

Assessment Of Knowledge, Attitude And Awareness Of Probiotics And Prebiotics Among Dental Professionals.

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Abstract

Introduction

Probiotics and Prebiotics are essential for good general health. Prebiotics are defined as non-digestible substances a food ingredient that has a beneficial effect on the host selectively stimulating the growth and/or performance of one or a limited number of bacteria in the colon.

Probiotics are live bacteria that when handed in sufficient proportion conduct a health benefit to host.

Aim

This survey was conducted to assess the level of prebiotics and probiotics knowledge, attitude and practice of dental professionals for oral health.

Materials and Methods

A questionnaire-based survey was conducted to assess knowledge related to the definition, mechanism of action, dosages, sources of probiotics and prebiotics addressing the dental professionals. Participants were requested to complete the questionnaire using Google form Platform. The collected data was subjected to statistical analysis

Results

58.4% of the participants were aware of Probiotics and prebiotics. 41.2% of the participants were aware of all the benefits by probiotics, 25.4% for improve Periodontal health, 13.1% for dental caries and 18% for reducing halitosis. In spite, of awareness of probiotics 44% of the respondents had never prescribed probiotics and prebiotics to their patients.

Conclusion

The findings of the present study revealed that majority of the dental professionals were aware about Probiotics and Prebiotics and its oral health benefits. But due to lack of knowledge, probiotics and Prebiotics has been used by a very few professionals as a therapeutic drug in treating and preventing oral lesions.

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I. Introduction

Oral cavity consists of diverse populations of various microorganisms. About 700 bacterial species colonized different parts of oral cavity such as teeth, gingiva, buccal mucosa, hard palate, soft palate, tongue and tonsils. [1] Oral disease are most commonly caused due to imbalance between this resistant microorganism therefore utilization of health beneficial bacteria to prevent and treat oral diseases and support host immune system, was first introduced in the beginning of 20th century. [2] In Greek, probiotics means "for" life", the term probiotics was first introduced by Lilley and Stillwell in 1965. [3]. Probiotic is derived from the Latin preposition 'pro' (for) and Greek adjective 'bios' which are live bacteria that when handed in sufficient proportions conduct a health benefit on the host' as defined by the world health Organization live bacteria from species of lactobacilli or Bifidobacteria are probiotics which may beneficial impact on health.[7]The term prebiotic was invented by Gibson and Roberfroid who changed the word "pro" to "pre" which means "before" or "for". Prebiotics are defined as non-digestible substances a food ingredient that has a beneficial effect on the host selectively stimulating the growth and/or performance of one or a limited number of bacteria in the colon. [4] Most commonly used microorganisms for probiotics production are lactic acid bacteria and bifidobacteria, although other bacteria and certain yeasts are also used. [5]Lactobacillus is often used as probiotic products for example Lactobacillus acidophilus, L. casei, L. paracasei, L. rhamnosus. [5] Bifidobacterium contains various Gram-positive non- motile anaerobic bacteria such as Bifidobacterium infantis, B. adolescentis, B. animalis. [6]Other bacterial strains species

(e.g. *Pediococcus acidilactici*, *Lactococcus lactis*, *Enterococcus faecium*) and certain yeasts (eg. *Saccharomyces boulardii*) are also suitable for probiotics production[6]. Nowadays, probiotics are found in nutritional supplements (gummies, gelatin capsules), medicines, healthy foods (yogurt) and drinks and baby formula. [5] Prebiotics comprises inulin, fructooligosaccharides, galacto-oligosaccharides, and lactulose. [2] Various prebiotics products are oats, bananas, fibers containing foods, garlic, onions. The main objective of prebiotics, similar to probiotics, is to improve the health of the host by changing the composition of the intestinal flora. However, prebiotics achieve this goal through a different mechanism. [2] Prebiotics and probiotics have various effects on dental caries, gingivitis, periodontitis, halitosis and fungal infection. Dietary intake of probiotic reduces the risk of chronic oral diseases.

Even though there is profound evidence of health benefits of using prebiotics and probiotics to improve oral health, dental professionals hesitate to recommend it to patients; because of difficulties in accessing information provided by different companies about oral health benefits of prebiotics and probiotics. Therefore, dental care providers should have adequate scientific knowledge about Prebiotics and probiotics and should provide right information to patients and recommend them for prevention and treatment of various oral diseases such as gingivitis, periodontitis, halitosis, fungal infection and dental caries.

As a dentist, it is essential to learn about alternative products such as Prebiotics and probiotics. This knowledge may be their starting point in developing a new practice of recommending these products to enhance oral health. However, there are only a few studies that have analyzed dental professionals' knowledge, attitude and practice towards uses of prebiotics and probiotics for promoting good oral health. For this reason, this survey was conducted to assess the level of prebiotics and probiotics knowledge, attitude and practice of dental professionals in Pune.

II. Methodology

An observational study was conducted for 246 Dental Professionals in Pune for a research project titled "Assessment of knowledge, attitude and awareness of Probiotics and Prebiotics among Dental Professionals.

Questionnaire Validation and Reliability

The validation of the questionnaire involved the calculation of Mean Content Validity Ratio (CVR), resulting in a CVR score of 0.779, demonstrating its robust content validity. Reliability of questionnaire was done using Cronbach's alpha value determined by average of four evaluators which was found to be 0.748 (satisfactory to good) agreement between evaluators.

Determination of Sample Size

To establish the required sample size, the assumed population prevalence (P) was set at 20% (0.2). A confidence level (1- α) of 95% (0.95) was chosen, corresponding to a Z value of 1.96, with an absolute precision (d) set at 0.05. Based on these parameters, the minimum sample size (n) was calculated to be 246. To account for potential non-responses or data-related issues, the final sample size for this study was rounded up to 300 subjects.

Method of data analysis:

Statistical analysis will be performed using Statistical Product and Service Solution (SPSS) version 21 for Windows (SPSSInc, Chicago, IL).

Descriptive qualitative data will be expressed in percentage/proportion.

Chi square test was used to find out association of various factors with knowledge, attitude regarding melanosis.

Questionnaire Structure

The questionnaire utilized in this study was carefully designed to investigate knowledge of Prebiotics and Probiotics among dental professionals.

Methodology

After providing a detailed explanation of the objectives, the questionnaire was distributed to the dental professionals in Pune . Participants were requested to complete the questionnaire using an online Google form and provide their responses based on their personal experiences.

The sampling methods used was non-probability sampling technique. The collected data were subjected to comprehensive statistical analysis and descriptive statistics were employed to compare and analyse the obtained results.

III. Result

Awareness of probiotics and prebiotics

A total 296 Dental professionals participated in the study. Table1 signifies the awareness of probiotics and prebiotics among Dental professionals.58.4% of the participants were aware of while the remaining population 41.6% were not aware about Prebiotics and Probiotics (Table1) with a significant statistical difference.

	Yes (%)	No (%)	Chi square test value	P value
Awareness of prebiotics and probiotics	(58.4%)	(41.6%)	Chi = 3.41	P =0.031

Table 1 Awareness of probiotics and prebiotics

Demographic Data.

A structured questionnaire was distributed to the dental professionals. There were27.1% males and 72.9% females in the study (Table 2)

Among 296 patients most of them were in age group 20-40 years (64.9%),24.1% with 30-40years of age and 8.9%with age more than 40years. (Table 2) Of all the respondents 50.9% were post graduates ,35.4% were Practioners and 13.5% were graduates. (Table 2)

Demographic Data	Distribution	Percentage	Frequency
Gender	Male	27.1%	92
	Female	72.9%	201
Age	20-40 years	64.9%	189
	30-40 years	24.1%	85
	More than 40 years	8.9%	26
Educational Qualification	Graduates	13.5	42
	Post graduates	50.9%	148
	practioners	35.4%	110

**Table 2: Demographic Data.
Sources of Probiotic and Prebiotics**

Among 293 participants most them (42.27%) were aware only about yoghurt as a probiotic while 26.12% responded for milk-based products, 7.90% fruit juice, 23.71% Cereals. (table 3) with a significant statistical difference. Most of the respondents 39.18% were aware about the prebiotic sources, 22.34% responded for fiber rich food, 16.5% for banana and 22% for leafy vegetables. (Table 3) Food sources of Probiotics	Frequency (n)	Percentage (%)
Yoghurt	123	42.27%
Milk based products	76	26.12%
Cereals	69	23.71%
Fruit juice	23	7.90%
	Chi=8.92, p=0.044	
Food sources of Prebiotics		
Fiber rich food	65	22.34%
Leafy vegetables	64	21.99%
Banana	48	16.49%
All of these	114	39.18%
	Chi=4.9, p=0.218	

Table 3: Sources of Probiotic and Prebiotics

Mechanism of action

Mechanism action of probiotics

41.7% of the respondents were aware of the mechanism action of Probiotic while 19.5% were aware that probiotics inhibits colonization of bacteria, 21.3% for modulation of host inflammatory response and 17.5% for normalization of oral microflora. (Table 5) with significant statistical analysis.

Mechanism action of prebiotics

39.52% of the respondents were aware of the mechanism action of probiotics while 19.24% responded support beneficial bacteria, 24.40% promote growth and health of bacteria while 16.84% for Non-digestible dietary ingredients with significant statistical value (p=0.109)

Mechanism action of probiotic	Frequency	Percentage
Inhibits colonization of bacteria	59	19.5%
Modulation of host inflammatory response	62	21.3%
Normalization of oral microflora	53	17.5%
All of these	130	41.7%
	Chi=6.4, p=0.029	
Mechanism action of prebiotic	Frequency	Percentage
Support beneficial bacteria	56	19.24%
Promote growth and health of bacteria	71	24.40%
Non-digestible dietary ingredients	49	16.84%
All of the above	115	39.52%
	Chi=6.78 P=0.109	

Table 4 -Mechanism action of probiotics and Prebiotics

Oral health benefits of probiotics.

41.2% of the participants were aware of all the benefits by probiotics,25.4% for improve Periodontal health , 13.1% for dental caries and 18% for reducing halitosis. With significant statistical difference p=0.042

For periodontal diseases, 24.7%responded lactobacillus act as antagonist to p.gingivalis,16.8% for balance host microflora,17.9% responded reduce inflammation while a few responded that probiotics modulate plaque ecology and 34.4% responded all of these are the effects of probiotics on periodontal disease.(Table 5)

For halitosis,25.4% responded probiotics avoid reestablishment of volatile sulfur producing bacteria,20.3%responded probiotics reduce the pathogenic bacterial count,18.6% responded probiotics coaggregates with halitosis causing bacteria.(Table 5)

For dental caries,25.8% responded that probiotics decreases streptococcus mutans count in saliva and plaque,23% for inhibition of colonies of bacteria,16.2% for reduction in carcinogenic biofilm while34.7% responded that all of these are the effects of probiotics on Dental caries. Table 5

Oral benefits of using probiotics	Frequency	percentage
Improve periodontal health	45	25.4%
Reduces halitosis	62	20.3%
Effects on dental caries	34	13.1%
All of these	123	41.2%
	Chi=7.46, p=0.042	

Table 5 Oral health benefits of probiotics

Bacterial genes used in probiotic Production

Participants were asked about the different strains of bacteria used in probiotics. In which lactobacillus 72.2% was most common type of strain used, followed by Bifidobacterium 21.3% and Streptococcus.5% with significant statistical difference(p=0.012)

Bacterial Genes	Frequency	Percentage
Lactobacillus acidophilus	182	72.2%
E. coli Nissle	5	1.5%
Bifidobacterium animalis	60	21.3%
Streptococcus mutans	15	5%
Chi=12.48, p=0.012		

Table6 Bacterial genes used in probiotic production

Probiotic products available in market

There are variety of products available in market, when asked about the products available in market most of the respondents were aware only about yakult while a few were aware about the probiotic gummies, chewing gums powdered capsule. (Table 7) with significant statistical difference $p=0.031$.

	Frequency (n)	Percentage%
Yakult	98	33.68%
Probiotic gummies	60	20.62%
Chewing Gums	89	30.58%
Powdered capsule	44	15.12%
Chi=3.1, p=0.031		

Table 7: Probiotic products available in market

Side effects of Probiotics and Prebiotics

Participants were asked about the complication may be seen due to prolonged use of probiotic and prebiotics.18.21% of the respondents for gastrointestinal effect-gas,.34.02% for allergic reactions,16.15% Oppprtunistic infection and 31.62% responded all of these were the side effects of probiotics. With significant statistical difference($p=0.076$)

Side effects	Frequency	Percentage
Allergic reactions	99	34.02%
Gastrointestinal effect	53	18.21%
Oppprtunistic infection	47	16.15%
All of these	92	31.62%
Chi=6.08 p=0.076		

Table 8: Side effects of Probiotics

Attitude Domain

	Strongly Agree N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)	Strongly Disagree N (%)	Chi	P value
There is need for dental professionals on education of prebiotics.	12.71%	56.01%	14.43%	12.37%	4.12%	Chi=7.56	P=0.034
As a healthcare provider will you recommend probiotics as prevention and treatment modality for your patients.	17.86%	51.54%	17.52%	13.05%	0 (0%)	Chi=6.98	P=0.045
Consuming probiotics are beneficial for general and overall health	27.49%	41.23%	23.02%	6.87%	1.37%	Chi=8.89	P=0.034

Table 9: Attitude Domain

Have you recommended probiotics and prebiotics to your patients?

51.20% of the respondents had never prescribed probiotics and prebiotics to their patients, while the remaining 26.11% had prescribed some form of probiotics to their patients(table 10) with significant statistical difference p=0.001.

	%	n	Chi square test	P value
Yes	26.11%	76	Chi=21.89	P=0.001
No	51.20%	149		
Maybe	15.46%	45		
Don't know	7.21%	21		

Table 10: Have you recommended probiotics and prebiotics to your patients?

Will you try using a probiotic and prebiotic product recommended by a Health care professional?

71% of the respondents were interested to try probiotic products while the remaining respondents were not interested in trials. With significant statistical analysis.(p =0.018)

	%	n	Chi square test	P value
Yes	71%	138	Chi=9.10	P=0.018
No	19%	79		
Maybe	7.50%	49		
Don't know	2.5%	25		

Table 11: Will you try using a probiotic and prebiotic product recommended by a Health care professional?

IV. Discussion

Prebiotics and probiotics are supplementary to each other. The probiotic enhanced effects may be seen in the oral cavity using biotherapeutic formulation that contain right microbial strain and synergistic prebiotics.

This research aimed to assessed the knowledge, attitude, and awareness of probiotics and prebiotics among dental professionals.

The findings of the survey showed maximum number of participants were aware of Prebiotic and Probiotics, these results agree with the study conducted among dental professionals in Ghaziabad by Muchhal *et al.*⁷

Most of the participants were willing to try probiotics and prebiotic recommended by their physician. This result shows that participants are keen to learn about Probiotics and prebiotics. In the previous study by Stanczak *et al* there were similar findings in which a significant number of participants were interested to try and learn about probiotic and prebiotic product recommended by Healthcare Professional.⁸

Regarding the source of Probiotics, 42.97% of the respondents in this study have chosen yoghurt as a probiotic food. These findings were similar in the results in a study conducted among Nigerian clinician by Osazuwa *et al* 45.1% of the respondents preferred yoghurt as a probiotic food.⁹

In the study by Mahendran *et.al* *Lactobacillus*, *Bifidobacterium* and *streptococcus* strains were commonly used as probiotic bacteria. In the present survey the findings were similar, Dental professionals responded the mentioned probiotic *al Lactobacillus*, *Bifidobacterium*.¹⁰

About the side effects, most of the dental professionals were aware about the complication of probiotics and prebiotics if not given in required dosages. This finding was similar to the study conducted by Sandler *et al*. that the administration of probiotics in high amounts increases the possibility of long-term side effects such as allergic reaction.¹¹

In the present study 71% were aware of prebiotic and probiotics but have limited prescribing to patients, thus this finding was similar to the previous study conducted in Chennai by Raja *et.al.in* around 83.5%.¹²

Thus, it was concluded that there is awareness about probiotics and prebiotics among dental professionals along with its effects on oral and general health. The respondents were willing to learn more about probiotic application through seminars conferences and workshops

V. Conclusion

The findings of the present study revealed that majority of the dental professionals were aware about Probiotics and Prebiotics and its oral health benefits. But due to lack of knowledge, probiotics and Prebiotics has been used by a very few professionals as a therapeutic drug in treating and preventing oral lesions. prebiotic and probiotics can be used as an adjuvant therapy for patients with side effects from treatment modalities. More studies need to be conducted with extensive research to examine effectiveness and efficiency.

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