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KNOWLEDGE AND ATTITUDE REGARDING PROBIOTICS AS AN ADJUNCT PERIODONTAL TREATMENT MODALITY AMONG UNDERGRADUATE DENTAL STUDENTS- A CROSS-SECTIONAL STUDY

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Abstract

Background and Aim: Probiotics have become of interest to researchers in recent times. The development of resistance to a range of antibiotics by some pathogens has increased the chances of formation of newer multidrug resistant bacteria. Probiotics provide an alternative to chemotherapeutics, which is economical and effective adjunct to cure periodontal disease along with the mechanical debridement modalities. Thus, a change in diet and lifestyle modifications by including probiotic foods may significantly delay the initiation and progression of periodontal diseases, promoting a healthy lifestyle. Aim of this survey was to evaluate the Knowledge and attitude regarding Probiotics as a periodontal treatment modality among undergraduate Dental students of Saveetha Dental College.

Methodology :- This survey was conducted using a validated questionnaire that was circulated among the undergraduate students of Saveetha Dental College. An institutional committee

approval was obtained to access the personal data of the patients.The questionnaire consisted of 10 questions through which the knowledge and attitude of the students regarding the use of probiotics as a periodontal treatment modality were determined. The statistical analysis was done using SPSS software (version 25). The responses from the Google sheet were transferred into excel and were then imported to SPSS software. Descriptive statistics were done using frequency and percentage and Chi square test was performed to assess the knowledge and attitude between the different years of study with a p value of <0.05 set as statistically significant. Total of 100 students participated in this survey.

Results: In the current study it is clear that a significant difference was noted with the interns showing greater level of knowledge with a p value <0.05.

Conclusion: From the current study we can conclude that there is a considerable amount of awareness regarding the usage of probiotics as an adjunct periodontal treatment modality among the students.

Keywords: probiotics, periodontium, gingiva, periodontitis, innovative technique

Introduction

Periodontitis is a chronic inflammatory disease affecting the supporting tissues of the teeth that is a result of the host-microbial interaction at the tooth-gingival junction that is further influenced by genetic and epigenetic factors. Dental plaque is the primary etiologic factor for the initiation of this inflammatory process. Dental plaque is a classic example of both a biofilm and a microbial community in that it exhibits emergent traits, i.e. plaque has properties that emerge from its environment. Evidence shows that the microbiome is needed for the health of the host and that alterations in the ecological equilibrium of microbes can lead to disease. Porphyromonas gingivalis, Prevotella intermedia, Bacteroides forsythus, Campylobacter rectus, and Actinobacillus actinomycetemcomitans are some of the most prevalent bacteria associated with periodontal disease.

Periodontitis is produced by a dysbiotic state of complex subgingival microbial populations. A few microorganisms in the subgingival biofilm, however, have been linked to disease. Porphyromonas gingivalis, Aggeratibacter actinomycetem comitans, Tannerella forsythia, and Treponema denticola are established perio-pathogens covering the red and green complex of Socransky colour coding. Although the tooth-associated biofilm plays a part in the development of periodontitis, the

irreparable damage to the periodontium is predominantly caused by the host inflammatory response. The pathophysiology of disease has been linked to T helper 1 and Th17 lymphocytes(1).

Probiotics are defined as "live bacteria that, when supplied in suitable proportions, confer benefits to the host's health," according to the World Health Organization. The term “probiotic” was initially proposed by Lilley and Stillwell in 1965. The most commonly used probiotic bacterial strains belong to the genera Lactobacillus and Bifidobacterium. Prebiotics indicate substrates that improve the growth or metabolic activities of particular indigenous organisms. When probiotics and prebiotics are mixed together, they form a symbiotic. Probiotics represent a practical and therapeutic option wherein beneficial microbes are introduced into the environment. They interact with the pathogenic microbes and the host to create a benign environment dominated by neutral or beneficial organisms. With the slow development in isolating new antibiotics and the rise of resistant pathogenic bacteria, it's become critical to strive to improve the usage of living medicines(2). Probiotics are at the base of this type of biotherapy.

Probiotics have been shown to affect immune responses by directly altering the local oral microbiome. Probiotics have been used in dentistry as effective adjuncts for reducing caries formation, decreasing oral Candida infection, and regulating gingivitis(3).
Non-surgical and surgical management of periodontal disease are common treatment options, with a focus on mechanical debridement. Mechanical debridement, on the other hand, is not always helpful in terms of improving clinical indicators(3,4). Increasing Evidence favors the use of probiotics to prevent or treat gingivitis and periodontitis. Probiotics are an effective adjuvant in lowering pathogenic microbes and relieving clinical indications of disease when taken orally. In the future, probiotics may be used as an addition or replacement therapy for antibiotics in the treatment of human periodontal infections(5).

Streptococcus oralis and Streptococcus uberis have been reported to inhibit the growth of pathogens both in the laboratory and animal models. They are indicators of healthy periodontium. When these bacteria are absent from sites in the periodontal tissues, those sites become more prone to periodontal disease. Recently, various studies have reported lactic acid inhibition of oral bacteria suggesting a promising role in combating periodontal diseases.

Mechanism of action

The mechanism occurs through three categories: the local microbiota normalization, immune response modulation, and the metabolic impact. Probiotics first compete with the oral pathogens for the adhesion site and then colonize the oral surface. Pretreatment with lysozymes should be carried out to increase adhesion properties(6). Probiotics interact with oral pathogens for nutrients and growth factors, generating antimicrobial molecules such as organic acids, hydrogen peroxide, carbon peroxide, diacetyl, and low molecular weight antimicrobial substances, bacteriocins, and adhesion inhibitors. As a result, probiotics prevent oral infections from inflamming the mouth and destroying oral tissue. By immune exclusion, immune elimination, and immune control, probiotics stimulate and modulate the immune system and enhance intestinal defence(7).

Our team has extensive knowledge and research experience that has translated into high quality publications.(8–20),(21–25) (26) (27)

Materials and methods

This cross-sectional questionnaire based online survey was conducted among the undergraduate dental students of Saveetha Dental College with a sample size of 100 participants. An institutional committee approval was obtained to access the personal data of the patients. A well structured and validated questionnaire was prepared in English language and circulated through an online Google form link. The survey was conducted for a duration of 1 month. Anonymity was maintained, the purpose of the study was explained to the participants in detail and the questionnaire was filled with their consent. The responses were obtained and statistically analysed using SPSS software to obtain the results. The descriptive data obtained were plotted in bar graphs. The association between the level of literacy and the knowledge was assessed using the Chi-square test with a p value of 0.05 set as statistically significant.

Results and discussion

The present questionnaire study was conducted to assess the knowledge and awareness among the dental students, regarding probiotics as an adjunct treatment modality for periodontal disease. In the present study 34.7 % of the study participants were males and 65.4% of them were females.

Participants of the survey were restricted to third year (34.78%), final year(38.92%) and CRRI (26.3%) of Saveetha Dental College.

61.66% of the study participants were aware about probiotics usage in periodontal therapy (figure 4). Probiotics are live microbial feed supplements which beneficially affect the host animal by improving microbial balance (28). Some bacteria help digest food, destroy disease-causing cells, or produce vitamins. Many of the microorganisms in probiotic products are the same as or similar to microorganisms that naturally live in our bodies.

43.7% of the study participants were aware that probiotics acts by stimulating dendritic cells resulting in Th1 and Th2 response modulating immunity- depicted in figure-5. A number of species of Lactobacillus and Bifidobacterium exert vital roles in innate immunity by increasing the cytotoxicity of natural killer cells and phagocytosis of macrophages and mediate adaptive immunity by interacting with enterocytes and dendritic, Th1, Th2, and Treg cells (29).

In the present study, 36% of the participants were aware that probiotic organisms survive in the human body due to their properties such as their ability to resist low pH and be viable (figure-6). *Lactobacillus* species are considered intrinsically resistant to acid. Although there are differences between species and strains, organisms generally exhibit increased sensitivity at pH values below 3.0. Hence, acid tolerance is accepted as one of the desirable properties used to select potential probiotic strains(30).

Only 25.4% of our study participants were aware of bifidobacterium lactis as an example of a probiotic microorganism while 40% of them thought yersinia pestis is a probiotic(figure-7). The most common form of commercially available probiotic bacteria is bifidobacterium lactis. The probiotic strain Bifidobacterium animalis subsp. lactis BB-12 , is the world's most documented probiotic. It is described in more than 300 scientific publications out of which more than 130 are publications of human clinical studies. The complete genome sequence of BB-12 has been determined and published(31).

Regarding the commercially available forms of probiotic, 53.3% of our study participants were aware that they were available as supplements, powders, mouthwashes (figure 8) and 50.4 % of

the participants knew that yogurt is the most commonly available fermented food product containing probiotics (figure 9)

Figure -10 shows that 47% of the participants thought that the most common side effect of probiotics is photosensitivity, but only 37.6% knew about the actual side effect which is digestive problems. Probiotics can cause other side effects such as stomach upset, gas, diarrhea, or bloating(2).

72% of the participants believed that probiotics will modify oral microbial flora and 56.8% of the participants believed that it is possible to cure periodontal infection by using probiotics(figure-11). 79% agreed to prescribe probiotics to their patients. These responses indicate that the participants had a positive attitude towards the use of probiotics as an adjunctive periodontal treatment modality.

A statistically significant association was noted with respect to the level of literacy and the level of knowledge, with a p value of 0.00. Interns were considerably more aware and knowledgeable which maybe attributed to their education, experience and exposure.

Probiotics are better counterparts of antibiotics and thus are free from concerns for developing resistance, further they are the body's own resident flora hence are most easily adapted to host. With fast evolving technology and integration of biophysics with molecular biology, designer probiotics pose a huge opportunity to treat diseases in a natural and non-invasive way. Periodontitis has an established risk of various systemic diseases like diabetes, atherosclerosis, hyperlipidemia, chronic kidney diseases, and spontaneous preterm birth(32). Hence, arresting the disease process at the earliest is imperative for overall good systemic health.

In the present study, though the participants were about probiotics as an adjunct periodontal therapy, their knowledge was inadequate with respect to the strains of the organisms and more clarity is required regarding their mechanism of action and their complications. However their attitude towards the use of probiotics in periodontal therapy as an adjunct to mechanical therapy is positive. Hence by imparting more knowledge and creating awareness at the undergraduate level, dentists would be better able to manage and treat severe and aggressive periodontal

infections. This would greatly help in the management of associated systemic diseases and improve their quality of lives.

Bar graphs

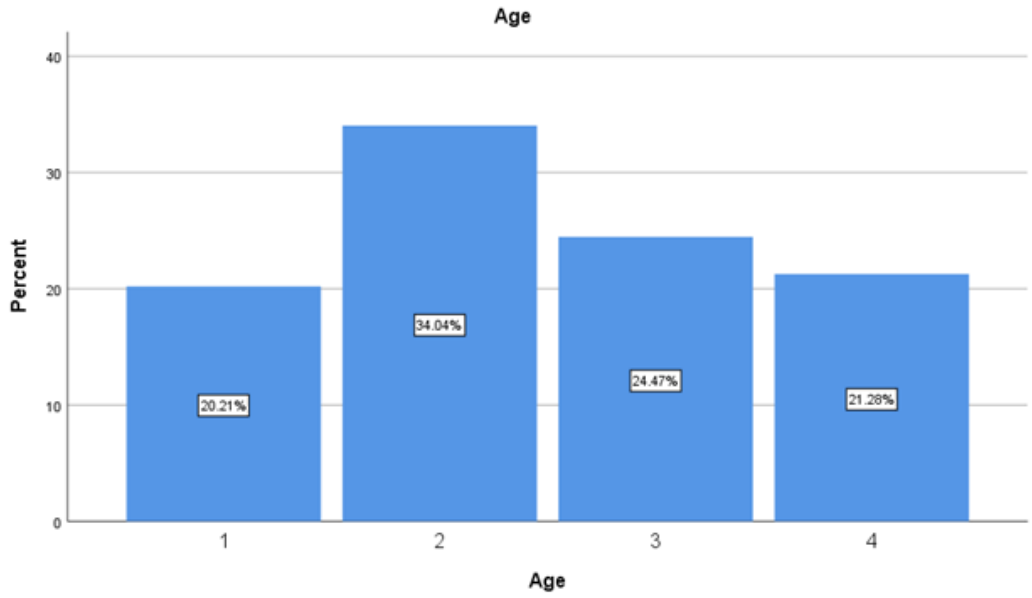


Figure 1

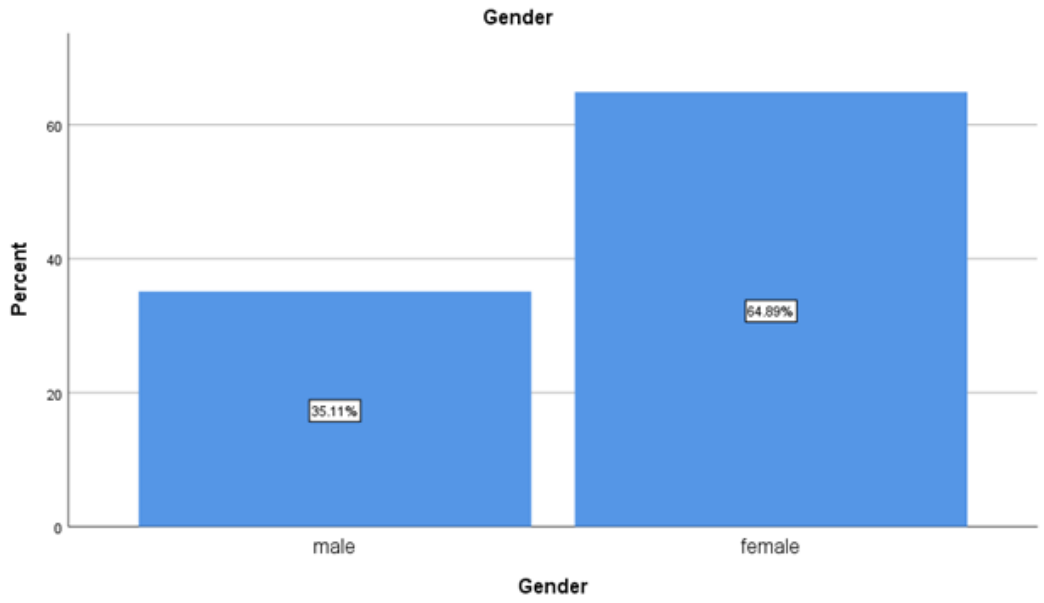


Figure 2

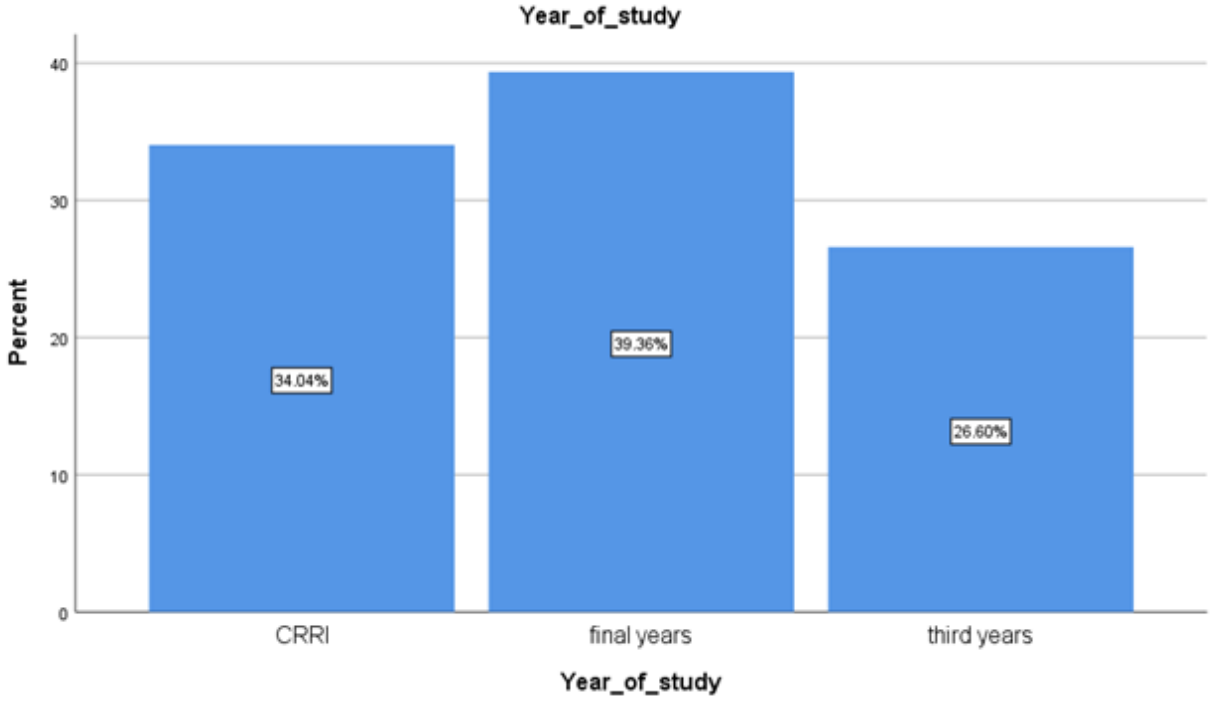


Figure 3

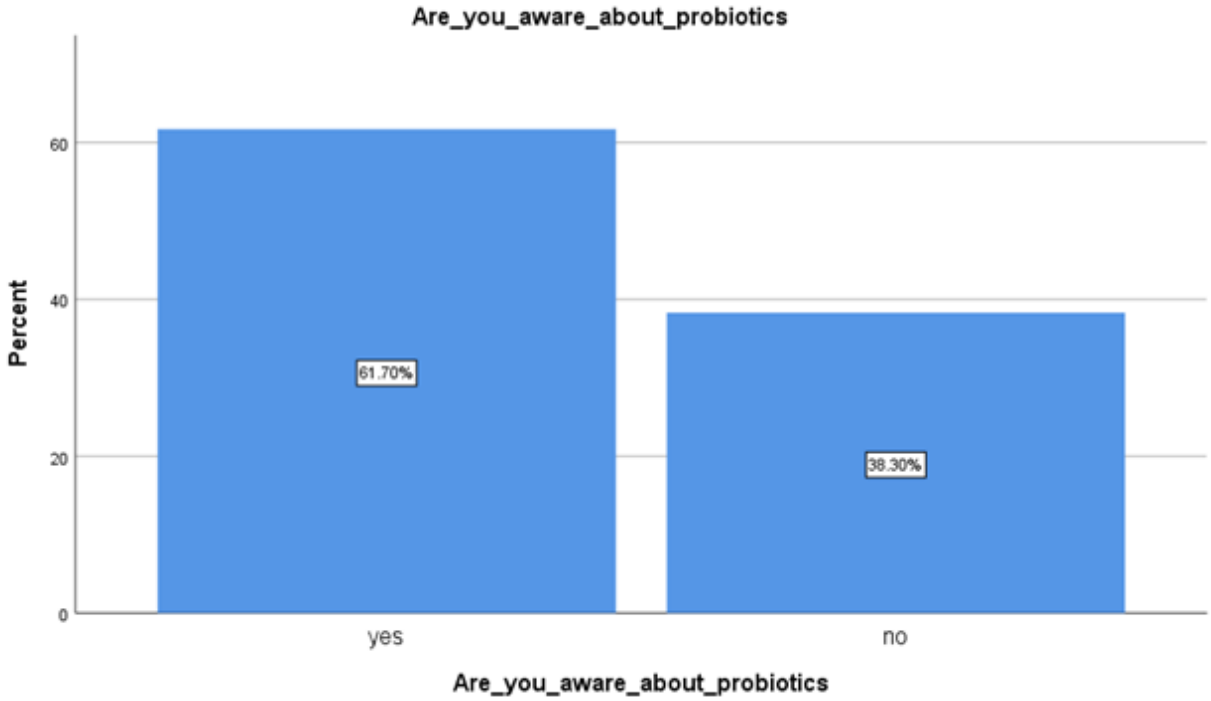


Figure 4

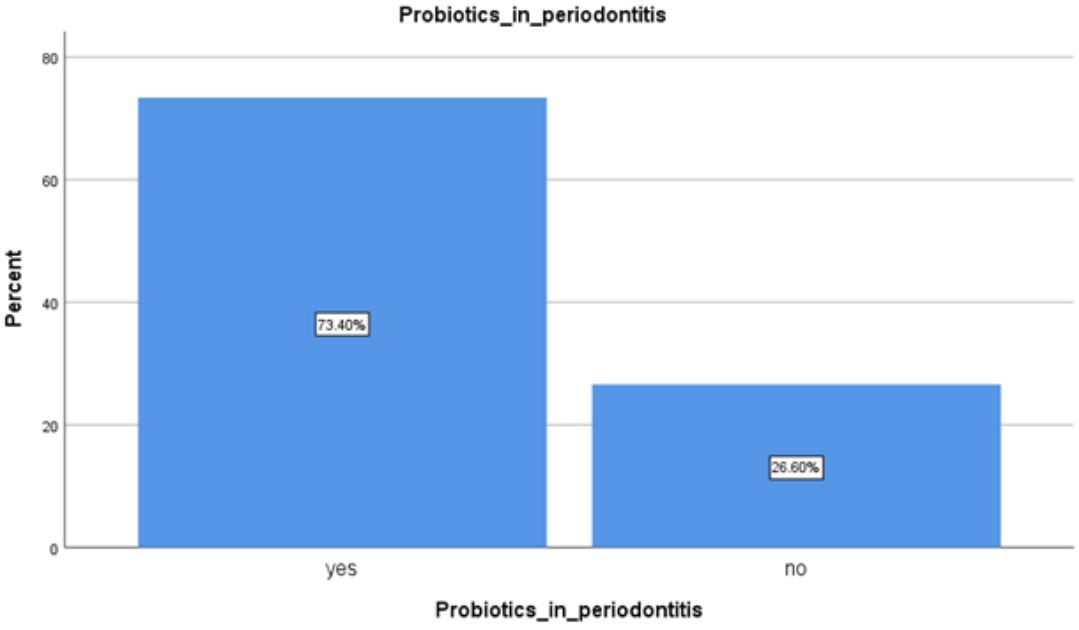


Figure 5

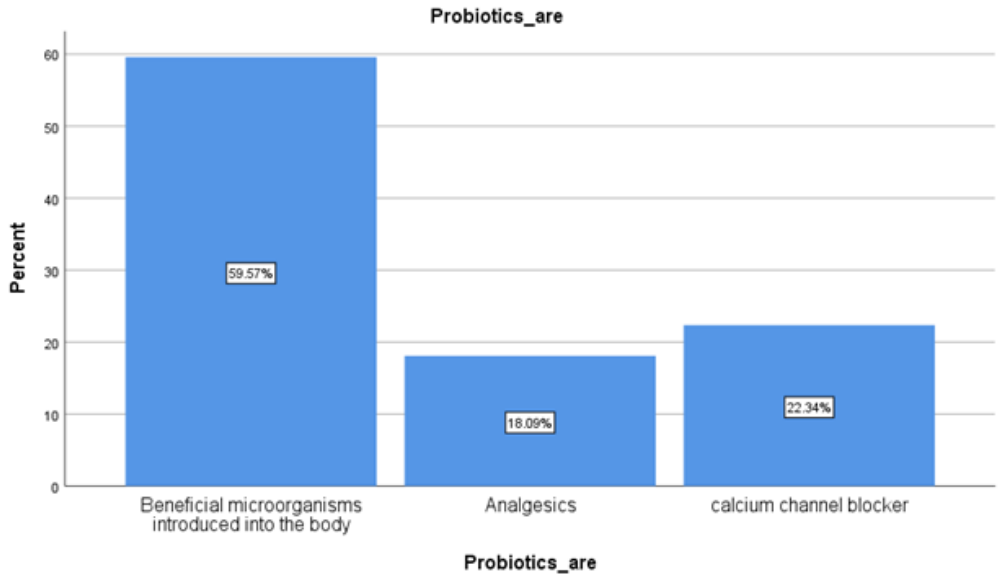
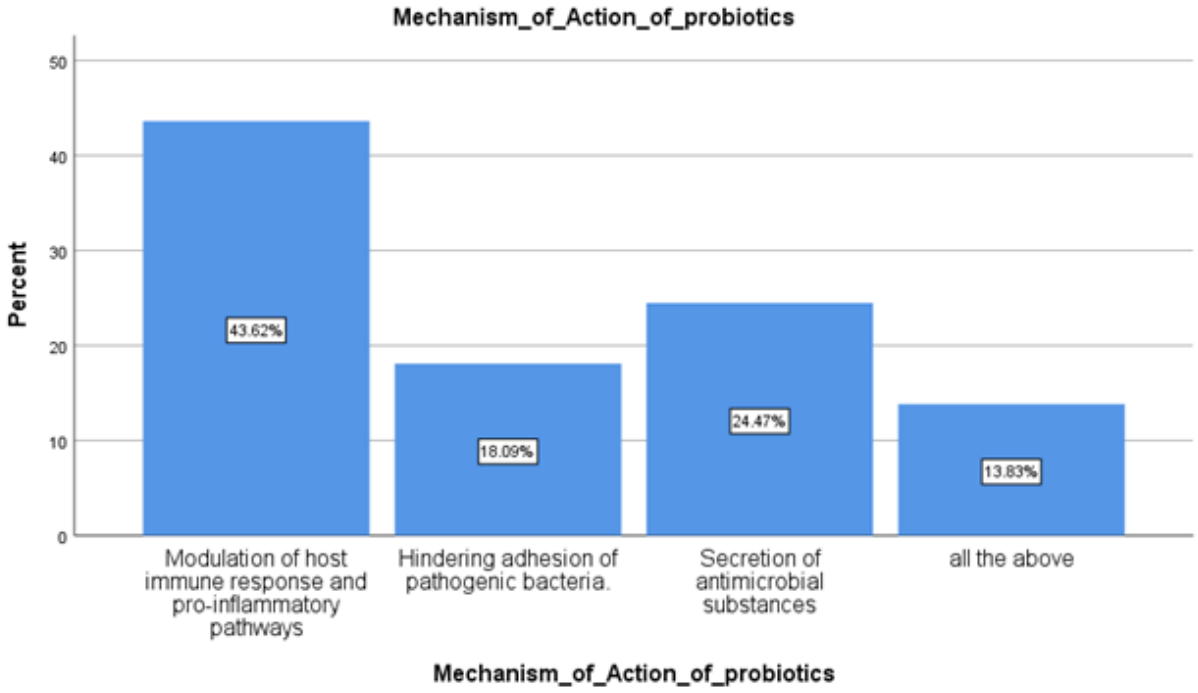


Figure 6



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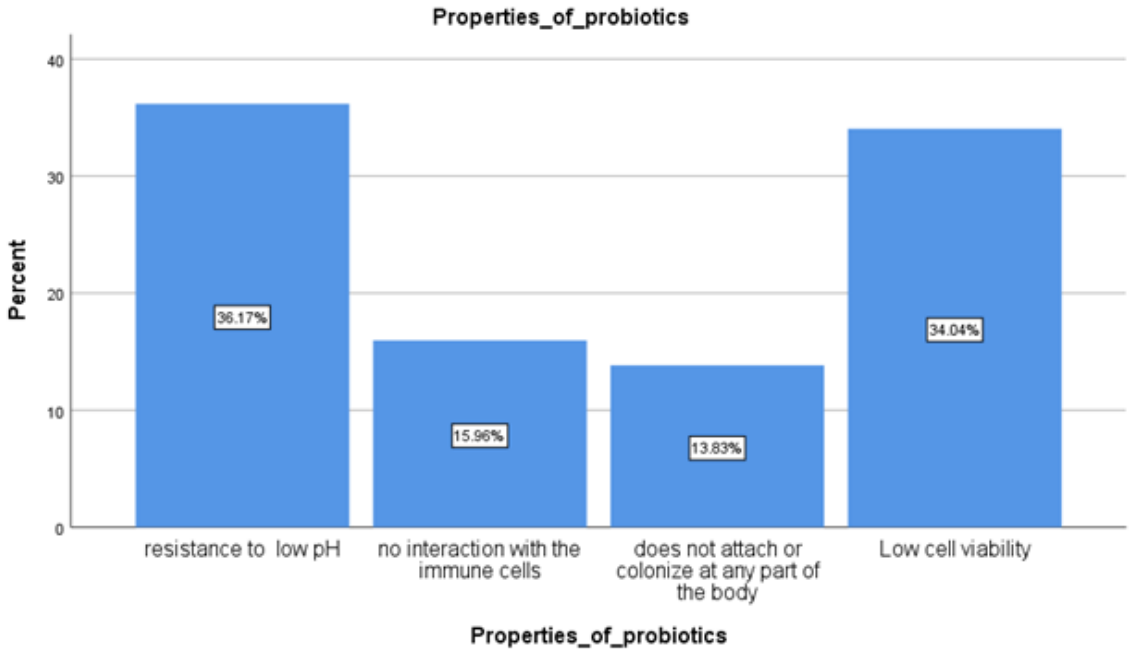


Figure 8

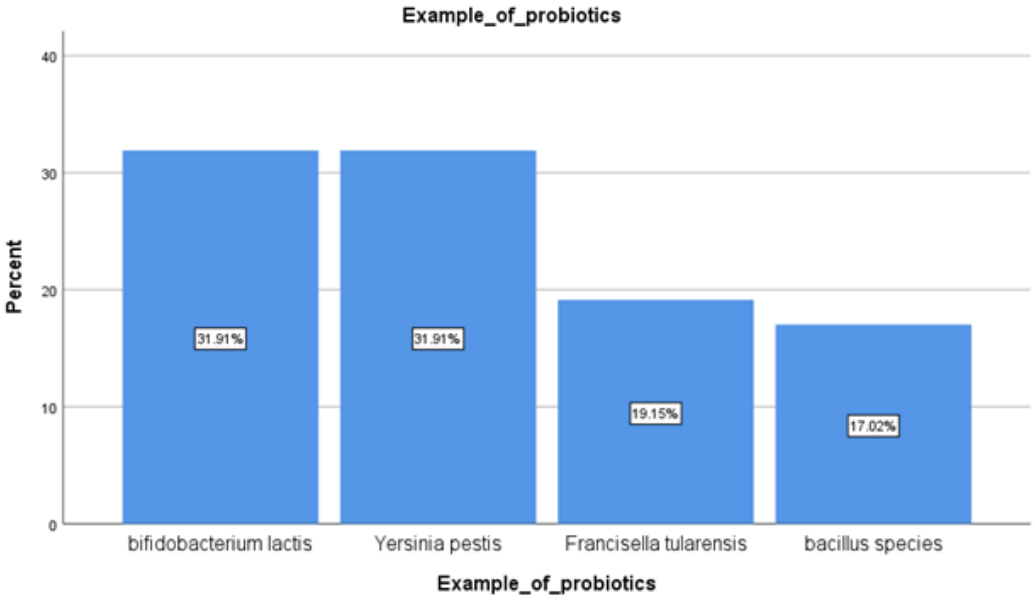
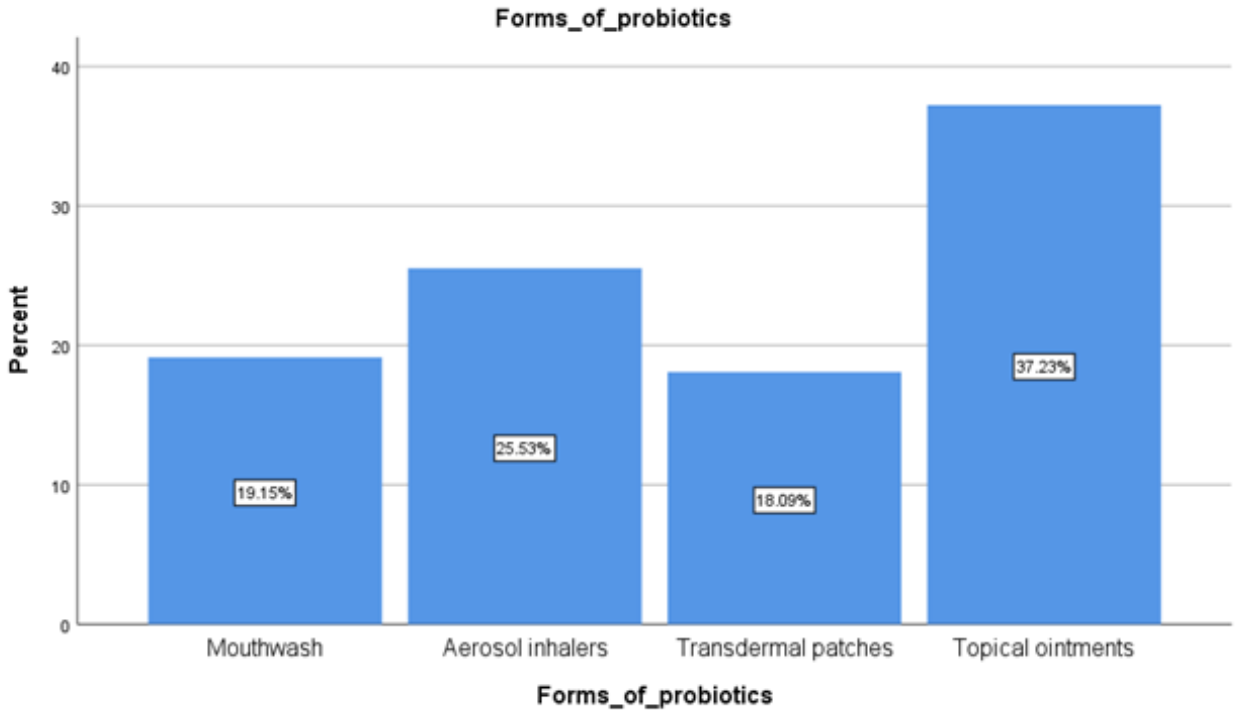


Figure 9


Forms_of_probiotics
Percent
40
30
20
10
0
19.15%
25.53%
18.09%
37.23%
Mouthwash
Aerosol inhalers
Transdermal patches
Topical ointments
Forms_of_probiotics

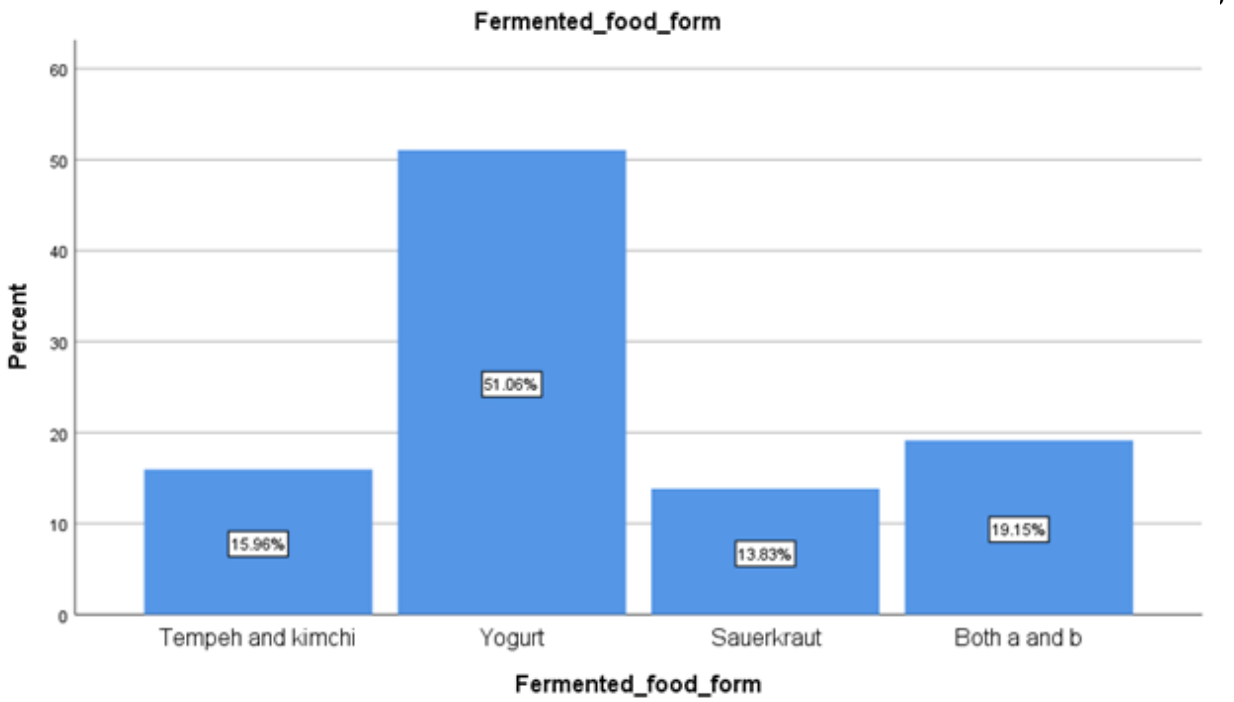

Fermented_food_form
Percent
60
50
40
30
20
10
0
15.96%
51.06%
13.83%
19.15%
Tempeh and kimchi
Yogurt
Sauerkraut
Both a and b
Fermented_food_form

Figure 11

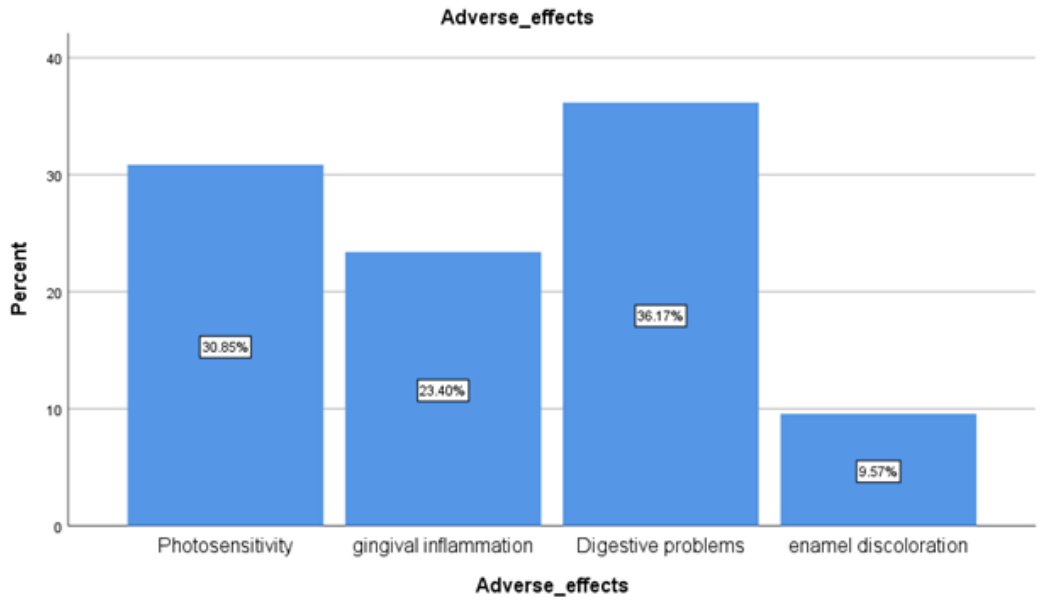


Figure 12

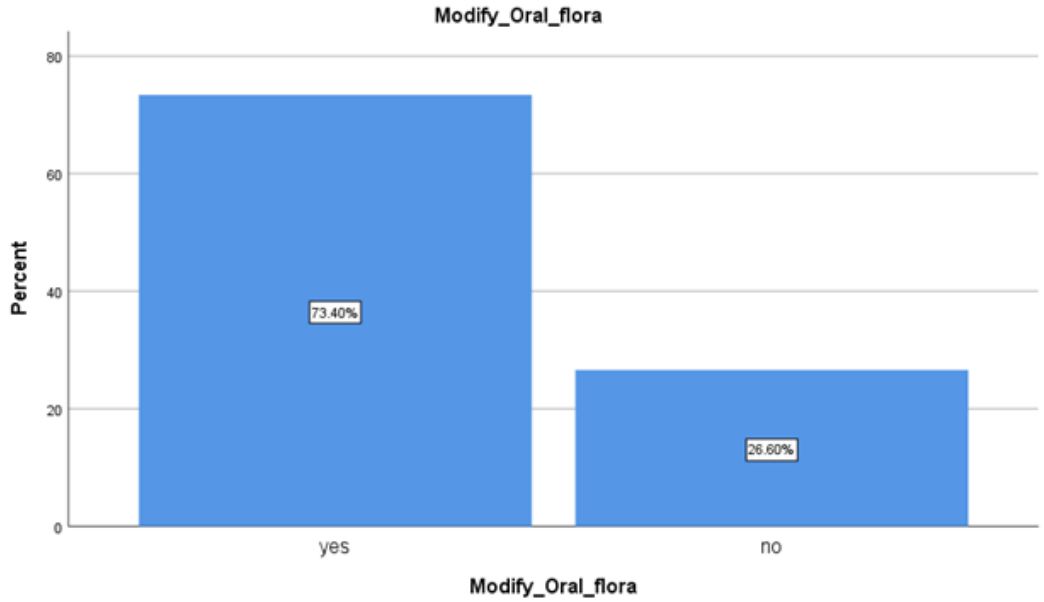


Figure 13

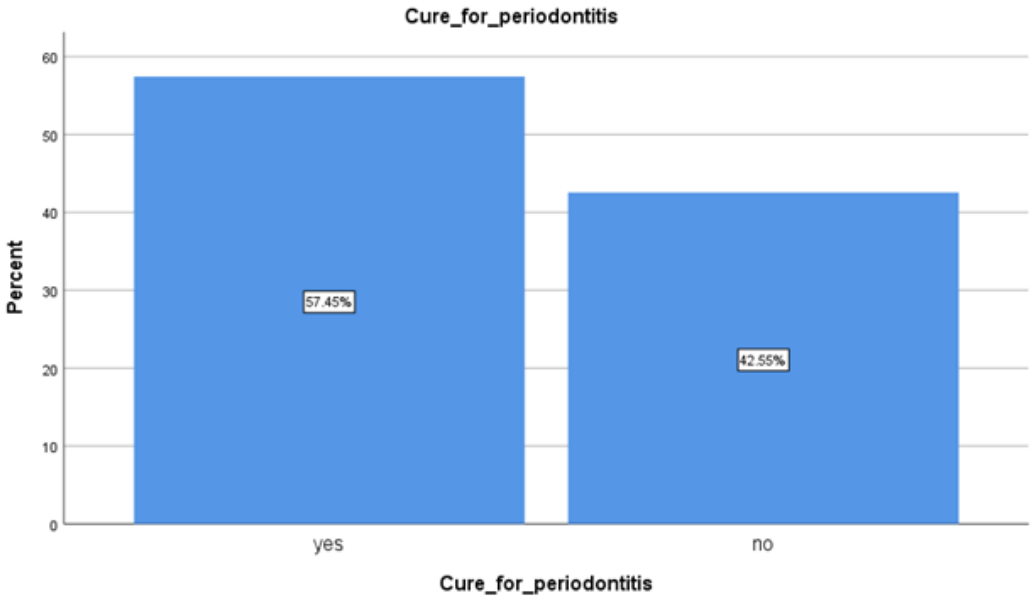


Figure 14

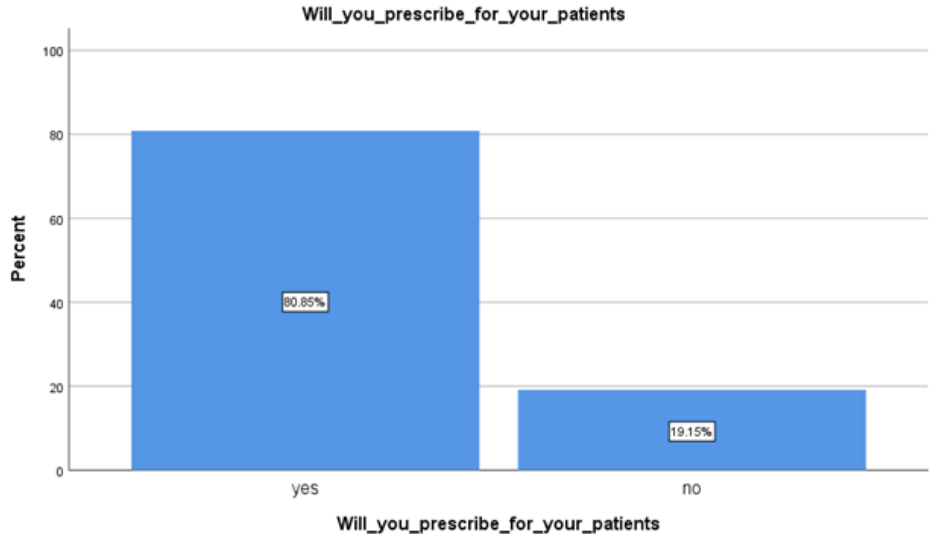


Figure 15

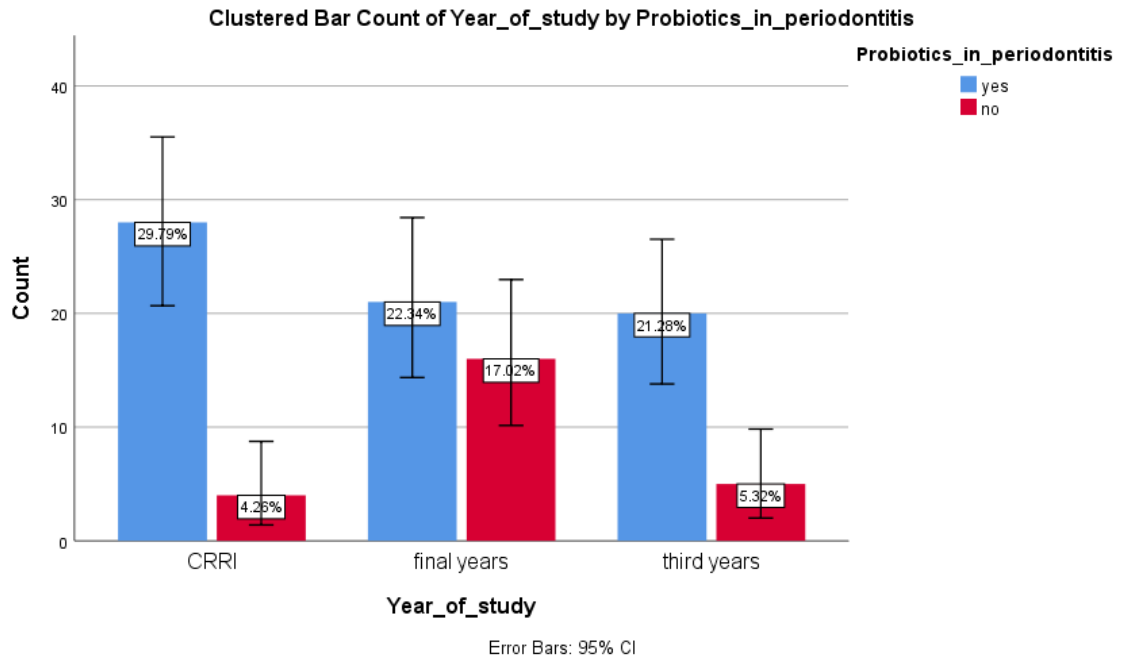


Figure 16

Conclusion

Probiotics are regulated as dietary supplements and are not subjected to the same rigorous standards as medications. Probiotic therapy uses bacterial interference and immunomodulation in the control of several infectious, inflammatory, and immunologic conditions. Similar to their better known actions in the GI tract, probiotics exert their effects in many ways also in the oral cavity. From the limitations of the current study we can conclude that though the study participants were aware about probiotics more information can be imparted regarding their mechanism of action and their available forms for probiotic use as adjunct periodontal treatment.

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Conflict of interest

Authors declare no conflict of interest.

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