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Research Article

Evaluation of infectious mononucleosis status among a cohort of dental students

Bhuvan Nagpal[1]*, Sreeshyla H.S.[1], Arnaw Kishore[2], Usha Hegde[1], Archana S.[1], M.N. Sumana[2]

[1]Department of Oral Pathology & Microbiology, JSS Dental College & Hospital, JSS University, Karnataka, India
[2]Department of Microbiology, JSS Medical College & Hospital, JSS University, Karnataka, India

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***Correspondence:**
Dr. Bhuvan Nagpal,
E-mail: dr.bhuvannagpal@gmail.com

ABSTRACT

Background: Infectious mononucleosis (IM) is a self-limiting disease caused by Epstein-Barr virus (EBV). It is transmitted by saliva and presents with a fever lasting for one to two weeks. Dentists are exposed to saliva while carrying out dental procedures and hence are at a risk of contacting this infection. Not many studies exist indicating the seroprevalence of IM among dentists globally and none in the Indian Scenario. Hence, the present study was undertaken to assess the seroprevalence of IM and thus create awareness among dental students. The aim and objectives of the study was to evaluate the seroprevalence of IM among a specific cohort of dental students in a South Indian Dental School.
Methods: Blood samples were drawn and serum was separated as per standard method. Rapid IM test Immutex kit (Tulip Diagnostics Ltd, Goa) was used for detection of heterophile antibodies. Absence of any agglutination indicated negative result.
Results: The seroprevalence of IM was found to be low (9%), with no difference between the sexes. 3rd year dental students followed by Final year students showed the most number of positive cases.
Conclusions: The prevalence of IM among dental students was low yet its presence in 9% of students cannot be overlooked. This could be either due to improper follow of universal precautions of sharing of objects such as lip balm, water bottles, straws etc. The 3rd year students constituted the maximum number of total positive cases. This can be justified by the fact that dental students come in contact with patient saliva in their 3rd year of their graduation.

Keywords: Infectious Mononucleosis, Epstein-Barr virus, Dental students, Heterophile antibodies, Seroprevalence

INTRODUCTION

Infectious Mononucleosis (IM), caused by Epstein-Barr virus (EBV), member of the Herpes virus family is a self-limiting clinical syndrome. A positive test for heterophile antibodies is an investigation for IM which is usually done on typical clinical and haematological findings in an individual. Heterophile antibodies are antibodies that agglutinate cells of other animal species that are mainly associated with mononucleosis due to EBV but may be, albeit rarely, also detected in other diseases.[1] They peak 2-5 weeks after the onset of symptoms and then decline rapidly, although they may rarely persist for 6-12 months.[2,3] 85%-90% of adolescents and adults are positive during the course of EBV infection; about 50% in the first week and 60%-90% in the second and third.[4]

IM is a self-limiting illness and the range varies from flu like illness to debilitating disease ranging to months, chronic and fatal cases have also been reported.[5] The virus targets the memory B lymphocytes and accelerates its proliferation resulting in the cell mediated immune response which produces a clonal expression of T cells. The cytotoxic T cell releases cytokines leading to classical IM symptoms.[6] The virus also causes Virus-associated Hemophagocytic Syndrome, Chronic Active Epstein-Barr Virus Infection, B-cell Lymphomas of Congenitally Immunodeficient Children, Posttransplant

Lymphoproliferative Disease, Burkitt's Lymphoma, Hodgkin's Lymphoma etc.[7] In the present study, we tried to find the seroprevalence of IM using IM specific kit among all dental students at JSS Dental College and Hospital, Mysuru, Karnataka, India.

METHODS

A cross-sectional serologic survey study was conducted among the dental students of JSS Dental College & Hospital, Mysuru, Karnataka, India between September 2015 to November 2015. The study population comprised of undergraduate dental students in the age group of 18-24 years from all the years of graduation (1st year, 2nd year, 3rd year, Final year and interns). Ethical approval was obtained from the institutional ethical committee. Written informed consent was obtained from each participant, and anonymity of the participant was maintained throughout the study. Students with documented immune suppression or on prolonged therapy and pregnant women were excluded from the study. A total of 200 students constituted the sample size for the study. Professional practice information of each dental student was recorded using a standard questionnaire which included demographic details of the dental student regarding their age, gender, year of study, exposure to saliva and the knowledge and practice about the use of personal protective devices such as gloves, mouth mask, protective eye covering and sanitizer after dental procedure. Following all aseptic precautions, blood samples were collected from each student by venipuncture using a vacutainer device, for serologic evaluation of heterophile antibodies against EBV antigen for IM. From the blood sample, serum was separated as per standard method in use and stored at – 20°C to – 80°C until analysis. All the samples were freeze thawed and brought to room temperature. Immutex kit (Tulip Diagnostics Ltd, Goa) was used for detection of heterophile antibodies. Inbuilt positive and negative control was run with every batch. The tests were carried out as per manufacturer's instructions. Absence of any agglutination was indicative of negative result.

RESULTS

Out of a total of 200 students enrolled in the study, the seroprevalence of IM was 9%. The mean age of the students was 21.81 years. It was seen that the maximum number of seropositive for EBV infection was recorded among 3rd year students followed by final year students, interns and the least was among 1st and 2nd year students (Table 1). The female to male ratio was 1.08:1 (Figure 1). Four common parameters to measure the universal precautions were taken into consideration. It included the use of gloves; mouth mask, protective eye covering and sanitizer post any procedure. It was observed that all the students used gloves whenever they performed a dental procedure, but 91.6% males and 92.3% females used the mouth mask during dental procedures. The dental students were not very bothered for the usage of protective eye covering with the usage being 44% among males and 50% in females. It was also observed that more than 25% of males and 15% of females were not bothered about the usage of hand sanitation after a dental procedure. Overall females fared better than the males in usage of the universal precautions (Figure 2).

Table 1: Seroprevalence of infectious mononucleosis among dental students.

Year of study	Total number of students who enrolled for the study	Total number of students who came out to be sero positive
1st Year	50	1
2nd Year	20	1
3rd Year	70	8
4th Year	26	5
Interns	34	3
Total	200	18

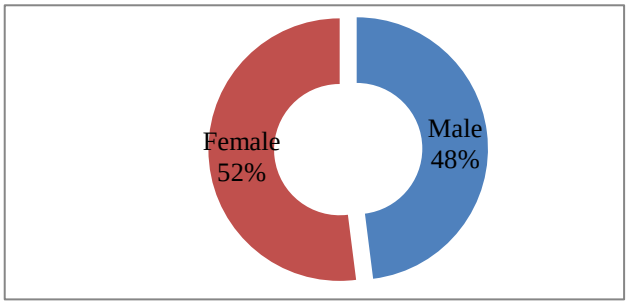

Figure 1: Distribution of gender of the students enrolled in the study.

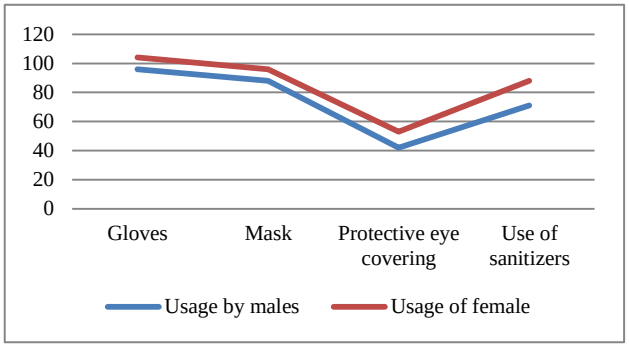

Figure 2: Use of universal precaution during dental procedure.

DISCUSSION

Epstein-Barr virus, a member of the family Herpesviridae, consists of a linear DNA core surrounded by a nucleocapsid and an envelope that contains glycoproteins. Epstein-Barr virus infections occur worldwide. These infections are most common in early childhood, with a second peak during late adolescence. By adulthood, more than 90% of individuals have been infected and have antibodies to the virus. IM is usually a

disease of young adults.[8] There is evidence of higher levels of antibodies to EBV in dentists and more in clinical dental students than preclinical dental students.[9] There is also evidence of transmission of EBV to health care workers from patients and from dental healthcare workers to patients.[10-13] The potential for transmission of herpes group of viruses via dental hand pieces has also been demonstrated.[14]

Various studies indicate the incidence of this infection. In a recent study conducted by Xiong G et al (China), the seroprevalence rate was around 80%.[15] In a study conducted by National Health and Nutrition Examination Surveys (NHANES), the seroprevalence among children and teenagers in the U.S.A. ranging from 6 – 19 years and 6-8 years was found to be 50% and 54.1% respectively. It was also found that the seroprevalence among 18 and 19 year individuals was 82.9% and 89% respectively.[16,17] Another study done by Chao Yu Chen et al. in Taiwan, the total seroprevalence of EBV was 82.28%.[18] Our's is the first seroprevalence study on IM done among the dental students in India. We found the overall seroprevalence of IM to be only 9% which is quite low. When we analysed the data to understand the salivary contact, it was observed that the universal precautions were not followed properly by all the dental students. Further, history revealed that sharing of objects like lip balms, water bottles, straws etc. were seen in few students. These might have attributed to the 9% seroprevalence among the students. However, 9% of seroprevalence is very low when compared with other studies, and this can be explained by the fact that the cultural and ethical issues which Indians follow prevent them from sharing of objects.

It was observed that the maximum numbers of students infected were from 3rd year and final year, together they constituted 72% of the total positive cases. This may be due to the fact that the 3rd year students come in contact with the patient for the first time and get exposed to saliva; since it has been proved that saliva is the mode of spread for EBV.[8] It was also observed that the seroprevalence of IM was equal in males and females.

CONCLUSIONS

The present study indicated that the seroprevalence of IM among a cohort of South Indian dental students was low. Since the dental students are a high risk group who might acquire and spread it among patients and fellow colleagues, more such studies to create awareness and evaluate its seroprevalence are to be encouraged.

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Ethical approval: The study was approved by the institutional ethics committee

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