test revealed (p>0.05) and hence it is not statistically significant implying no association between the gender and protective measures[figure-22]. The association between gender and site of head and neck cancer was analyzed statistically. Pearson's chi-square test revealed (p>0.05), which is not statistically significant. Therefore there was no association between the gender and site of head and neck cancer[figure-23]. Another statistical evaluation was done to check the association between gender and disease that has the highest rate of transmission via saliva. Pearson's chi-square test showed (p>0.05)and hence it is not statistically significant,which infers that there was no association between gender and disease that has the highest rate of transmission via saliva[figure-24]. The association between gender and Kaposi sarcoma was statistically analysed. Pearson's chi-square test revealed (p>0.05), which was not statistically significant. Hence there was no association between gender and kaposi sarcoma[figure-25]. The statistical analysis between gender and requirement of special clinics. Pearson's chi-square test showed (p>0.05) which was not statistically significant. This concludes that there was no association between gender and requirement of special clinics[figure-26].

The mouth is the major portal of entry to the body and is equipped with a formidable mechanism for sensing the environment and defending against toxins and invading pathogens. Poor oral conditions may adversely affect both oral and general health(Patil *et al.*, 2010). This study was conducted to assess the knowledge ,awareness and attitude about oral manifestations of viral infections among dental students.

The results show that the dental students have adequate knowledge about oral manifestations of viral infections. When asked about protective measures 81.4% used all protective wear,12.20% chose only protective clothing. In Esam et. al 2015 study, 96.6% students reported wearing gloves gloves,53.8% reported wearing masks and 18.6% reported wearing protective eye wear (Halboub *et al.*, 2015).

Our study showed that 88.7% of the students knew that Hepatitis -B has the highest rate of transmission via saliva(Pratha, Ashwatha Pratha and Geetha, 2017). In the study conducted by Chandhran et. al 25.3% of the third years were aware of the fact. 30% of the final year students and 27.3% of the interns were aware of salivary transmission(Mahesh *et al.*, 2014). InJames et.al's study it was concluded that there is lack of knowledge regarding HBV post exposure prophylaxis(James, Srinivas and Muthusekhar, 2018). Where as in Sarah et al's study 92% responded that HIV could be transmitted through saliva(Hasan, Ganapathy and Jain, 2018).

88.2% knew that HPV had no visible signs where as in Saranya et.al's study only 37% were aware about oral manifestations of HPV(Saranya, 2017). 92.6% responded that tongue is the principal head and neck cancer site associated with HPV, similar to Malik et.al who found in his study that 88.2% correctly identified HPV as a risk factor for oral cancer development(Sallam *et al.*, 2019). On the contradictory in Arora et.al study only 44% replied that posterior part of the tongue is the commonest site for HPV related OSCC(Arora, Ramachandra and Squier, 2018).

92.6% were aware that dentists can get Herpetic paronychia which was in correlation with Monika et. al 's study were 70% of them agreed that dentists being more susceptible to Hepatitis-B infection(Gayathri, 2016). 98% of the students knew that Kaposi sarcoma was related to HIV where as in the study conducted by Santhosh Kumar et. al only 47.6% were confident in their ability to treat HIV patients(Kumar *et al.*, 2018). In Jain et al's study most of the students were aware about HIV(Jain, Mohanraj and Premavathy, 2019).92.1% knew that oral candidiasis was the most common oral manifestation in HIV, which was in accordance to Reshma et. al's study where 73%had good knowledge about HIV(Rahman and Mp, 2017). The use of antioxidants is also advised as the overall immune status of the individual is improved.

CONCLUSION

From the study conducted it can be concluded that the dental students were well aware about most of the oral manifestations caused by viral infections but the knowledge about the spread of viral infections and the protective measures to be taken is lacking. It is essential for the dental students to keep themselves updated about these infections and follow the prescribed protocol to handle patients with such diseases with ease and utmost precaution.

AUTHOR CONTRIBUTIONS

All the authors contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

CONFLICT OF INTEREST

Authors declare no potential conflict of interest.

GRAPHS
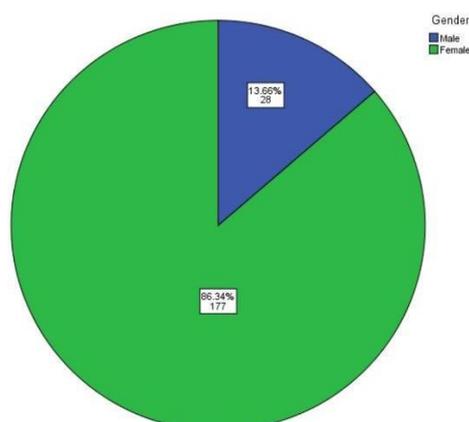
Figure-1: The pie chart shows the gender distribution of the students who participated in the survey. The blue colour represents male students(13.66%) and the green colour represents the female students (86.34%).
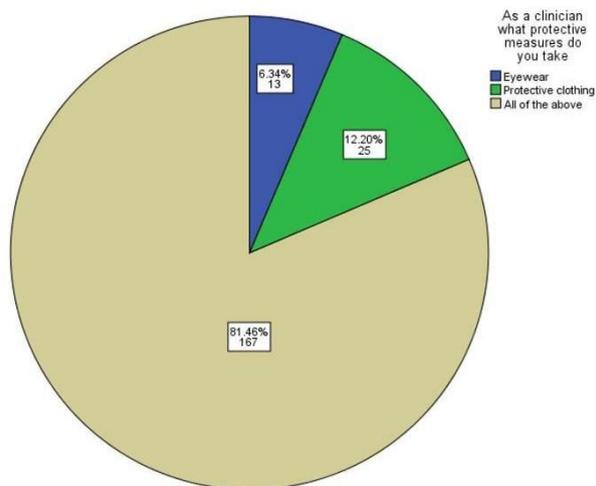
Figure-2: The pie chart shows the responses to the awareness about protective measures to be taken to prevent infection. 6.34% responded as eye wear (blue). 12.20% responded as protective clothing (green). 81.46% respondents answered as all of the above (beige).
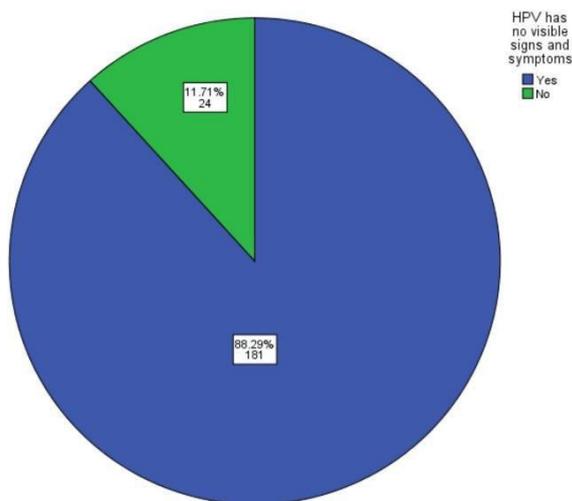
Figure-3: The pie chart shows the responses to the question HPV has no visible signs.88.29% responded yes (blue). 11.71% responded no (green).
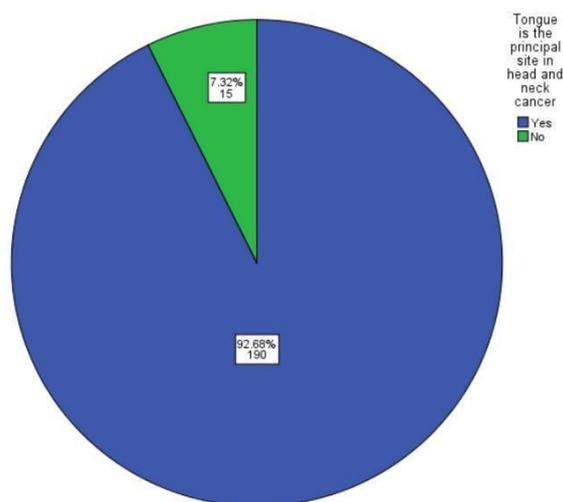
Figure-4: The pie chart shows the responses for the awareness about whether tongue is the principle cancer site in the head and neck region.92.68% responded yes (blue) and 7.32% responded no (green).
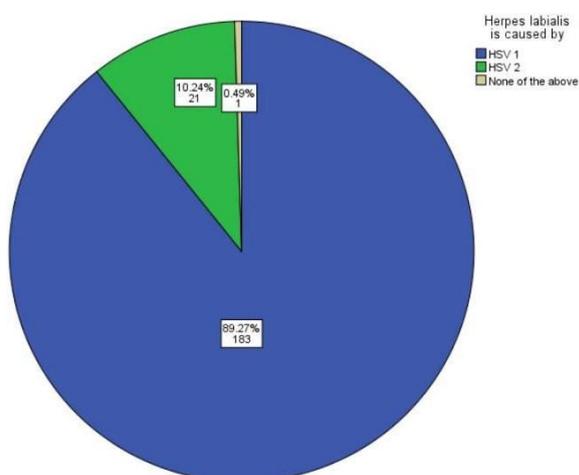
Figure-5: The pie chart shows the responses for the question about the virus that causes Herpes labialis. 89.27% responded as HSV-1(blue). 10.24% responded as HSV-2(green).0.49% responded as none of the above (beige).
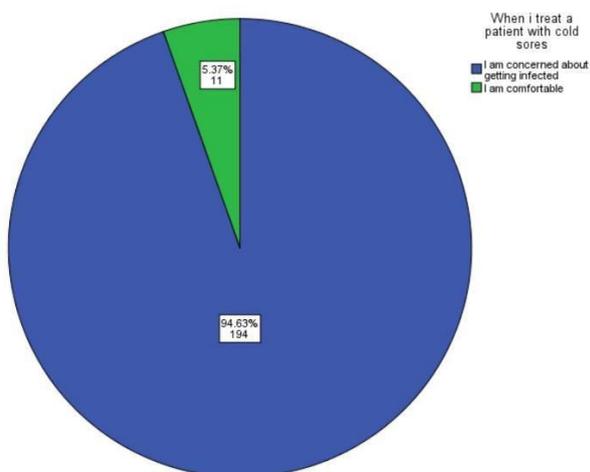
Figure-6: The pie chart shows responses for the attitude about comfort levels in treating a patient with cold sores.94.63% responded that they were concerned about getting infected (blue). 5.37% responded that they were comfortable (green).
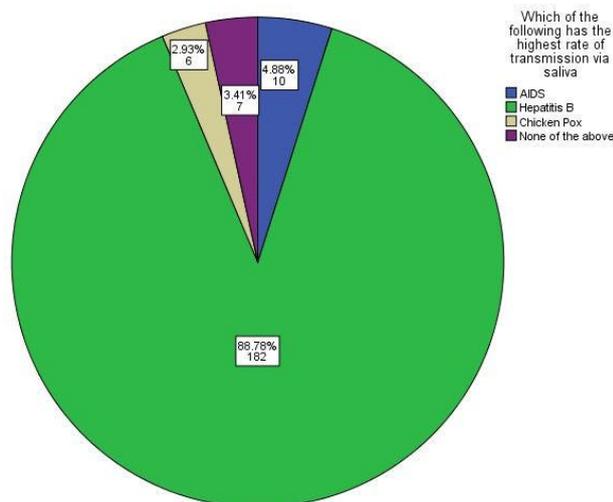
Figure-7: The pie chart shows the responses for the awareness about the disease which has the highest rate of transmission via saliva. 4.88% responded as AIDS (blue),88.78% responded as Hepatitis-B(green).2.93% responded as chicken pox (beige) and 3.41% responded as none of the above (purple).
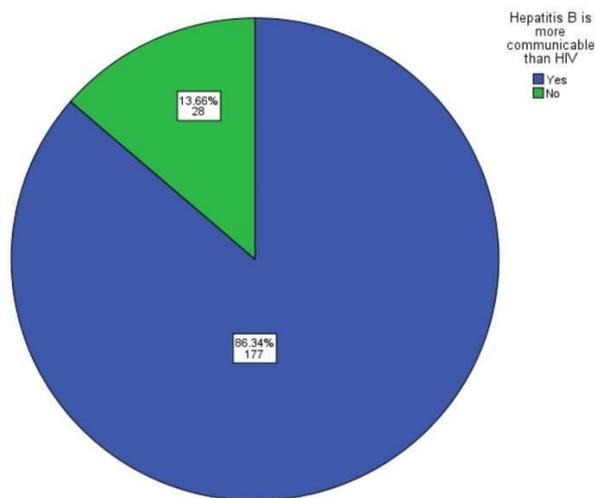
Figure-8: The pie chart shows the responses for awareness about whether Hepatitis-B is more communicable than HIV. 86.34% responded yes (blue), 13.66% responded no (green).
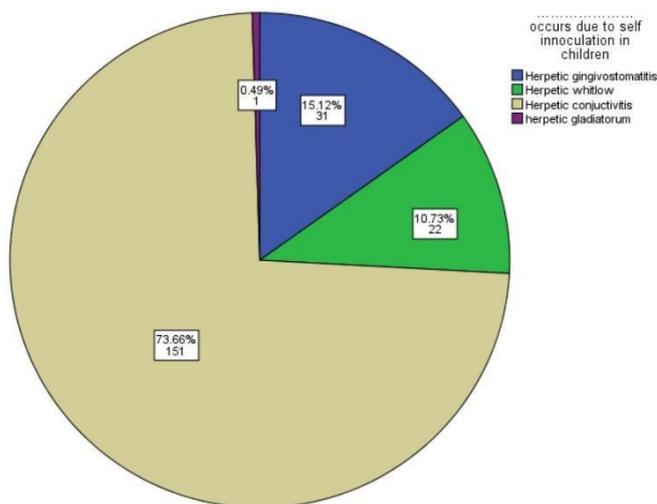
Figure-9: The pie chart shows the responses for the awareness about the disease that occurs due to self inoculation in children.15.12% responded as herpetic gingivostomatitis (blue). 10.73% responded as

herpetic whitlow (green).73.66% responded as herpetic conjunctivitis (beige). 0.49% responded as herpetic gladiatorum(purple).
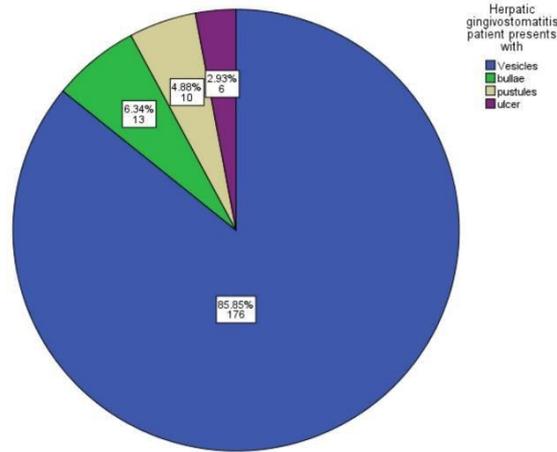
Figure-10: The pie chart shows the responses for the clinical presentation of a patient with herpetic gingivostomatitis.85.85% responded to the question as vesicles (blue).6.34% responded as bullae (green). 4.88% responded as pustules (beige).2.93% responded as ulcer (purple).
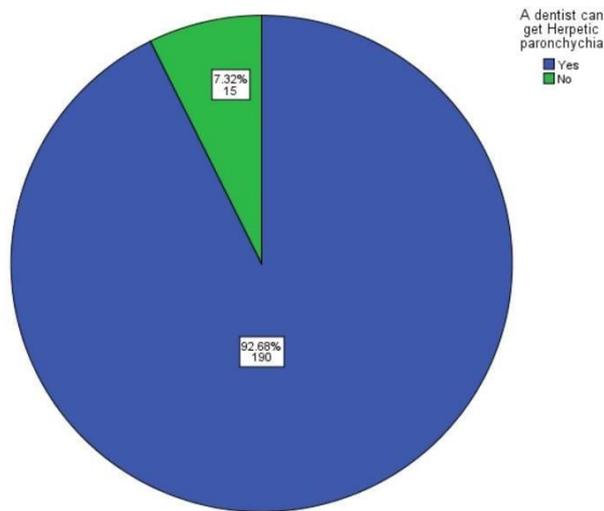
Figure-11: The pie chart shows the responses for the question that whether a dentist could get herpetic paronychia.92.68% responded yes (blue). 7.32% responded no (green).
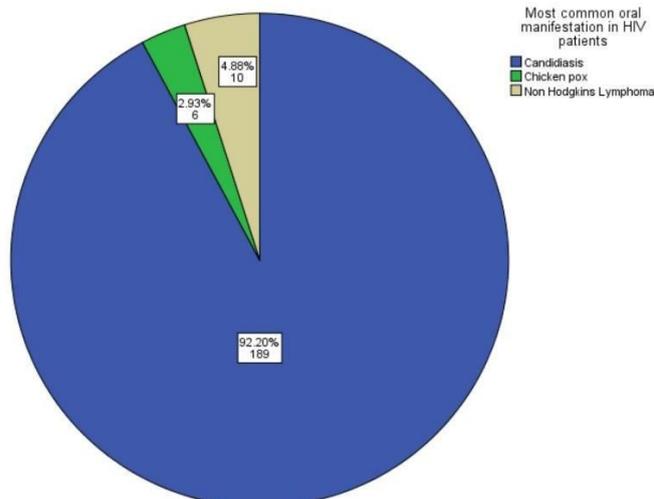
Figure-12: The pie chart shows the responses for the awareness about the most common oral manifestation in HIV patients.92.20% responded candidiasis (blue). 2.93% responded as chicken pox (green).4.88% responded as non- hodgkin's lymphoma (beige).
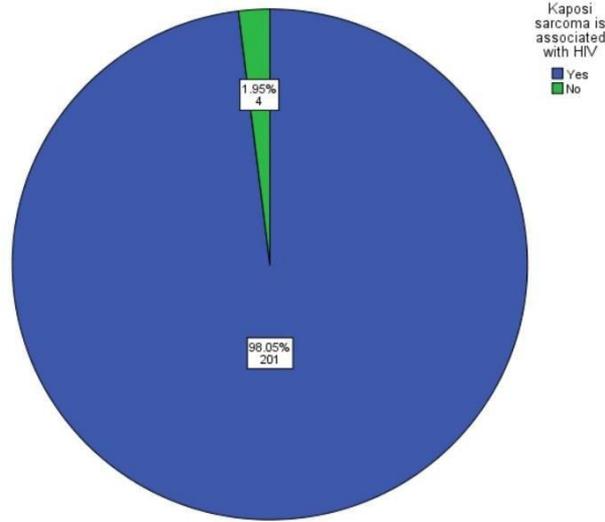
Figure-13: The pie chart shows the responses for the awareness about whether Kaposi's sarcoma was associated with HIV. 98.05% responded yes(blue), 1.95% responded no (green).
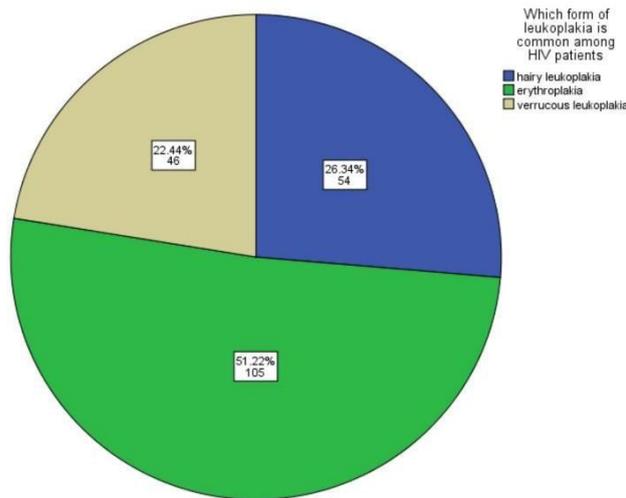
Figure-14:The pie chart shows the responses for the question regarding the form of leukoplakia thats most commonly found in HIV patients. 26.34% responded as hairy leukoplakia ,51.22% responded as erythroplakia (green). 22.44% responded as verrucous leukoplakia (beige).
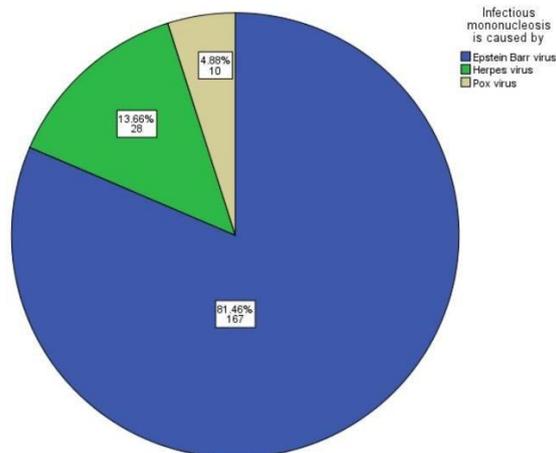
Figure-15:The pie chart shows the responses for the awareness about the virus that causes infectious mononucleosis. 81.46% responded as Epstein Barr virus (blue), 13.66% responded as Herpes virus (green),4.88% responded as Pox virus (beige).
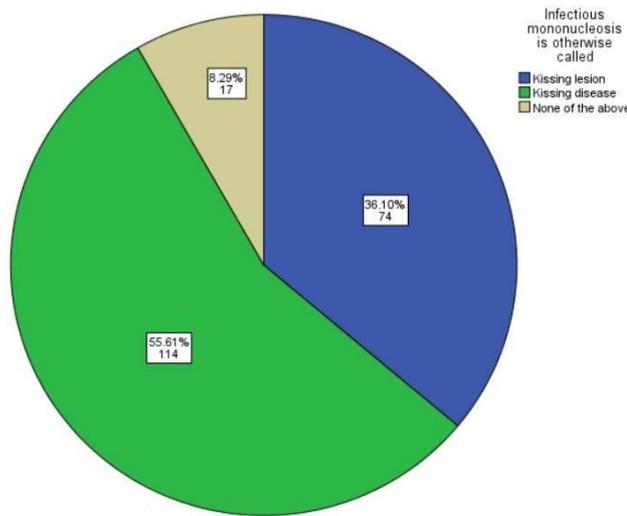
Figure-16: The pie chart shows the responses for the awareness about the other name for infectious mononucleosis. 36.10% responded as kissing lesion (blue) , 55.61% responded as kissing disease (green), 8.29% responded as none of the above (beige).
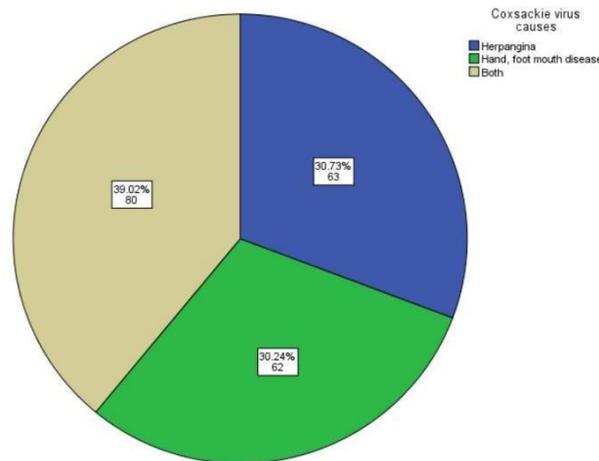
Figure-17: The pie chart shows the responses for the awareness about the disease caused by coxsackie virus. 30.73% responded as herpangina, 30.24% responded as hand, foot, mouth disease (green). 39.02% responded as both (beige).
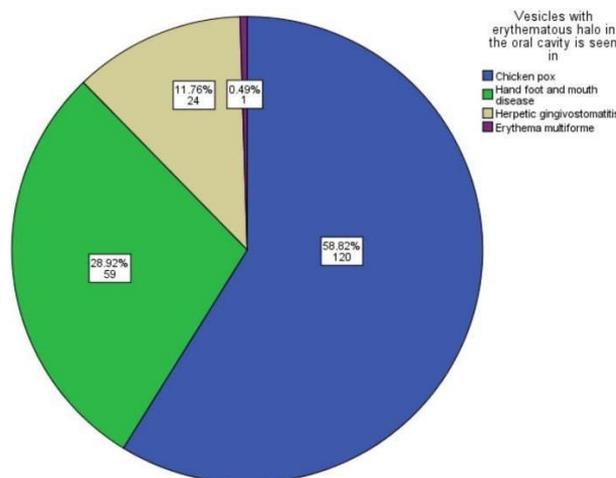
Figure-18: The pie chart shows the responses for the awareness about diseases that present as vesicles with an erythematous halo in the oral cavity.58.82% responded as chicken pox (blue).28.92% responded as hand, foot and mouth disease.11.76% responded as herpetic gingivostomatitis (beige). 0.49% responded as erythema multiforme (purple).
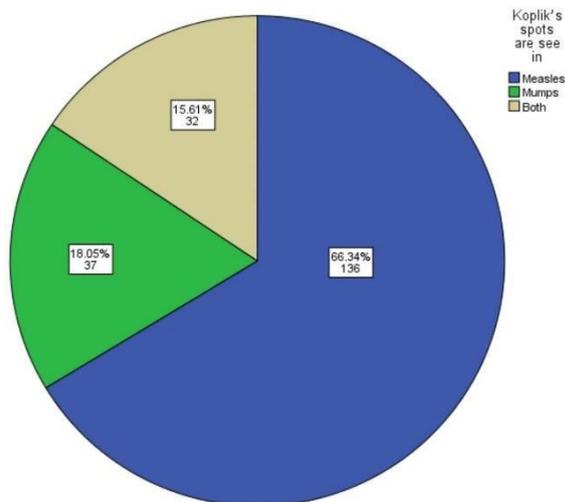
Figure-19: The pie chart shows the responses for the awareness about the disease that shows the presence of koplik's spots.66.34% responded as measles (blue), 18.05% responded as mumps (green), 15.61% responded as both (beige).
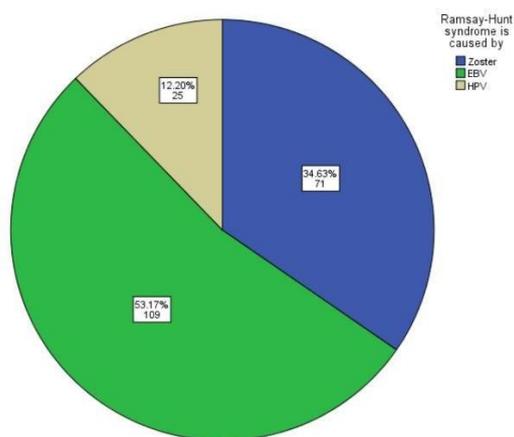
Figure-20: The pie chart shows the responses for the awareness about the virus that causes Ramsay-Hunt syndrome. 34.63% responded as zoster (blue).53.17% responded as EBV   (green).12.20% responded as HPV (beige).
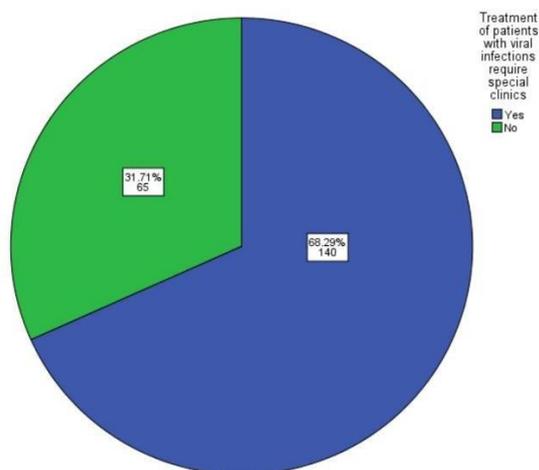
Figure 21: The pie chart shows the responses for the question whether treatment of viral infections required special clinics. 68.29% responded yes (blue), 31.71% responded no (green).
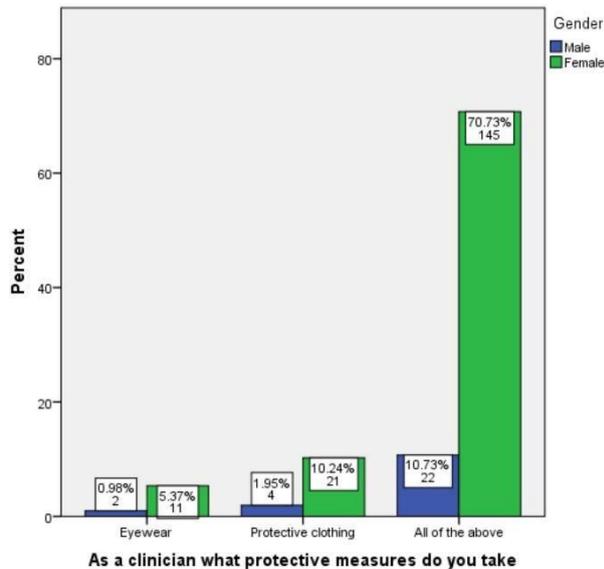
Figure-22: This is a clustered bar graph representing the association between gender and the protective measures to be taken to prevent infection . The X-axis represents the protective measures and Y-axis represents the percentage of participants. The blue colour represents the male participants and green colour represents the female participants. Most females were aware about the protective measures. Pearson's chi square test shows (chi square -0.182;df-2;p-value= 0.913 (p>0.05)). Hence it is not statistically significant.
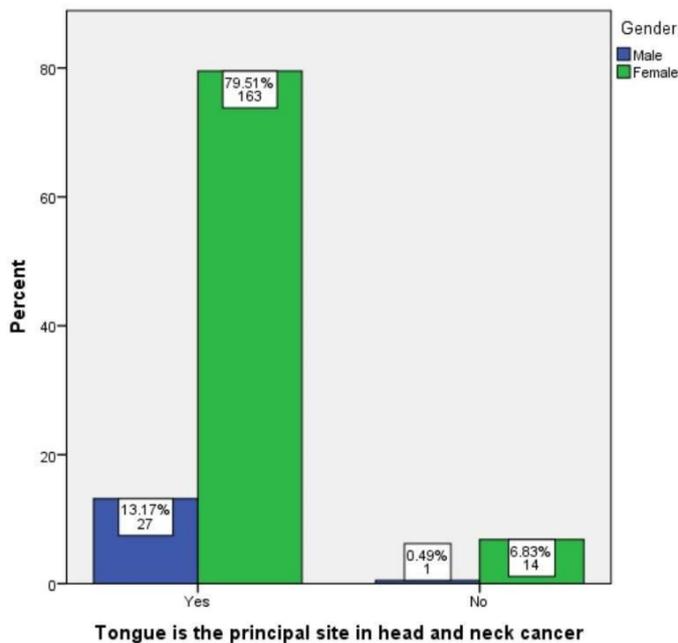
Figure-23: This is a cluster bar graph representing the association between gender and responses for the question that tongue is the principal site in head and neck cancer. The X-axis represents the responses for the question and Y-axis represents the percentage of participants. The blue colour represents the male participants and green represents the female participants. A majority of females responded that tongue is the principal site. Pearson's chi square test shows (chi square -0.671;df-1;p-value= 0.413 (p>0.05)). Hence it is not statistically significant.
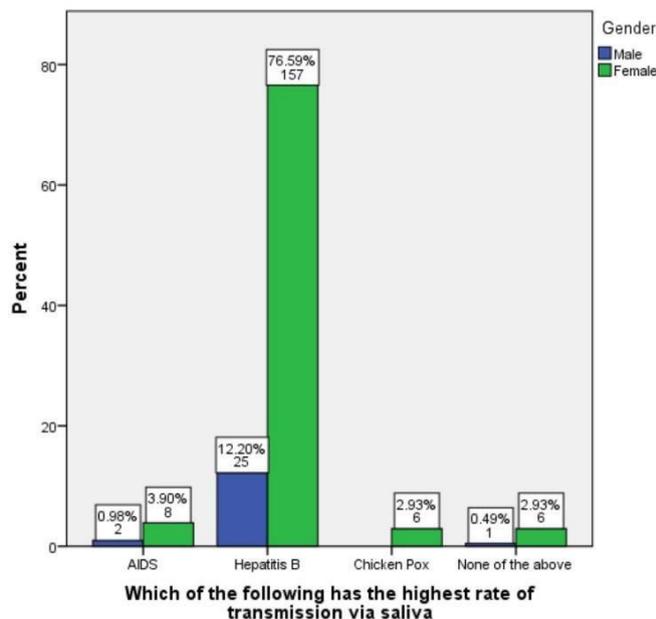
Figure-24: This is a clustered bar graph representing the association between gender and the disease that has the highest rate of transmission via saliva. The X-axis represents the various diseases and Y-axis represents the percentage of participants. The blue colour represents the male participants and green represents the female participants. Majority of females responded Hepatitis- B. Pearson's chi square test shows Pearson's chi square test shows (chi square -2.070;df-3;p-value= 0.413 (p>0.05)). Hence it is not statistically significant.
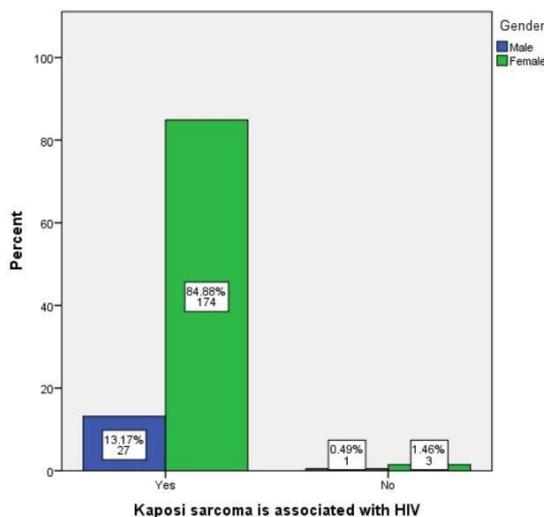
Figure-25: This is a clustered bar graph representing the association between gender and the responses for the question whether kaposi's sarcoma is associated with HIV. The X-axis represents the responses for the question and Y-axis represents the percentage of participants. The blue colour represents the male participants and green represents the female participants. A majority of females responded that HIV is associated with Kaposi`s sarcoma. Pearson's chi square test shows (chi square -0.445;df-1;p-0.50(p>0.05). Hence it is not statistically significant.
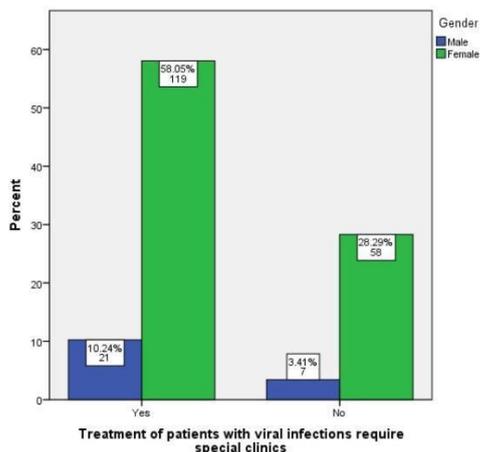
Figure-26: This is a clustered bar graph representing the association between gender and the responses for the question whether treatment of patients with viral infections require special clinics. The X-axis represents the responses for the question and Y-axis represents the percentage of participants. The blue colour represents the male participants and green represents the female participants. A majority of females responded that treatment of patients with viral infections does require special clinics . Pearson's chi square test shows (chi square -0.674;df-1;p-0.412(p>0.05). Hence it is not statistically significant.

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