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Original Research

Ayurveda in Dentistry: Time to Recall Oil Pulling for dental hygiene- A survey based study

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ABSTRACT:
Context: The indiscriminate use of chemical formulations for treatment of various ailments has led to problems like antibiotic resistance and decreased efficacy. Hence, there is an increasing shift towards use of traditional or complementary alternative medical systems which offer certain simple to implement methods for the overall oral health of general population. **Aims:** To evaluate awareness and knowledge regarding the practice of oil pulling among dental students and professionals in India. **Methods and Material:** A self-constructed validated questionnaire was prepared and circulated amongst dental students and dental professionals in India. Responses received from 141 participantswere evaluated and the results were statistically analyzed. **Results:** 47% participants believed that oil pulling helps in the reduction of various dental diseases. 40% of the people agreed that oil pulling can be readily employed. 30 out of 52 respondents (57.7%) suggested that oil pulling be included in the dental curriculum. **Conclusions:** The results provide an insight into the awareness and knowledge regarding the practice of oil pulling among dental students and professionals in India. It also highlights the need for its inclusion in curriculum and practice for the preventive health benefits. **Key Messages:** Oil pulling is an ancient Ayurvedic procedure to maintain dental hygiene. There is a significant lack of knowledge among dental fraternity about its existence and practice. This highlights the need to include it in dental curriculum to increase awareness and its application for promoting overall oral health of people.

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INTRODUCTION

Infectious diseases have influenced many aspects of human history. Until the 1940s, human evolution was driven by the challenge of surviving in a microbe dominated environment and life has been a constant battle between “them” and “us”. Bacteria that cover most of our body surfaces are not just benign but also essential to our existence. The human mouth contains more than 300 bacterial species, both harmful and useful.[1]However, the extensive and indiscriminate use of antibioticshasled to antibiotic resistance.Even when the bacteria are not human pathogens, they may still be dangerous because they can transfer their antibiotic resistance genes to other pathogenic bacteria.[2,3] The appearance of ‘multi-drug resistant’ bacterial strains in particular, havenecessitated the search for new antibacterial agents as well as driven research towards the study of antimicrobial agents from traditional alternative medicines. Certain medicinal plants confer considerable antibacterial activity against numerous microorganisms causing oral diseases including dental caries.[4]Dentists as oral physicians need to be informed regarding the use, safety and effectiveness of the various traditional medicines. As this is a scarcely explored part in the field of dentistry, there is a need for integration of skilled dental treatment modalities and complementary alternative medical (CAM) systems to provide the best possibilities from each system to patients.[5]

In the oral cavity, the accumulation and metabolism of bacteria on hard oral surfaces is considered the primary cause of dental caries, gingivitis, periodontitis, stomatitis, peri-implant infections and various other oral health problems. Despite theadvancesin dental techniques, procedures and

technology, preventive dentistry remains the foundation of oral health care. Daily plaque removal with a toothbrush is an important component of most oral hygiene programs intended to prevent and treat periodontal diseases.[6] Mechanical tooth cleaning even today remains the most reliable procedure for controlling supragingival bacterial plaque.[7] Failure to acknowledge the techniques, poor manual dexterity and inaccessibility of certain areas of the mouth has lessened the effectiveness of conventional tooth brushing.[8]Hence,research efforts have focused on chemotherapeutic agents for reducing or preventing plaque-induced oral diseases.

In the era of diminishing usage of chemicals and moving towards the use of natural products, it is preferable to use cross-pathy strategies for ease of more beneficial oral care with no or less severe side effects. Homoeopathy has the mother tinctureand Unani has several medicinal plants including*AqarQarha (Anacyclus pyrethrum DC.), Kaatsafed (Acacia catechu Willd.)* Aqaqia *(*Acacia arabica *Lam/Babool)* to maintain oral hygiene. In Ayurveda the anti-bacterial activity of Ayurvedic plants is due to the presence of potentially bioactive blends, which help to lessen the bacterial load in the oral cavity and thus prevent the formation of plaque, dental caries and ulcers. Oil pulling therapy or oil swishing is an ancient ayurvedic natural remedy procedure that involves pulling or swishing edible oil in the mouth for oral and systemic health benefits. In Ayurveda text 5 Charaka Samhita, it is mentioned as Kavala or Gandusha.

Oil pulling has been used as a traditionalIndian treatment to remove bacteria and other microorganisms and promote good oral health and prevent decay, bleeding gums, oral malodor, dryness of throat, cracked lips and for strengthening teeth, gums, and jaws.[9]Oil pulling technique involves taking an agreeable measure of eatable oil like sunflower, coconut or sesame oil and holding it in the mouth or gargling with it. At the point when the oil turns flimsy and smooth white, it is spit out. Oil pulling techniqueworks by cleaning the teeth and is ideally done on an empty stomach toward the onset of the day.[10]This technique is cost-effective, simple & effortless, completely harmless, also advantageous against commercial products: no staining, no lasting after-taste, no allergic responses and readily accessible in every household. This technique acts effectively through either one or several of the followingmechanisms:

I. Saponification and emulsification
II. Viscosity of the oil helps in cleaning
III.Antioxidant property
IV. Antiviral and antimicrobial properties
V. Mechanical pressure theory

Considering the paucity of available literature, this study was formulated to study the existing level of awareness and practice of oil pulling among dental professionals in India and to propose an understanding of integrated medical practice for better treatment outcomes.

MATERIAL AND METHOD

SUBJECT SELECTION

The study included 147 dental undergraduate and postgraduate students and professionals of different specialties. The study was approved by the Institutional Ethics Committee (Ref no GDCH/SS/EC/6706 dated 16/09/2019).Participants had to sign an informed consent and those not consenting to fill the survey and individuals opting out of the survey process were excluded from the study.

STUDY METHOD

A self-constructed validated questionnaire having a total of 10 open end and closed-end questions were prepared through Google form.The participants were strictly instructed not to refer to any text and formulate answers based on their inherent thinking capability and existing knowledge to avoid bias in answering.The questionnaire was propagated employing online social media platforms.

VALIDATION OF QUESTIONNAIRE

A pilot study with 20 respondents of similar demographic characteristics was conducted. A Cronbach's alpha value of 0.8 indicated that no further modifications were required in the questionnaire.

The sample size was determined using a single proportion formula

$$n = \frac{1.96^2\, p(1-p)}{d^2}$$

Where p = Estimate of the expected proportion, d = Desired level of absolute precision

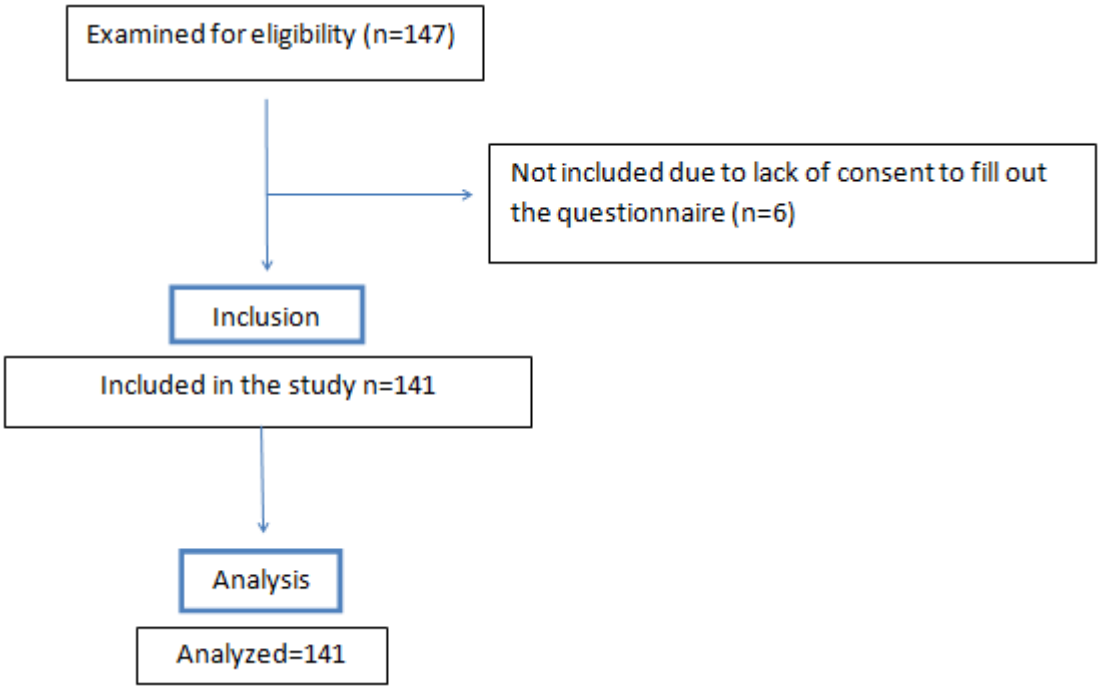
Assuming the current prevalence/event to be at least 10% and keeping 95% confidence limit, for p = 0.05

n = 78

Hence, a total of 78 respondents were necessary to complete the survey.

A final sample size of n=147 was achieved employing a deliberate sampling method.Data were recorded in the form of excel sheets.

STROBE'S FLOWCHART

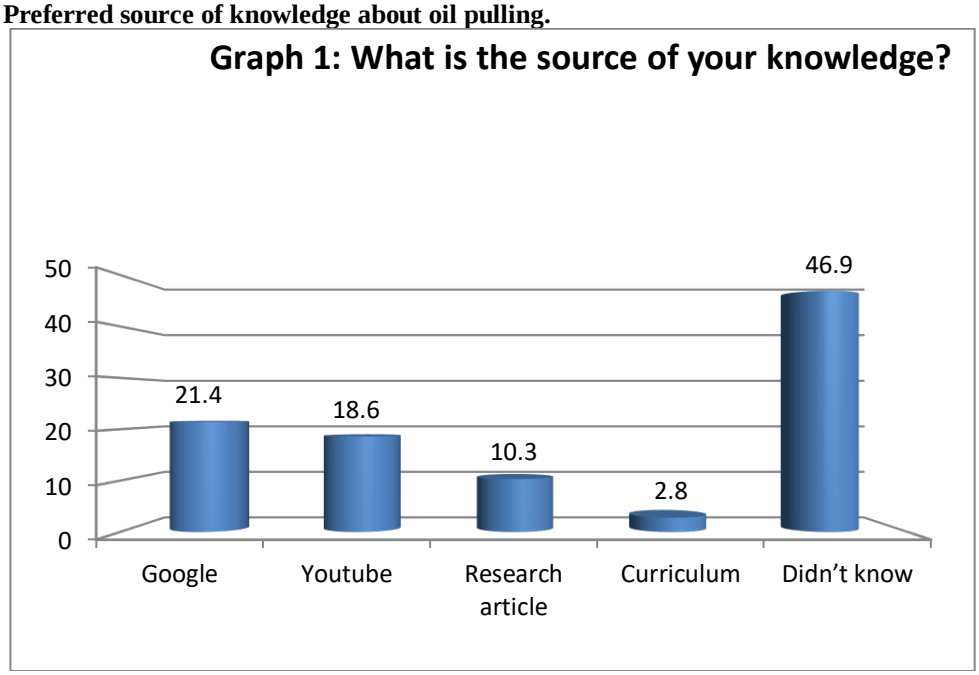


RESULT

The data obtained were statistically analyzed by using Statistical software IBM SPSS statistics 22.0 (IBM Corporation, Armonk, NY, USA). In the survey conducted among 141 participants, 87.5% of the people were undergraduates (BDS) students. Other respondents wereresidents in prosthodontics (7.6%), endodontics (2.8%), periodontics (1.4%) andoral and maxillofacial surgeons (0.7%).

About 53.1% of the people were aware of the word oil pulling and 46.9% of them didn't know about it. 21.4% of participants heard about oil pulling from google, 18.6% from youtube,10.3% from research articles and 2.8% from the curriculum. (Graph 1).

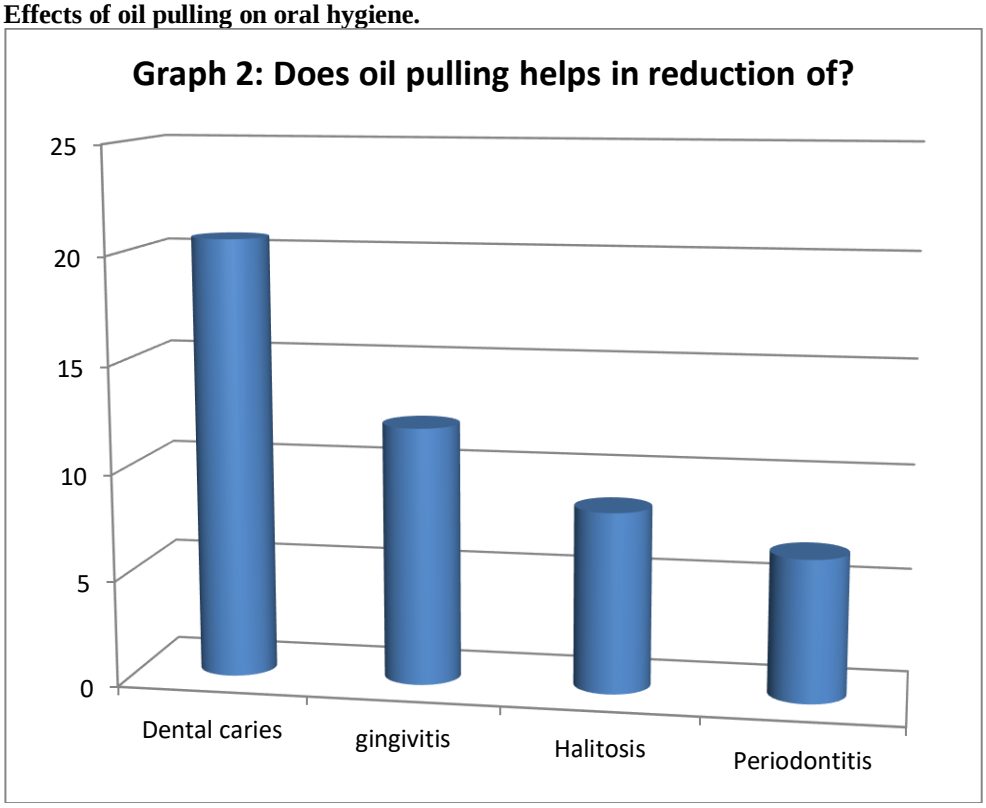
Graph 1: Preferred source of knowledge about oil pulling.



Among 88 responses of the participants, coconut and sesame oil was the most preferred oil for oil pulling. Out of them 12 prefer coconut oil (14%), 10 prefer sesame oil (11%) and 3 prefer sunflower oil (3.4%).Clove oil, olive oil, castor oil, almond oil, fenugreek oil were the other suggested oils.

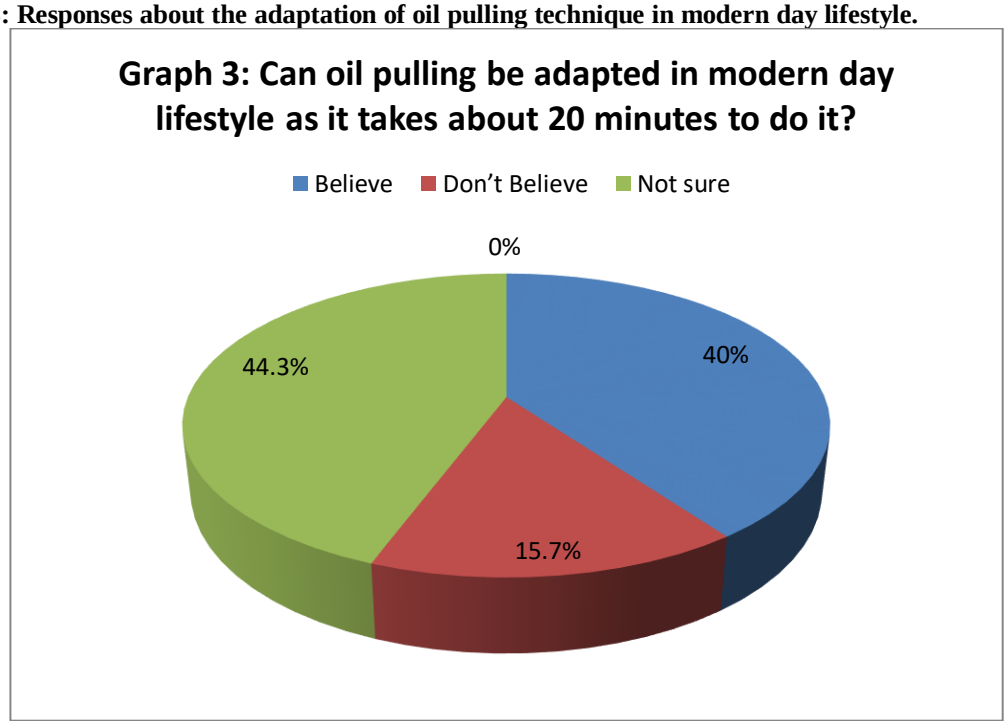
Among 141 participants 47.6% believed that oil pulling helps in the reduction of dental diseases like dental caries 20.6%, gingivitis 12.1%, halitosis 8.5%, periodontitis 6.4% (Graph 2) and the rest 52.4% of people were unaware of the benefits.

Graph 2: Effects of oil pulling on oral hygiene.



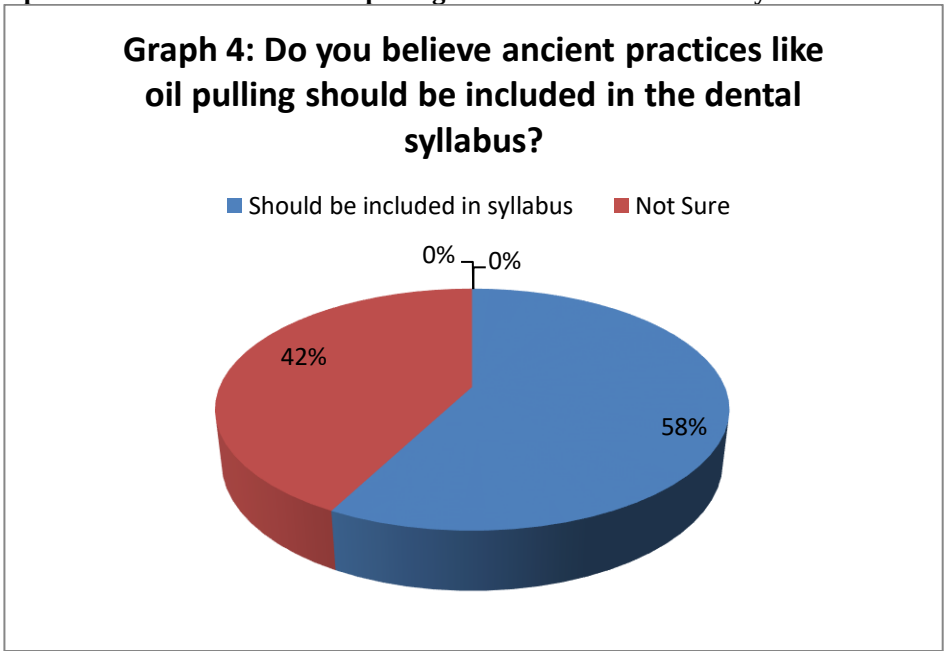
14.2% of the people inform their patients about the technique and 85.8% don't.35.9% believed that oil pulling could be used as a supplemental aid in daily oral hygiene regime. About40% of the people believed that oil pulling can be adapted tomodern-day lifestyle as it takes about 20 minutes to do it.(Graph 3)

Graph 3: Responses about the adaptation of oil pulling technique in modern day lifestyle.



Among 52 responses,30 participants (57.7%) believed that oil pulling should be included in the syllabus and the dentists must be made aware of it through the curriculum.(Graph 4)

Graph 4: Responses about that whether oil pulling should be included in the syllabus or not.



DISCUSSION

Despite several advancements, ancient techniques play a significant role in the field of health sciences. Oil pulling/swishing is an ancientIndian technique mentioned in Ayurvedic literature,which is well-recognized across South Asia.Oil pulling can essentially lessen plaque and gingival diseases through a decrease in microbial counts. Nonetheless, this method isn't widely discussed and known to public. It was noted in the present study that though more than half the respondents were aware of the term but many of them were uninformed with regards to the system and the further adequacy of the procedure.

Since coconut oil and sesame oil are the most common oils utilized in Indian families, these are the most generally employed ones for oil pulling.Pavithran and Krishna[11] compared the efficacy of coconut oil, sesame oil and saline on S. mutans count in a randomized controlled trial. All three were effective and coconut oil pulling was superior to saline washing with statistically significant difference.

Tim Griessel et al[12] examined the oral microbiome after oil pulling with standardized sunflower seed oil compared with saline pulling. The analysis revealed thatoil pulling is able to reduce the overall microbial burden of the oral cavity transiently. The authors found that oil pulling has the characteristic of an oral massage. It enwraps the epithelial cells carrying bacteria in oil vesicles and reaching all the areas in oral cavity. Hence, it can be considered as aneffective standard oral hygiene technique.They also recommended this technique for patients suffering from hyposalivation or xerostomia.

Oil pulling treatment has been as effective as chlorhexidine against plaque-induced gum disease. Chlorhexidine on long term use causes taste sensation and produces brown stains on the teeth which is hard to eliminate. The practice of oil pulling likely prevents bacterial bond and plaque accumulation in the oral cavity. The other possible mechanisms could be the saponification or the emulsification process that happens because of the soluble base hydrolysis of fat.[13]Flaxseed oil is a vegetable fat, which when acted upon by the salivary antacid, similar to the bicarbonates, starts the emulsification procedure. Emulsification is the cycle by which insoluble fats can be separated into small droplets and scattered in water. Emulsification extraordinarily increases the surface tensionof the oil correspondingly increasing its cleansing activity. Flaxseed oil also has comparative saponification mechanism as that of sesame oil and is rich in omega-3 unsaturated fats. Kesavalu L et al[14] led a review that defended omega-3 unsaturated fats as a valuable aid in the treatment of periodontal diseases.

In a randomized controlled trial, Alluru Deepika[15] comparedflaxseed oil pulling versus chlorhexidine against plaque-induced gingivitis. Plaque index and modified gingival index scores were recorded for the subjectsafter 30 days. The results revealed that there was a statistically significant reduction of the pre- and post-values of the plaque and modified gingival index scores in both, the study and control groups (P <0.001).

Asokan S and Emmadi P[16] studied the effect of oil pulling against plaque induced gingivitis in a randomized control triple blind study.The study group was subjected to oil pulling with sesame oil and the control group was given chlorhexidine mouthwash daily morning before brushing. Reassessment of the index scores and collection of plaque for measuring the colony count of the aerobic

microorganisms was done after 10 days. Oil pulling treatment was found to be similarly compelling as chlorhexidine against plaque-initiated gum disease. The authors also found several advantages of sesame oil compared to chlorhexidine such as no staining, no lingering after-taste,no allergy, easy availability and low cost; the only drawback being longer time duration required to perform oil pulling.

In another randomized controlled single blind, crossover trial in participants with medication-induced xerostomia, the oil pulling efficacy (sunflower oil) versus mineral water after one-week of use was investigated. Oil pulling helped in reduction of overall burden of medication induced xerostomia compared with mineral water. The participants doing oil pulling showed improved effect in terms of persistence of taste and moisturizing effects than water, and improved several subjective parameters such as overall effectiveness, pleasant feel in the mouth, easier swallowing and were less likely to wake up during the night. The authorsrecommended that oil pulling should be considered when advising patients on appropriate and economic methods for symptomatic relief of xerostomia.[17]

In the study by Roshni LNU et al, 60 participants were randomly divided into three groups with group I practicing oil pulling, Group II using Chlorhexidine mouthwash and Group III acting as control group with distilled water. Saliva samples were collected and cultured on 1st day and after 2 weeks from all subjects. Colonies were counted to compare the efficacy of coconut oil and Chlorhexidine with distilled water. The results showed significant reduction in *S. mutans* count in both the coconut oil pulling and Chlorhexidine group. The authors advocated oil pulling as a safe and effective alternative to Chlorhexidine and considered it as a preventive therapy at home to maintain oral hygiene.[18]

Kolhe and Patani[19]examined the effectiveness of oil pulling technique using sesame oil to maintain oral hygiene among patients undergoing orthodontic treatment. Twenty patients undergoing fixed orthodontic treatment were randomly selected and divided into two groups i.e., oil pulling group and the control or CHX group. Colony-forming unit counts of bacteria were assessed at baseline and after 14 days. Furthermore, patient acceptance from either group was evaluated using a questionnaire. The oil pulling therapy showed a significant reduction in total colony counts of aerobic microorganisms in the patients undergoing fixed orthodontic treatment. 60% of patients on oil pulling test group were willing to continue the regimen.

Nicholas C. Jones[20]compared the antimicrobial adequacy of fluoride mouth flush, natural mouth wash and oil pulling on the caries action and S. mutans counts and found that fluoride and herbal mouthwashes were similarly powerful in diminishing the caries action and showed a stamped decrease in S. mutans count. The author cited lack of adequate research regarding its effectiveness,but recommended that an understanding of the practice of oil pulling by the dental hygienist may lead to increased options for them to treat periodontal disease in their patients.

Another important finding of this study was the acceptance by 30 members out of 52 responses that oil pulling should be included in the syllabus and the dental specialist should be made aware about it through the curriculum so that more people are educated about its efficiency.

The authors advocate, additional long-term multicentric randomized controlled trials in a larger population using various chemical and traditional agents in future research.

CONCLUSION

It is suggested that oil pullingtechnique be promoted among dentists and the general population as an adjuvant to normal oral health regime. Our own ancient practices and beliefs are born out of our own native wisdom and should be included back in modern dentistry with evident proof regarding its effectiveness. Despite all the advancements in the field of health sciences, simple traditional healingprocedures can often produce comparable and evenbetter results combined with no or lesser side effects.

Hence, the dentists as well as their patients should be educated about such techniques. It is recommended to include them in the dental curriculum which can greatly influence and enhance the use of these antiquated but effective procedures for the overall health of population at large.

CONFLICT OF INTEREST

None

SOURCES OF RESEARCH FUNDING

None

ETHICAL APPROVAL

Ethical approval by Institutional Ethics Committee, Government Dental College and Hospital, Mumbai

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