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## Knowledge and awareness of microbial pathogens causing periodontal diseases in host among dental students: An etiological survey

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### Abstract

**Aim:** The purpose of this study / survey was to determine the knowledge of microbial pathogen causing periodontal diseases in host among dental students.

**Methodology:** Questionnaire comprising of 20 questions was distributed among 100 dental students. people participated in survey were asked about microorganism involved in periodontal disease, test involved in determination of proteolytic activity of oral anaerobes, about bacterial communication in biofilm, color coded complex of periodontal microorganisms.

**Conclusion:** In nutshell, we arrived to a point that students lack knowledge on micropathogens causing disease in host and need a focus on topics such as microbial interactions with the host in periodontal disease.

**Keywords:** Micropathogens, inflammatory response in hosts, periodontal pathogenesis

### 1. Introduction

Periodontology is the scientific study of periodontium in health and disease. The periodontium (in Greek “peri” means ‘around’ and “odontos” means ‘tooth’) is a dynamic structure composed of the tissues supporting and investing the teeth. It comprise of gingiva, periodontal ligament, cementum and alveolar bone <sup>[1]</sup>. The human fetus inside the uterus is sterile, but as soon as it passes through the birth canal, it acquires vaginal and fecal microorganisms. Within 2 weeks, a nearly mature microbiota is established in the gut of the newborn baby. Within hours after birth, the sterile oral cavity will be colonized by low numbers of mainly facultative and aerobic bacteria. It is obvious that the periodontal microbiota is extremely complex. More than 500 different species are capable of colonizing the adult mouth. Primary colonizers in dental plaque are *S. oralis*, *S. sanguis*, *A. oris* etc, secondary colonizers are *P. gingivalis*, *T. forsythia*, *Treponema denticola* causes bleeding on gums <sup>[2]</sup>. The stimulation of host responses are caused by lipopolysaccharides and lipoteichoic acid of micropathogens <sup>[3]</sup>.

### 2. Materials and Methodology

Survey questions were distributed to dental students. A total of 100 questionnaire forms were distributed. 20 questions were framed up with choice of four options respective to each questions was made.

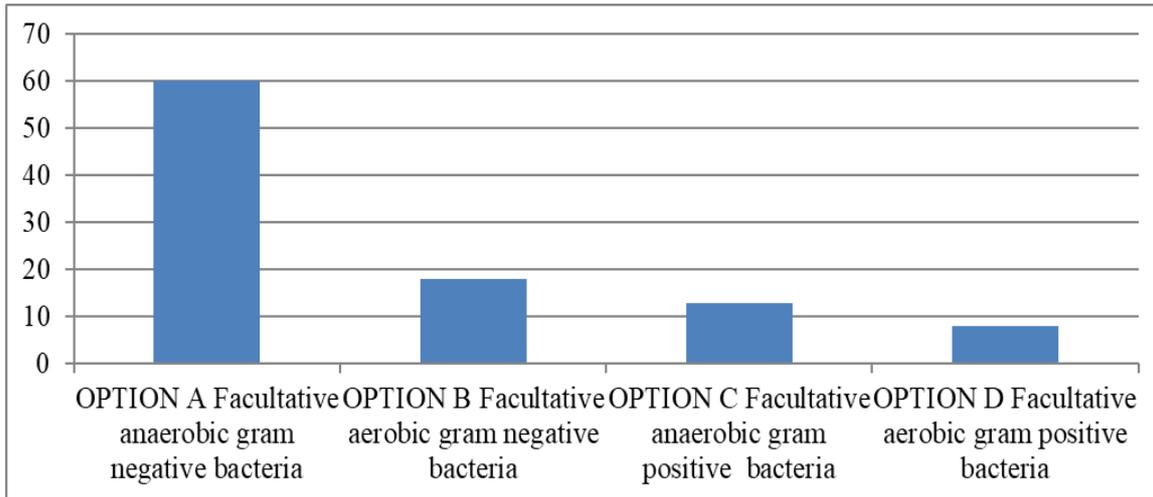
The framework covered microorganisms interaction in host causing periodontal disease, about colonizers in dental plaque and certain aspects covered inflammatory response in host. Students were asked to choose one answer in multiple choice question set up.

The survey was conducted among third year and the final year students of Thai moogambigai Dental College Hospital, Chennai, India. The questions were about bacterial interactions in host, inflammatory response and about microorganisms. The survey is about to obtain knowledge and awareness among dental students. Ethical committee approval was obtained from the university. The students were verified about the survey and informed commit was obtained.

### Correspondence

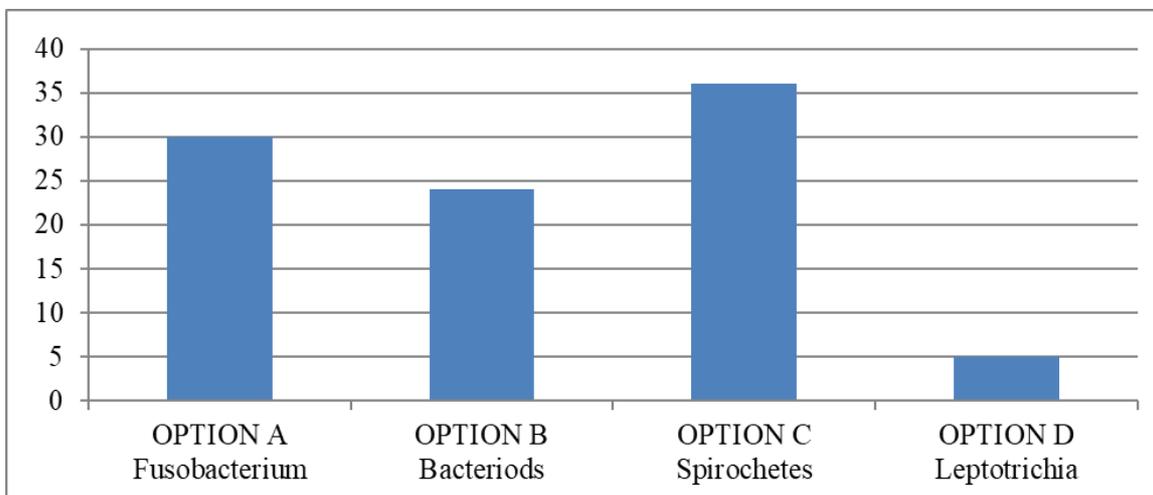
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**3. Results**



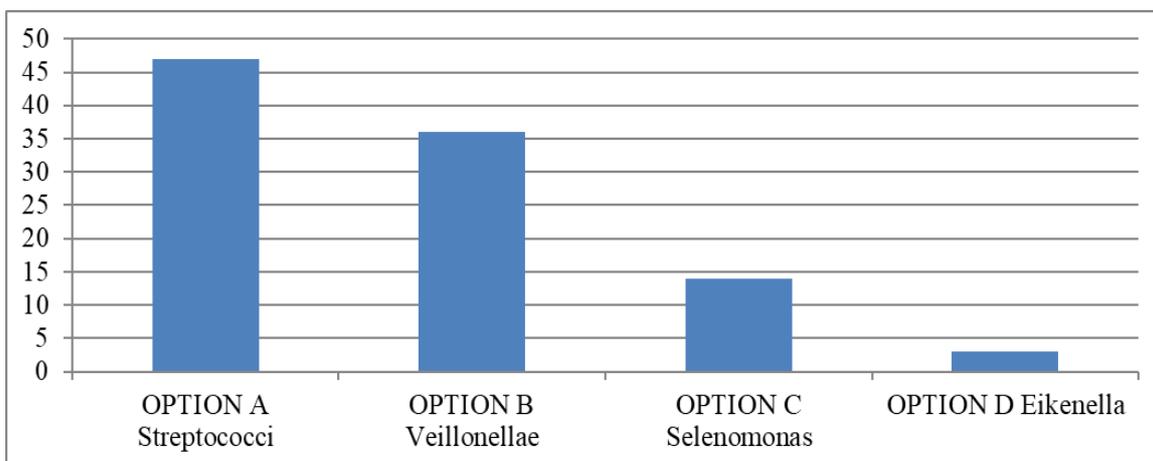
**Chart 1:** Which micro organism are involved in periodontal disease

Out of 100 students; for question no. 1: 60 percentage of people selected the correct option –a Facultative gram negative anaerobic bacteria. Remaining percentage people selected other options.



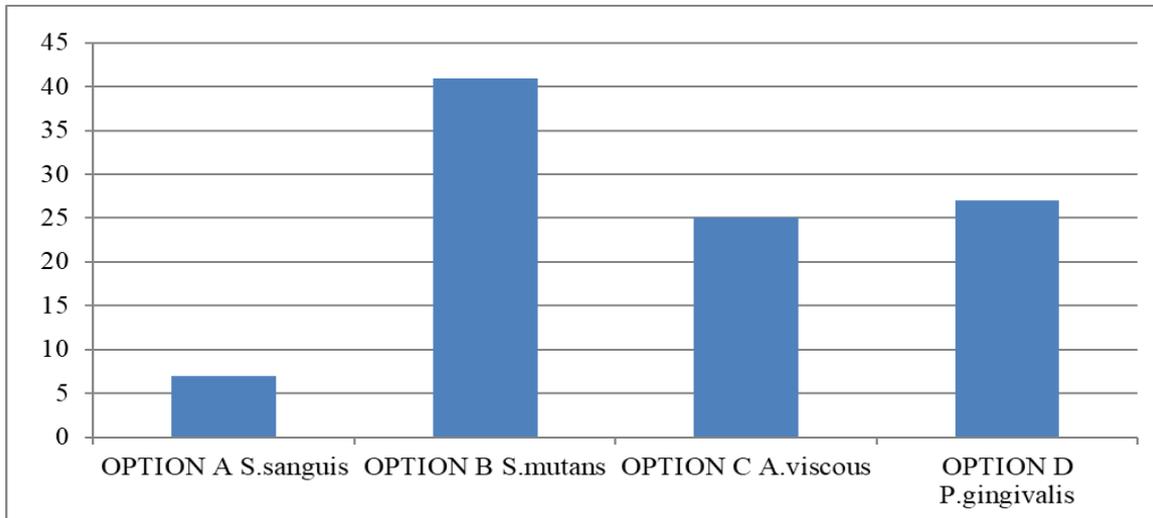
**Chart 2:** Which of the following species will be in abundance in plaque

Out of 100 students; for question no. 2 : 17 percentage of people selected the correct option –aFusobacterium. Remaining percentage of people selected the other options.



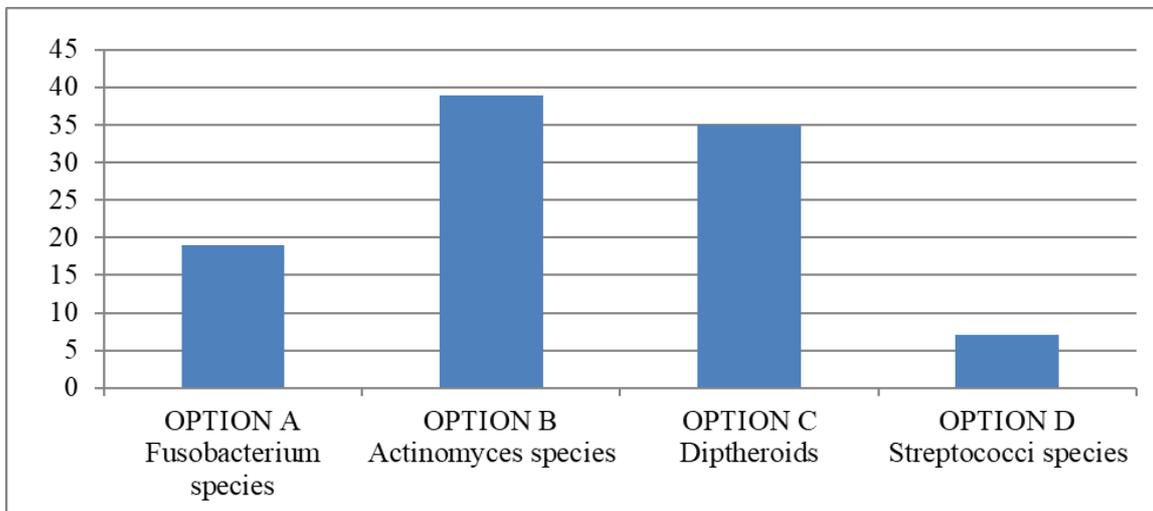
**Chart 3:** Which gram negative bacteria is found most beneficial in oral cavity

Out of 100 students; for question no.3: 36 percentage of people selected the correct option - b veillonellae. Remaining percentage of people selected the other options.



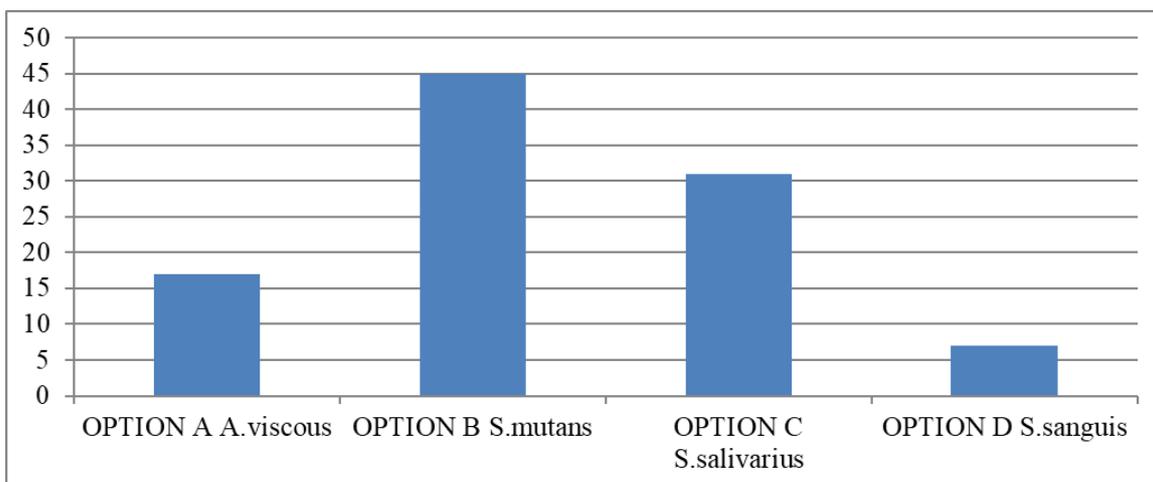
**Chart 4:** Which of the following is a periodontal pathogen

Out of 100 students; for question no.4: 27 percentage of people selected the correct option – d P.gingivalis. Remaining percentage of people selected other options.



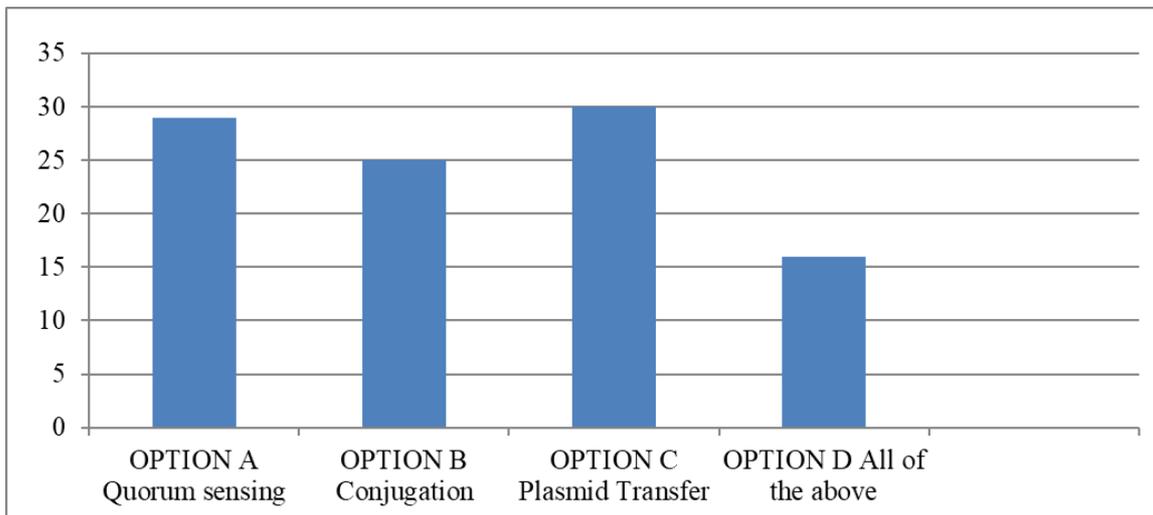
**Chart 5:** Which organism are least found in normal gingival crevices

Out of 100 students; for question no.5: 35 percentage of people selected the correct option -c Diptheroids. Remaining percentage of people selected other options.



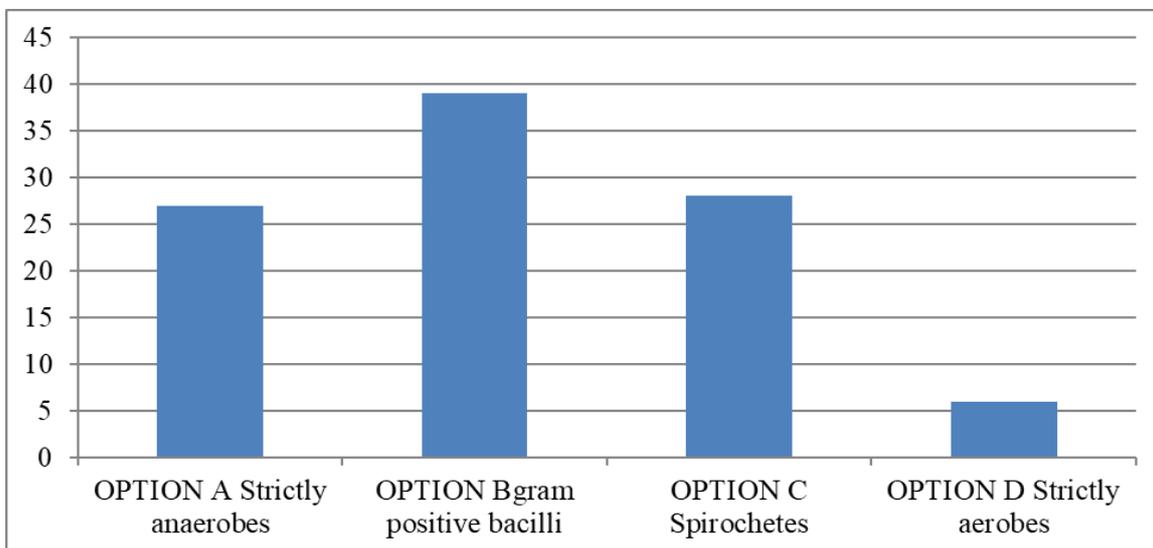
**Chart 6:** Of the following four bacterial species which is least likely to be found in plaque

Out of 100 students; for question no.6: 31 percentage of people selected the correct option –c S.salivarius. Remaining percentage of people selected other options.



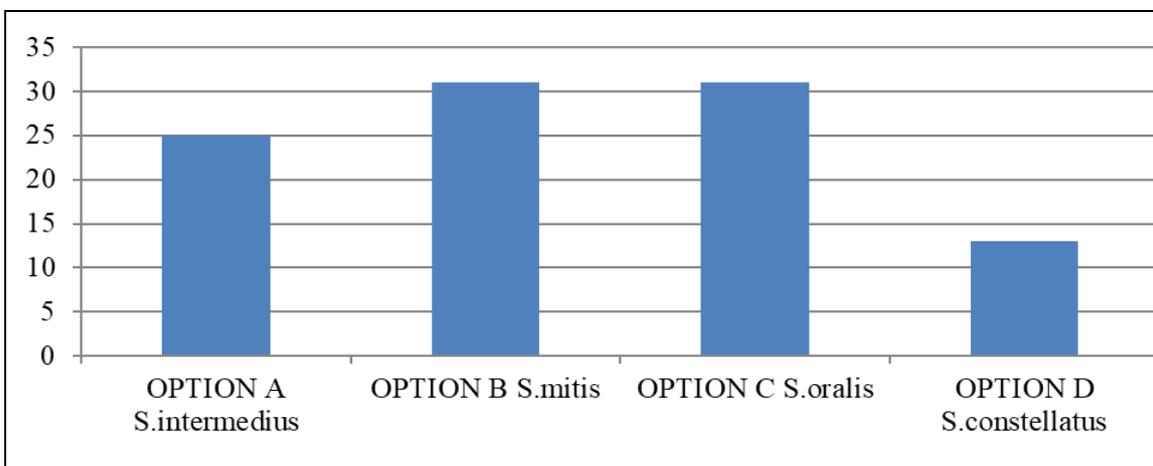
**Chart 7:** What are the methods of transferring information in a biofilm

Out of 100 students; for question no.7: 16 percentage of people selected the correct option -d All of the above. Remaining percentage of people selected other options.



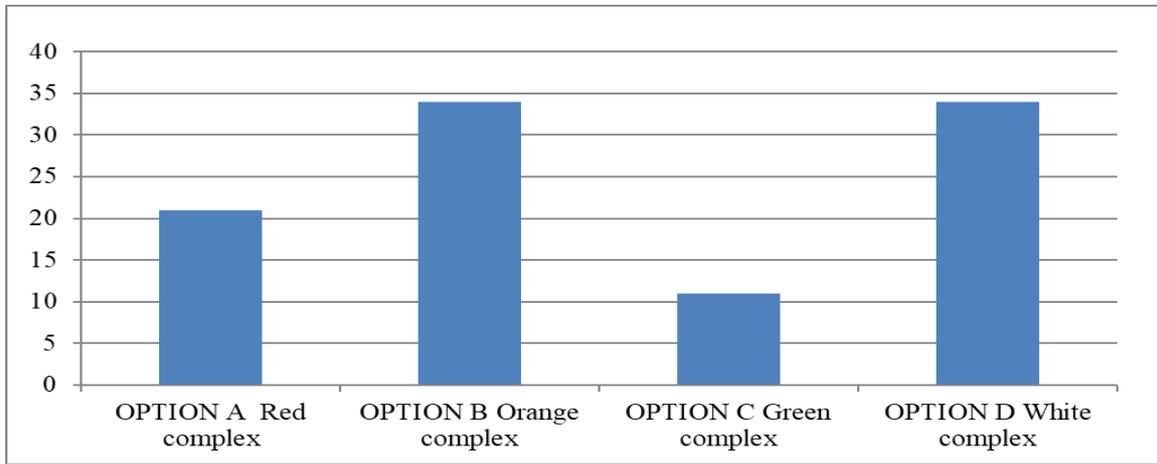
**Chart 8:** Majority of oral microorganisms are

Out of 100 students; for question no.8: 27 percentage of people selected the correct option - a Strictly anaerobes. Remaining percentage of people selected other options.



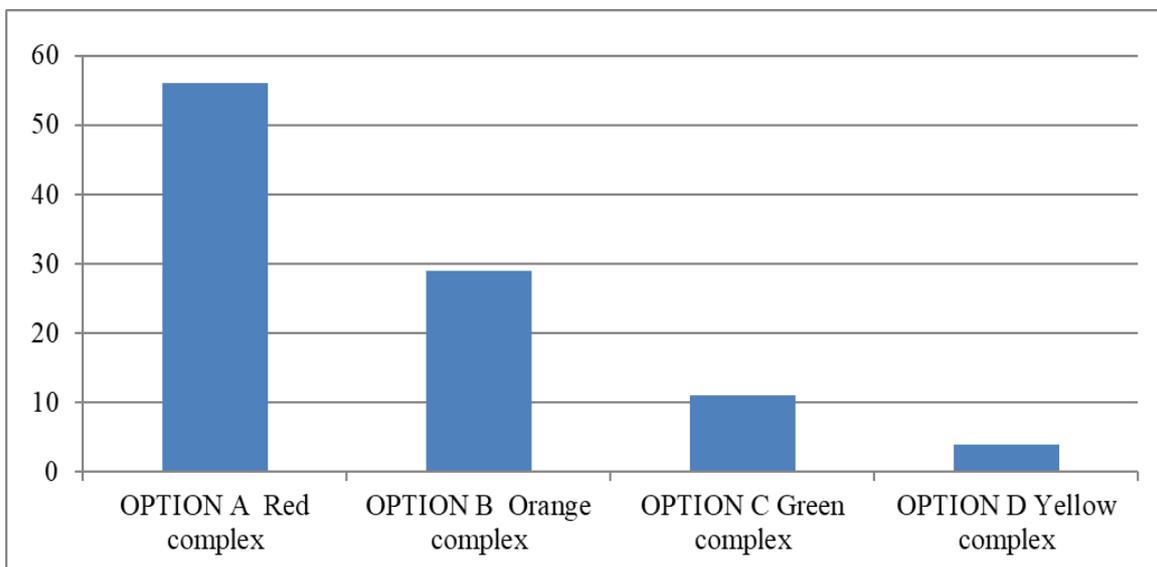
**Chart 9:** which of the following is not a primary colonizers in dental plaque

Out of 100 students; for question no. 9: 13 percentage of people selected the correct option- d S.constellatus. Remaining percentage of people selected other options.



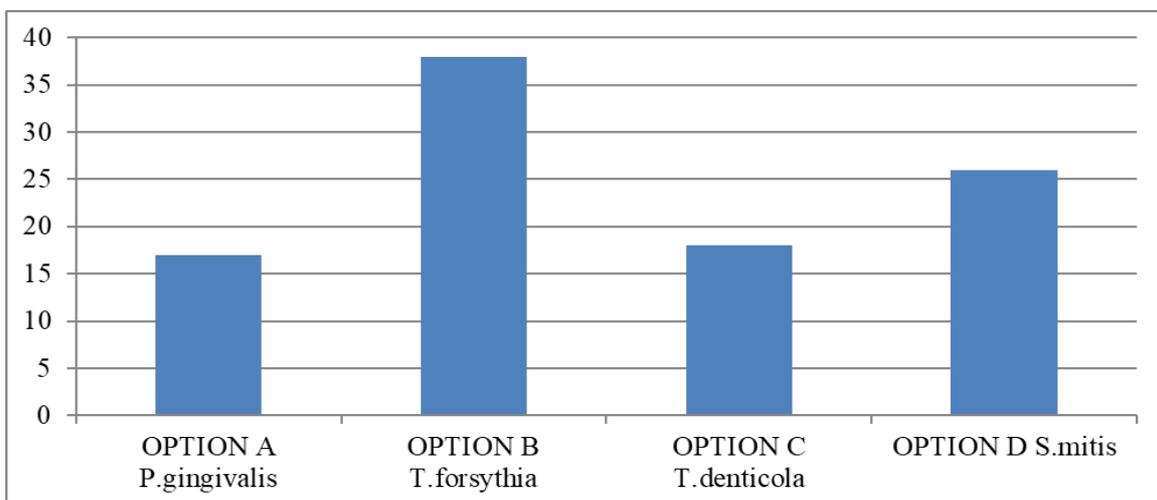
**Chart 10:** Which color coded complex of periodontal micro organisms is not present

Out of 100 students; for question no. 10: 34 percentage of people selected correct option - d White complex. Remaining 66 percentage of people selected other options.



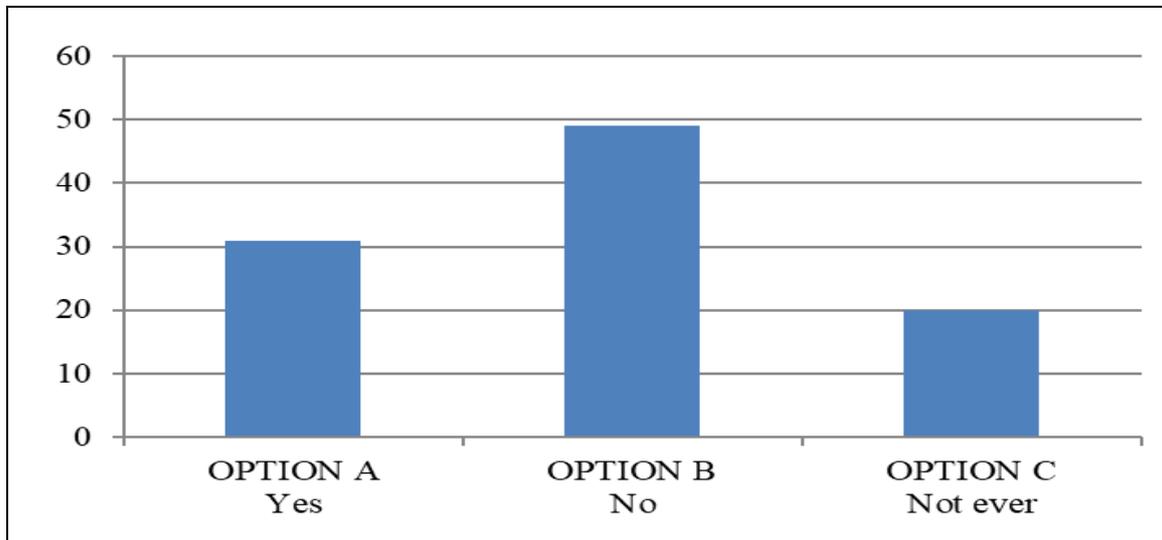
**Chart 11:** which color coded complex of periodontal microorganisms are involved in bleeding on probing

Out of 100 students; for question no. 11: 56 percentage of people selected the correct option - a Red complex. Remaining 44 percentage of people selected other options.



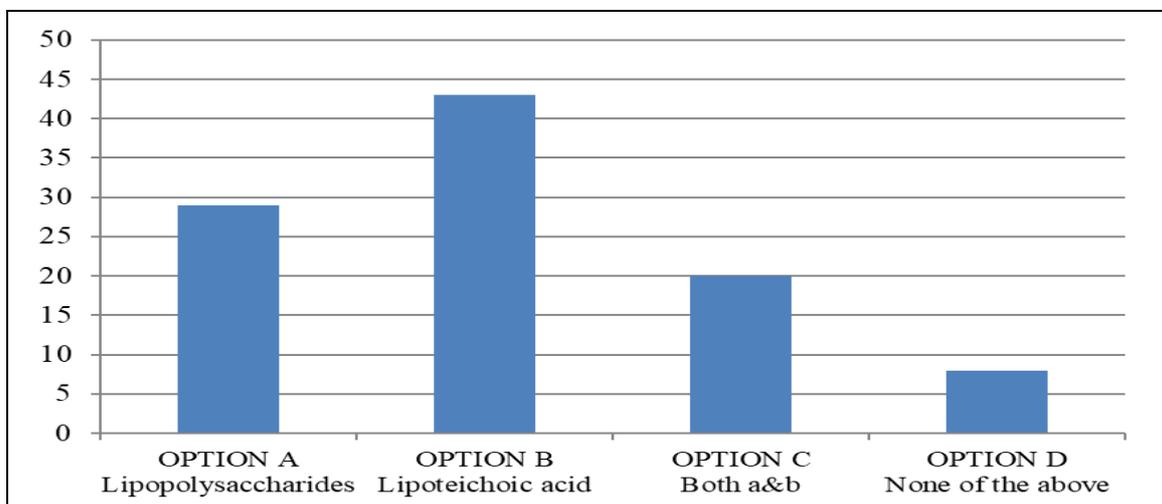
**Chart 12:** which of the following is not a red complex organisms

Out of 100 students; for question no.12: 26 percentage of people selected the correct option - d S.mitis. Remaining 74 percentage of people selected other options.



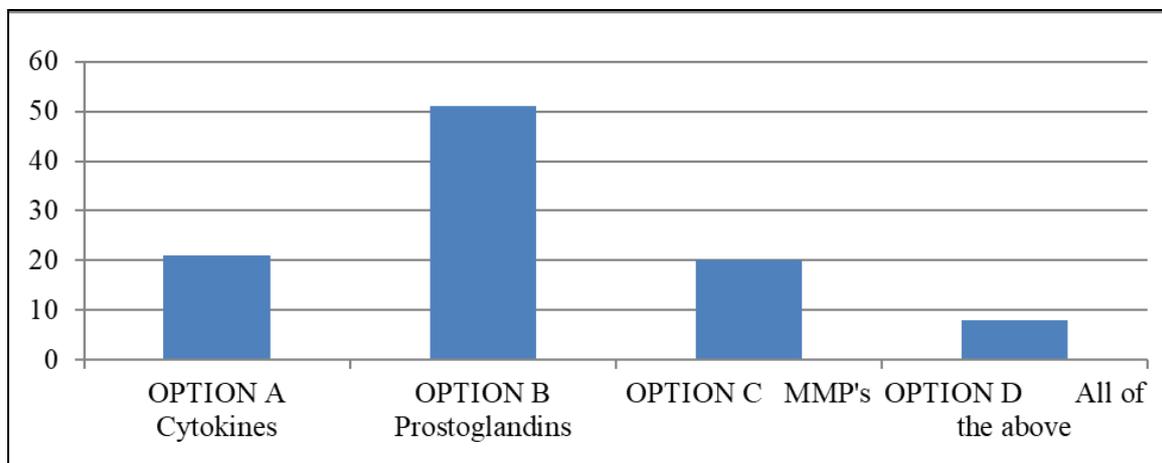
**Chart 13:** Do you think microbial factors alone are involved in periodontal disease

Out of 100 students; for question no. 13: 49 percentage of people selected option - b NO. Remaining percentage of people selected other options.



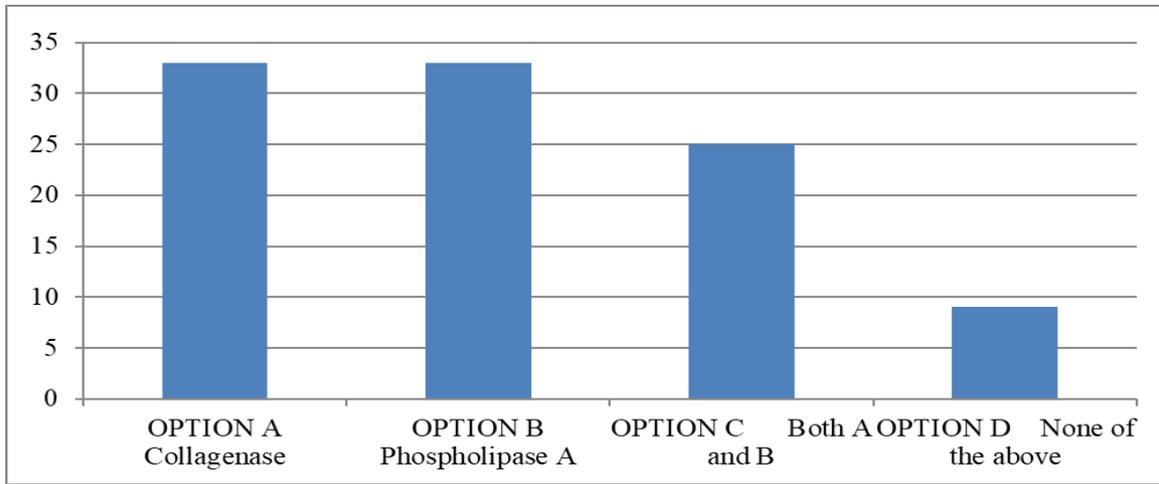
**Chart 14:** Which of the following causes stimulation of immune response in host

Out of 100 students; for question no. 14: 20 percentage of people selected the correct option-c Both A and B. Remaining percentage of people selected other options.



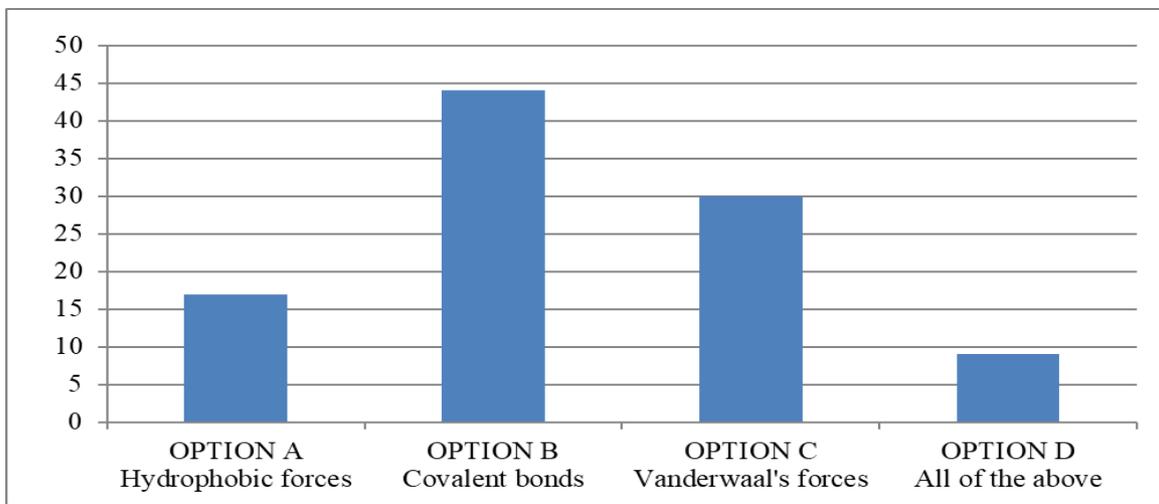
**Chart 15:** Which of the following place a fundamental role in inflammation in periodontal disease

Out of 100 students; for question no.15: 8 percentage of people selected the correct option - d All of the above. Remaining percentage of people selected other options.



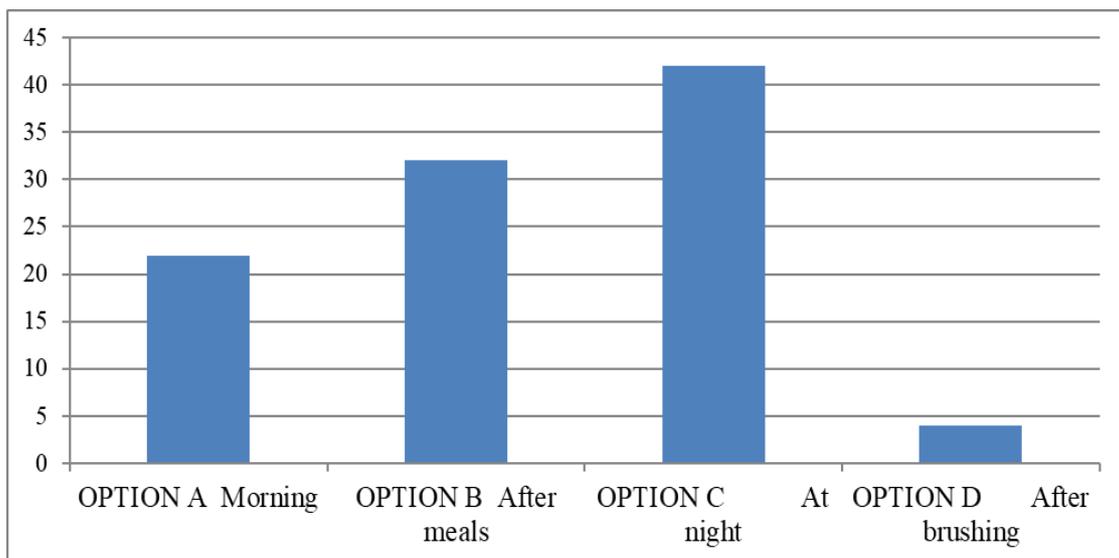
**Chart 16:** Which of the following bacterial enzymes are capable of degrading host tissues

Out of 100 students; for question no.16: 25 percentage of people selected the correct option - c Both A and B. Remaining percentage of people selected other options.



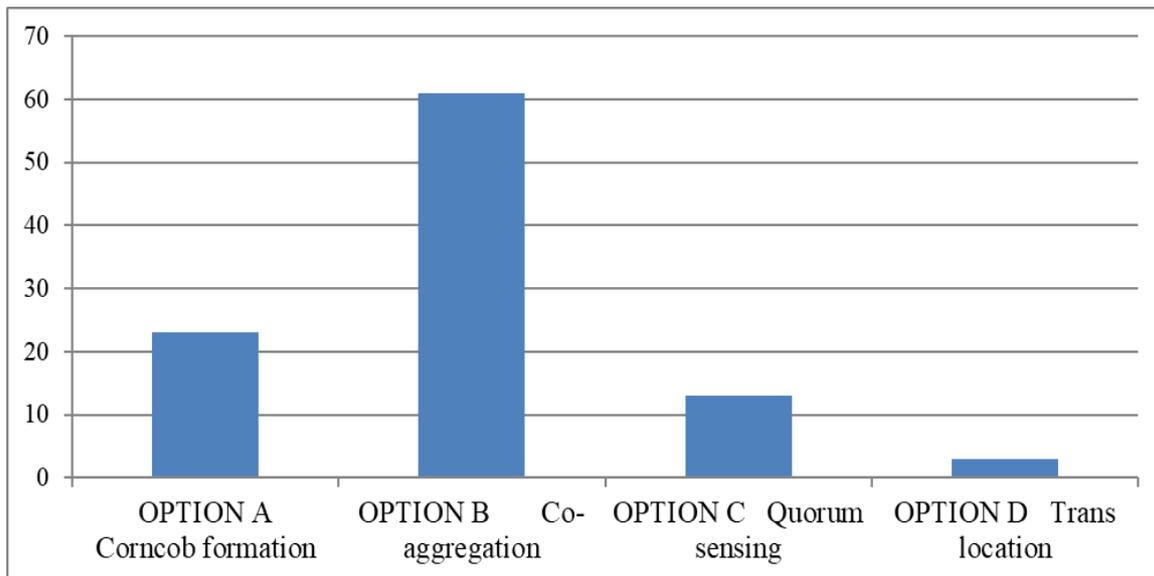
**Chart 17:** Bacteria in plaque are held together by

Out of 100 students; for question no.17: 9 percentage of people selected the correct option -d All of the above. Remaining percentage of people selected other options.



**Chart 18:** Number of bacteria involved in the oral cavity are greater in

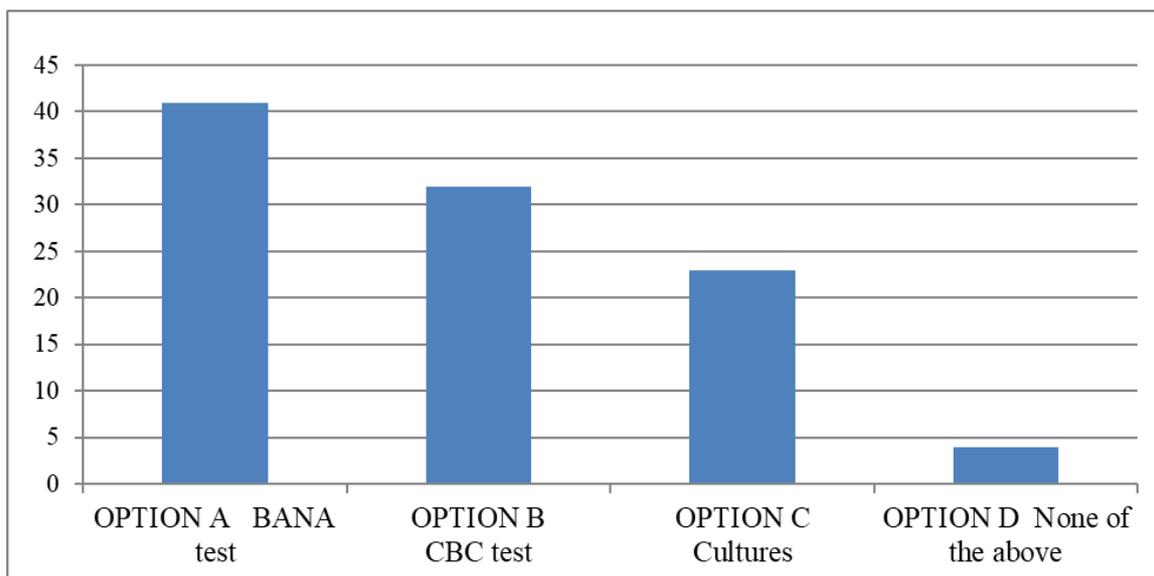
Out of 100 students; for question no. 18: 22 percentage of people selected the correct option -a Morning. Remaining percentage of people selected other options.



**Chart 19:** Bacterial communication with each other in a biofilm is known as

Out of 100 students; for question no. 19: 13 percentage of people selected the correct option -c Quorum sensing.

Remaining percentage of people selected other options.



**Chart 20:** Which test is involved in determination of proteolytic activity of oral anaerobes causing bad breath

Out of 100 students; for question no.20: 42 percentage of people selected the correct option – a BANA test. Remaining percentage of people selected other options.

**4. Discussions**

Periodontal disease is complex in nature. It is a multifactorial disease, which is largely influenced by genetic, environmental and microbial factors [4, 5]. Pathogenesis is defined as “the organization and development of a disease”. Knowledge of pathogenesis helps as to understand about the process that lead to the development of this diseases and consequently the changes it produces in the structure and function of the periodontium. In broad terms, the pathogenesis of a disease is a mechanism by which a causative factor or factors cause the diseases [7].

Periodontal disease results from a complex interplay between the sub gingival biofilm and the host immune - inflammatory events that develop in the gingival and the periodontal tissue in response to the challenge presented by the bacteria. It is generally accepted that the gingivitis precedes periodontitis

but it is clear that not all cases of gingivitis progress to periodontitis [6, 8].

The bacteria are important because they initiate and perpetuate the inflammation, but they are only directly responsible for a relatively small proportion of the tissue damage that occurs. Our understanding of the causes and pathogenesis of oral diseases and condition is continually changing with an increase in scientific knowledge [9].

Gingivitis that associated with dental - plaque formation is the most common form of gingival disease. Plaque - induced gingival disease is the result of interaction between the microorganisms found in the dental - plaque biofilm, the tissues, and inflammatory cells of the host. Periodontitis is an inflammatory disease of supporting tissues of teeth caused by specific microorganisms and the clinical feature that distinguishes periodontitis from gingivitis is presence of clinically detectable attachment loss [10].

The present study reveals that the dental students had fairly good knowledge on microorganisms causing periodontal disease in host. Majority of percentage, more than 60% of

students who were surveyed had fair knowledge on micropathogens causing periodontal disease in hosts.

A substantial number students mentioned that red complex organisms causes bleeding on probing. The awareness about primary and secondary colonizers in dental plaque is low. The survey revealed students did not have adequate knowledge on host-modulatory role played by the plaque organisms. Their is need to educate them in about host bacterial interactions which is the main culprit in periodontal disease progressions. The student also have awareness about various test kits ( Chair side Kits) Which could be of help in evaluating the micro biological profile about the patients. More interactive sessions could be planned in colleges, which could improve their knowledge on biofilm and its role in periodontal diseases.

They lack knowledge on inflammatory response in hosts and also on bacterial mode of living in biofilm. The study conducted among the dental students indicated low level of awareness on periodontal problems and their interactions in the hosts. The students seemed to show a good interest in learning and gaining more knowledge about inflammatory response in hosts, bacterial mode of living in biofilm and periodontal pathogenesis.

## 5. Conclusion

Concluding the survey, the students have a fair knowledge on periodontal micropathogens, but they lack knowledge on periodontal pathogenesis. so they require updating their knowledge in a better way. The survey was conducted among a particular group of students and does not indicate it is appropriate to everyone.

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