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Oil pulling curriculum at universities, community colleges, private and proprietary schools throughout the United States

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Oil pulling curriculum at universities, community colleges, private and proprietary schools
throughout the United States

By

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B.S., Dental Hygiene, University of New Mexico, 2015

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

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ABSTRACT

Study Design: A cross-sectional study design was conducted by emailing a survey to dental hygiene program directors nationwide.

Objective: Evaluate the integration of oil pulling curriculum among associate, bachelor's, and masters programs.

Methods: A 10-question survey was delivered to dental hygiene program directors in the United States via an online survey tool, Survey Monkey.

Results: Oil pulling is taught in nine out of fifty-two schools that responded. Five of thirty-two associate programs are teaching oil pulling, three of fifteen bachelor's programs are teaching oil pulling, and one out of five master programs is teaching oil pulling, the sample size revealed a p-value of 0.8778).

Conclusions: The survey shows teaching of oil pulling didactically in associate programs was (16.6%), bachelor's (20%), and master programs (20%). More studies are needed as there was limited response to the survey and a comprehensive assessment on the extent in which oil pulling is taught in dental hygiene schools throughout the United States was unable to be significantly reached.

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Chapter 1

Introduction

More dental patients are seeking natural ways to stay healthy, including dental/oral health. Patients are seeking natural products that do not cause harmful or adverse side effects. For these reasons, it is important for the dental hygienists to be aware of current trends in daily oral hygiene regimens.

Statement of the Problem: Is the extent in which oil pulling is being taught at universities, community colleges, private and proprietary schools throughout the United States known?

Significance of the Problem: In recent years oil pulling has gained in popularity. Part of oil pulling popularity is based upon more people looking for natural ways to help treat their dental concerns and whiten their teeth. The problem with oil pulling is that there is a lack of research and is not yet fully accepted by the dental community. Based on the lack of currently available evidence, oil pulling is not recommended as a supplementary oral hygiene practice, and certainly not as a replacement for standard, time-tested oral health behaviors and modalities. The ADA recommends that patients follow a standard oral hygiene regimen that includes twice-daily tooth brushing with fluoride toothpaste and cleaning between teeth once a day with floss or another interdental cleaner, using ADA accepted products. Brushing with fluoride toothpaste and cleaning between teeth help prevent cavities and keep the periodontium healthy. Current reports on the potential health benefits of oil pulling have clear limitations. Existing studies are unreliable for a number of reasons, including the misinterpretation of results due to small sample size, confounders, absence of negative controls, lack of demographic information, and lack of blinding. To date, scientific studies

have not provided the necessary clinical evidence to demonstrate that oil pulling reduces the incidence of dental caries, whitens teeth or improves oral health and well-being.⁽¹⁾

Oil pulling has become so popular that you can find a great deal of YouTube videos claiming it has helped people with their oral health and has whitened their teeth. Oil pulling has even had its notoriety popularized in the news and even on news channels like Fox news. A fox news report on March 24, 2014 reported, according to Ayurveda expert Dr. Scott Gerson, *“It’s the practice known as “oil pulling,” and it has been gaining popularity in the United States over the last year or so. The ritual is simple: Just fill your mouth with coconut or sesame oil and swish it through your teeth and gums for five to 10 minutes each day. This odd habit is supposed to “pull” toxins out of your body and trap them in the oily solution. While this trend may seem rather unique, oil pulling has long established roots in Ayurveda – an alternative system of medicine native to India. Oil pulling was believed to help cure over 25 systemic diseases. It’s used to prevent tooth decay, to prevent halitosis, bleeding gums, dryness or hoarseness of the throat, while strengthening the teeth and gums. Oil pulling is believed to “pull out toxins circulating in the tissues lining the oral cavity”.* In 2009, one study found that people who practiced oil pulling for 10 days showed a reduction in dental plaque comparable to plaque reductions seen in people who used chlorhexidine mouthwash during the same time period. And in 2008, another study found that oil pulling effectively reduced mouth bacteria in the plaque and saliva samples of study participants.⁽²⁾

With all of the attention surrounding oil pulling and the use of essential oils for treating the oral cavity it may be relevant for the dental community to do the proper research regarding the benefits and safety of oil pulling and essential oils. Some of the recent concerns

of pulling with other essential oils are the safety of the oils and the use of pesticides on the plants that the oils are harvested from.

Operational Definitions -

Oil Pulling- the placement of oil in the oral cavity and swishing of the oil for a given point of time.

Ayurveda- or Ayurvedic medicine is a system of medicine with historical roots in the Indian subcontinent. Globalized and modernized practices derived from Ayurvedic traditions practiced outside South Asia are a type of alternative medicine.

Essential oils- An essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants. Essential oils are also known as volatile oils, ethereal oils, aetherolea, or simply as the oil of the plant from which they were extracted.

Halitosis- mouth odor.

Chapter 2

Review of Literature

Introduction

Oil pulling has been proven to be an effective method in reducing plaque formation and plaque induced gingivitis. This preliminary study shows that coconut oil is an easily usable, safe and cost effective agent with minimal side effects which can be used as an adjunct in oral hygiene maintenance. More studies on the antimicrobial potency of coconut oil on microorganisms causing oral diseases are required to authenticate the use of coconut oil as an effective oral antimicrobial agent. Further studies on coconut oil with a large number of subjects and comparative studies using various chemotherapeutic agents can improve the quality of evidence. ⁽³⁾ Oil pulling or oil swishing, in alternative medicine, is a procedure that involves swishing oil in the mouth for oral and systemic health benefits. Oil pulling has been used extensively as a traditional Indian folk remedy for many years to prevent decay, oral malodor, gingival bleeding, and dryness of throat, and cracked lips and for strengthening teeth, and periodontium. It is not a new concept and it has been mentioned in the Ayurvedic text Charaka Samhita where it is called Kavala Gandoosha/Kavala Graha. The concept of oil pulling was familiarized by Dr. F. Karach in the 1990s in Russia. It is claimed to cure about 30 systemic diseases ranging from headache, migraine to diabetes and asthma. For oil pulling therapy, a tablespoon (teaspoon for young children above 5 years of age) of sesame oil is taken in the mouth, sipped, sucked, and pulled between the teeth for 10 to 15 min. The viscous oil turns thin and milky white. The oil should not be swallowed as it is said to contain bacteria and toxins. Oil pulling therapy should be followed by tooth brushing and is preferably done on empty stomach in the morning. ^(4,5)

Oil pulling or oil swishing therapy is a traditional procedure in which the practitioners rinse or swish oil in their mouth. It is purported to cure oral and systemic diseases but the evidence is lacking. Oil pulling with sesame oil and sunflower oil was found to reduce plaque related gingivitis.

Chemical Properties of Virgin Coconut Oil

A study on the commercial virgin coconut oil (VCO) available in the Malaysian and Indonesian market was conducted. The paper reported the chemical characteristics and fatty acid composition of VCO. There was no significant difference in lauric acid content (46.64-48.03%) among VCO samples. The major triacylglycerols obtained for the oils were LaLaLa, LaLaM, CLaLa, LaMM and CCLa (La, lauric; C, capric; M, myristic). Iodine value ranged from 4.47 to 8.55, indicative of only few unsaturated bond presence. Saponification value ranged from 250.07 to 260.67 mg KOH/g oil. The low peroxide value (0.21-0.57 mequiv oxygen/kg) signified its high oxidative stability, while anisidine value ranged from 0.16 to 0.19. Free fatty acid content of 0.15-0.25 was fairly low, showing that VCO samples were of good quality. All chemical compositions were within the limit of Codex standard for edible coconut oil. Total phenolic contents of VCO samples (7.78-29.18 mg GAE/100 g oil) were significantly higher than refined, bleached and deodorized (RBD) coconut oil (6.14 mg GAE/100 g oil). These results suggest that VCO is as good as RBD coconut oil in chemical properties with the added benefit of being higher in phenolic content. Coconut oil is easily available edible oil. It is unique because it contains predominantly medium chain fatty acids of which 45-50 percent is lauric acid. Lauric acid has proven inflammatory and anti-antimicrobial effects. ^(3,6)

Side Effects of Oil Pulling

Some side-effects of oil pulling are rare but have been reported. Exogenous lipoid pneumonia is a rare disease caused by aspiration or inhalation of oily substances. Lipoid pneumonia is an uncommon non-infectious inflammatory lung disease that is caused by the presence of lipids in the alveoli. It is classified into two major groups, depending on whether the lipid/oil in the respiratory tract is from an exogenous or endogenous/idiopathic source. Pathologically, lipoid pneumonia is a chronic foreign body reaction to fat. It is characterized by lipid-laden macrophages. Although there have been reports on exogenous lipoid pneumonia caused by various types of lipids and oils, to the best of our knowledge, only one report has indicated that oil pulling (specifically sesame oil pulling), was a cause of lipoid pneumonia. We herein report two uncommon cases of lipoid pneumonia that occurred due to repeated sesame oil pulling. ⁽⁷⁾

ADA Policy on Unconventional Dentistry

As emphasized in the ADA policy statement on unconventional dentistry, the provision of dental care should be based on sound scientific principles and demonstrated clinical safety and effectiveness. Based on the lack of currently available evidence, oil pulling is not recommended as a supplementary oral hygiene practice, and certainly not as a replacement for standard, time-tested oral health behaviors and modalities.

The ADA recommends that patients follow a standard oral hygiene regimen that includes twice-daily toothbrushing with fluoride toothpaste and cleaning between teeth once a day with floss or other interdental cleaner, using ADA-Accepted products. Brushing with fluoride toothpaste and cleaning between teeth help prevent cavities and keep gums healthy.

(8)

Specific Oral Bacteria

Streptococcus mutans are gram-positive cocci shaped bacteria. These facultative anaerobes are commonly found in the human oral cavity, and are a major contributor of tooth decay. The result of decay can greatly affect the overall health of the individual. *Streptococcus mutans* is a cariogenic microorganism that breaks down sugar for energy and produces an acidic environment, which demineralizes the superficial structure of the tooth. The result of the conversion disintegrates the coating of the tooth then later dissolves the calcium molecule creating a hole. Transmission of *S. mutans* can be found in people of all ages although it is more common for infants and children. The transfer of genotypes is responsible for the transmission of *S. mutans* from mothers to their children although, there is a genotypic variation from one population to the next. Someone with a healthy oral flora will roughly contain 10,000 CFU per ml of *Streptococcus mutans* in their mouth. *Streptococcus mutans* possesses three virulence factors: water insoluble glycans, acid tolerance, and production of lactic acid.

A toothache is the most common symptom of tooth decay. An infection or irritation of the tooth pulp usually causes the pain. If diagnosed with tooth decay, there are many treatment options such as: fillings, crowns and root canals. Since every human has bacteria in their mouth, the only prevention is to lessen the impact of acid fermentation by practicing adequate oral hygiene. ⁽⁸⁾ Several researchers have evaluated and pinpointed the specific oral bacteria, such as *Streptococcus mutans*, *Streptococcus sobrinus*, *Streptococcus sanguinus*, *Lactobacillus acidophilus*, *Lactobacillus casei*, *Actinomyces naeslundii* genospecies 1 and 2, *Aggregatibacter actinomycetemcomitans* (previously *Actinobacillus actinomycetemcomitans*), *Porphyromonas gingivalis*, *Treponema denticola*, *Tannerella forsythia* (previously

Tannerella forsythensis), *Prevotella intermedia*, *Campylobacter rectus*, and *Fusobacterium nucleatum* in subgingival. ⁽¹⁰⁾

Antimicrobials

Oil pulling benefits has been compared and studied in conjunction with a prescription strength antimicrobial called Chlorhexidine gluconate. In a study cited by S Asokan, the Chlorhexidine group showed a greater statistically significant reduction of *S. mutans* count in plaque and saliva at different time periods than the oil pulling group. However, sesame oil has certain advantages over Chlorhexidine gluconate: it does not stain, it has no lingering aftertaste, and causes no allergy. Sesame oil is 5-6 times more cost-effective than chlorhexidine gluconate and is, moreover, readily available in the household.

There are no disadvantages in oil pulling therapy except for the extended duration of the procedure compared with chlorhexidine. Though oil pulling therapy cannot be recommended for use as a treatment adjunct as of now, it can be used as a preventive home therapy to maintain oral hygiene. ⁽¹¹⁾

Another study done in 2009 reported subjects completed oil pulling with sesame oil and the control group chlorhexidine gluconate mouthwash. Axelsson and Lindhe have shown that chlorhexidine mouthwash is effective in the reduction of plaque and gingivitis ⁽¹²⁾, daily 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. The results revealed 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 ($P < 0.001$ in both). There was a considerable reduction in the total colony count of aerobic microorganisms present in both the groups. The conclusion of the study was that both therapies showed a reduction in the

plaque index, modified gingival scores, and total colony count of aerobic microorganisms in the plaque of adolescents with plaque-induced gingivitis. (13)

Halitosis

Oil pulling therapy has been equally effective like Chlorhexidine on halitosis and organisms associated with halitosis. The terms halitosis, breath malodor, or bad breath are used to denote unpleasant breath odor. These terms are not synonymous with oral malodor, which has its origin only from the oral cavity. Halitosis should not be confused with odor associated with food intake, smoking, or morning breath on awakening. Nearly 85% of the cases of halitosis have the cause originating from the oral cavity. Gingivitis, periodontitis, and tongue coating are the predominant causative factors. Extra oral causes include ear-nose-throat pathology, systemic diseases like diabetes, metabolic, hormonal, renal, or hepatic disturbances, bronchial carcinoma, or gastroenterologic pathology.

There is no scientific proof to accept oil pulling therapy as a treatment adjunct to cure halitosis. Online searches in PubMed and other databases show only testimonies and literature on personal experiences. Pilot studies conducted by Asokan *et al* have shown that the oil pulling therapy with sesame oil has been equally effective in reduction of *S. mutans* count, plaque index, and modified gingival index scores as compared to chlorhexidine mouthwash.(4)

Antimicrobial Properties of Coconut Oil

The emergence of antimicrobial resistance, coupled with the availability of fewer antifungal agents with fungicidal actions, prompted this present study to characterize *Candida* species in the oral environment and determine the effectiveness of virgin coconut oil as an antifungal agent on these species. In 2004, 52 recent isolates of *Candida* species were

obtained from clinical specimens sent to the Medical Microbiology Laboratory, University College Hospital, Ibadan, Nigeria. Their susceptibilities to virgin coconut oil and fluconazole were studied by using the agar-well diffusion technique. *Candida albicans* was the most common isolate from clinical specimens (17); others were *Candida glabrata* (9), *Candida tropicalis* (7), *Candida parapsilosis* (7), *Candida stellatoidea* (6), and *Candida krusei* (6). *C. albicans* had the highest susceptibility to coconut oil (100%), with a minimum inhibitory concentration (MIC) of 25% (1:4 dilution), while fluconazole had 100% susceptibility at an MIC of 64 microg/mL (1:2 dilution). *C. krusei* showed the highest resistance to coconut oil with an MIC of 100% (undiluted), while fluconazole had an MIC of >128 microg/mL. It is noteworthy that coconut oil was active against species of *Candida* at 100% concentration compared to fluconazole. Coconut oil should be used in the treatment of fungal infections in view of emerging drug-resistant *Candida* species. ⁽¹⁴⁾

Contraindications of Research Results

Not all the research done on oil pulling suggests that pulling is better or even comparable to Chlorhexidine. On comparison of the antimicrobial efficacy of fluoride mouth rinse, herbal mouth rinse and oil pulling on the caries activity and *S. mutans* counts, fluoride and herbal mouth rinses were equally effective in reducing the caries activity and showed a marked reduction in *S. mutans* count. However, oil pulling did not show promising results as an effective antimicrobial agent in reducing bacterial colonization. The study showed inconclusive evidence of oil pulling versus chlorhexidine, both having the same results as an effective antimicrobial agent in reducing bacterial colonization. Further studies must be conducted using a larger sample size and long-term follow-up to evaluate and compare the

antimicrobial activity of oil pulling, herbal and fluoride mouth rinses on the caries activity and *S. mutans* counts in the saliva of children, using Oratest and Dentocult SM kit. ⁽¹⁵⁾

Teeth Whitening with Coconut Oil

One of the more popular claims to oil pulling is that it will whiten teeth over a period of time. Research is lacking to back up the efficacy of whitening teeth by oil pulling and it based on ancient Indian folklore, rather than being a method promoted by people who have training and qualifications in medicine and dentistry ⁽¹⁶⁾. Dr. Blake-Gumbs of Cleveland clinic says “Oil-pulling is not going to whiten your teeth, clear your sinuses or cure your diabetes, despite what proponents say. There is no research to corroborate all of these other health claims.” ⁽¹⁷⁾ There will need to be a great deal of research done regarding this claim.

Chapter 3

Methods and Materials

Study Approval:

This study was approved by the Human Research Review Committee via the University of New Mexico's Human Research Protection's Office on March 14, 2017. (HRRC #17-103). (See Appendix A).

Hypothesis:

Oil pulling has a greater prevalence of being taught in higher degree (bachelors and master) offering dental hygiene schools.

The Survey and Subjects:

This research focused on studying the practices of oil pulling and the uses of essential oils for treatment of the oral health. Previous studies have shown the effects of oil pulling and the use of essential oils but have been met with controversy and have not yet been accepted by the field of dentistry. This study will attempt to evaluate the teaching of oil pulling among the major dental hygiene programs among the United States

The research sample included dental hygiene program directors from universities, community colleges, private and proprietary schools throughout the United States.

The research design used a survey to assess the extent in which oil pulling is taught in dental hygiene schools. The survey was conducted using an online survey program, Survey Monkey, and asking a series of questions was emailed to the head directors of dental hygiene programs around the United States.

The survey asked a series of questions such as (but not limited to); is oil pulling being taught at their school, how is it being taught and what is the schools standing on oil pulling.

The data collected will be analyzed to show the variances among dental hygiene programs with different degree levels at universities, community colleges, private and proprietary schools throughout the United States and with different degree levels.

Chapter 4

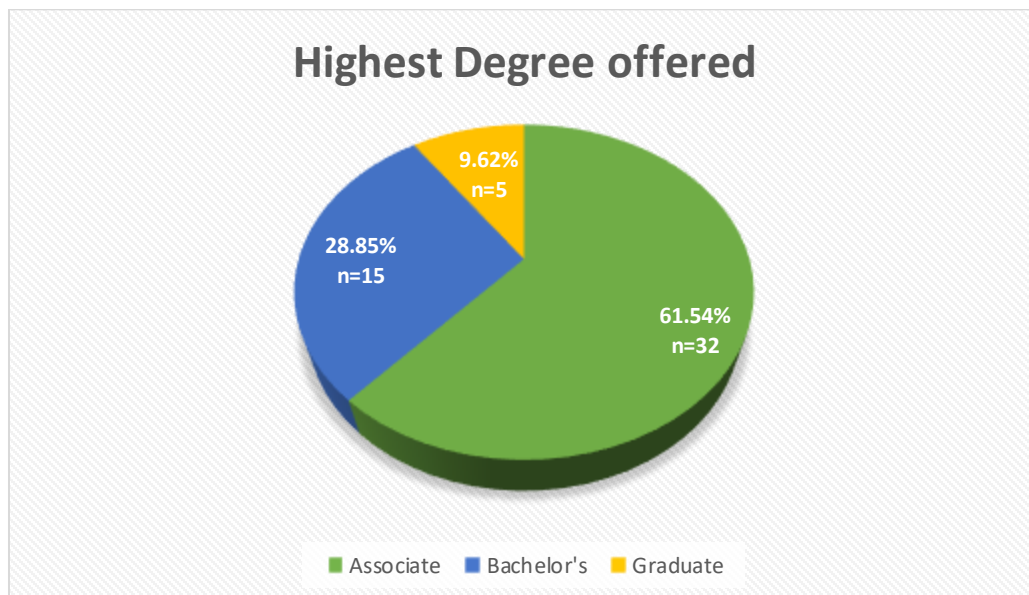
Results, Discussion, and Conclusion

Results:

Three hundred fourteen surveys were emailed and there were 52 responses, yielding a response rate of 17%. Descriptive statistics were summarized using the online tool, Survey Monkey. Chi square test were performed to determine statistical significance. Alpha value of .05 was utilized. (Appendix C). Although there is only a representation from a small sample size, the survey shows that some dental hygiene programs are teaching oil pulling. However, the majority of hygiene programs are not teaching oil pulling.

Question one asked dental hygiene program directors “what is the highest degree offered in your program?” Figure 1 shows of the 52 responses, 32 or 61.54% declared to be an associate program, 15 or 28.85% declared to be a bachelor’s program and 5 or 9.62% declared to be a graduate program.

Figure 1: Question One: Highest Degree Offered



Question 3 of the survey asked participants to respond using a scale to the statement: Oil pulling is being taught in your classes didactically. Figure 2 displays the responses received by the associate program directors. Two programs out of thirty (6.6%) said that they were neutral. Five programs out of thirty (16.6%) of the associate programs who responded are teaching oil pulling didactically in their classes. Twenty-three programs (76.6%) either disagreed or strongly disagreed with the statement indicating they are not teaching this topic.

Figure 2: Associate program directors responses to statement: Oil pulling is being taught in your classes didactically.

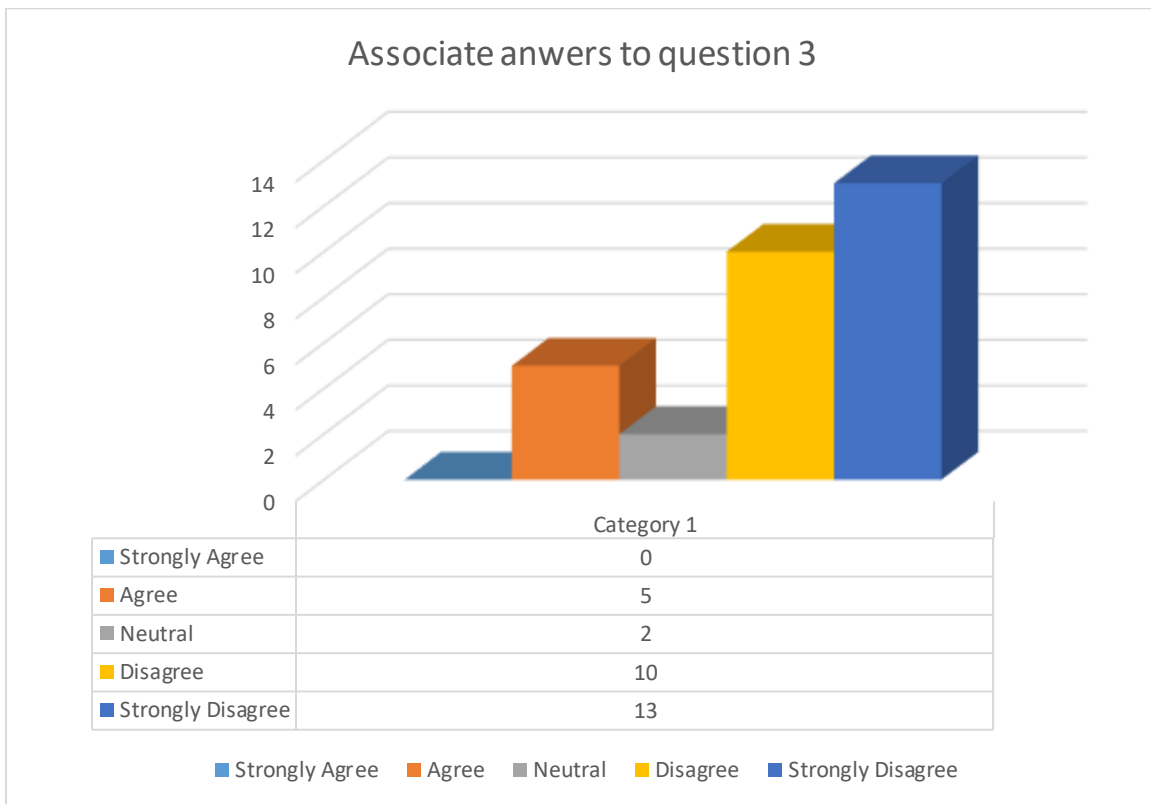


Figure 3 displays the responses received by the bachelor's program directors. The chart reveals that 3 (20%) bachelor's programs are teaching oil pulling, 9 (60%) programs are not, and 3 (20%) programs said that they were neutral.

Figure 3: Bachelor program directors responses to statement: Oil pulling is being taught in your classes didactically.

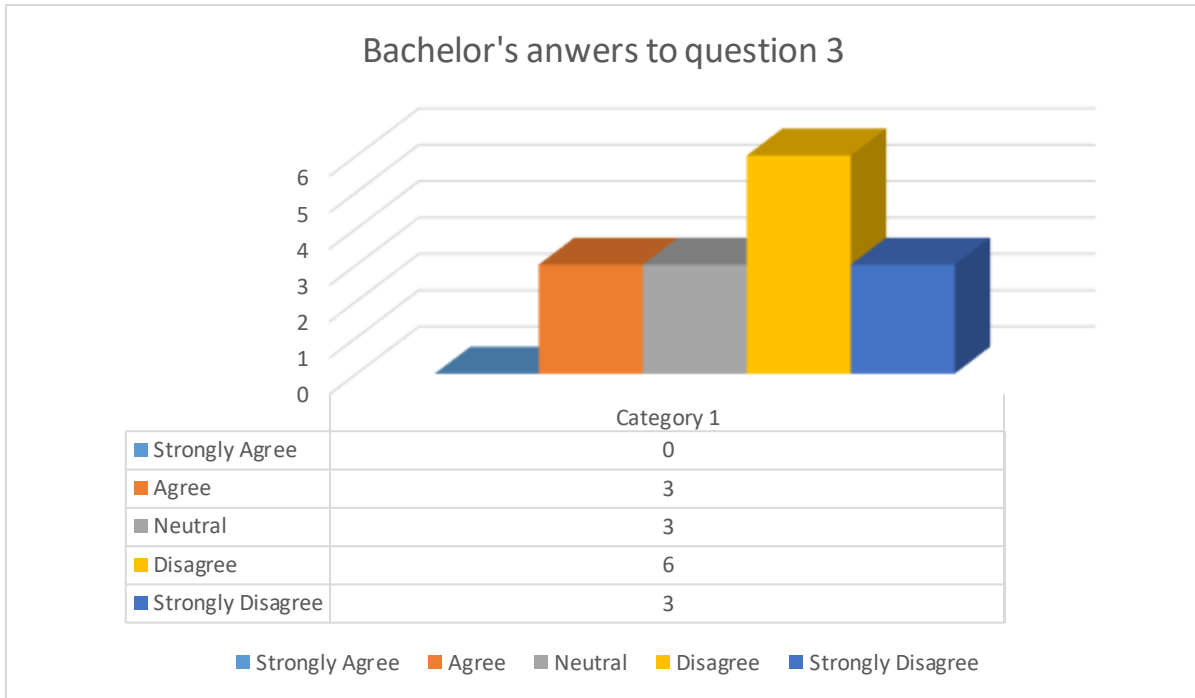


Figure 4 displays the responses received by the master program directors. The chart reveals that 1 (20%) master program is teaching oil pulling didactically in their classes. Three programs (60%) are not. One program remained neutral.

Figure 4 Master’s program directors responses to statement: Oil pulling is being taught in your classes didactically.

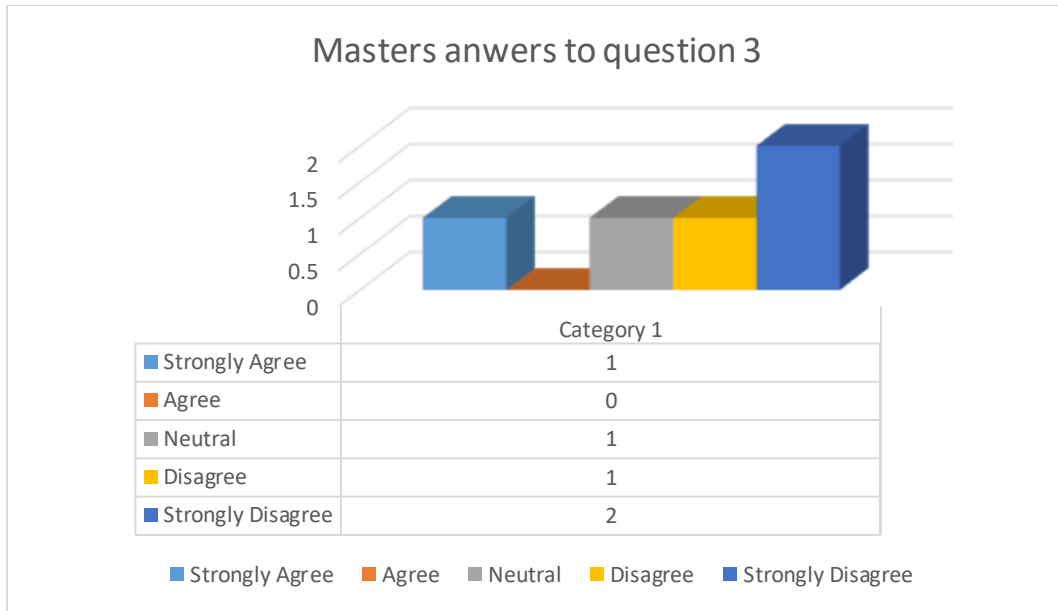


Figure 5 represents responses (n=52) to questions 4, 5 and 7 of the survey. Question 4 revealed that 49 (94.2%) disagreed or strongly disagreed that oil pulling is being taught in their clinics. Question 5 revealed thirty-three (63.5%) disagreed or strongly disagreed that oil pulling is supported by the faculty. Question 7 revealed 47 (90.3%) disagreed or strongly disagreed to having students recommend oil pulling to patients in the clinic.

Figure 5: Answers to questions 4, 5, and 7 of the survey.

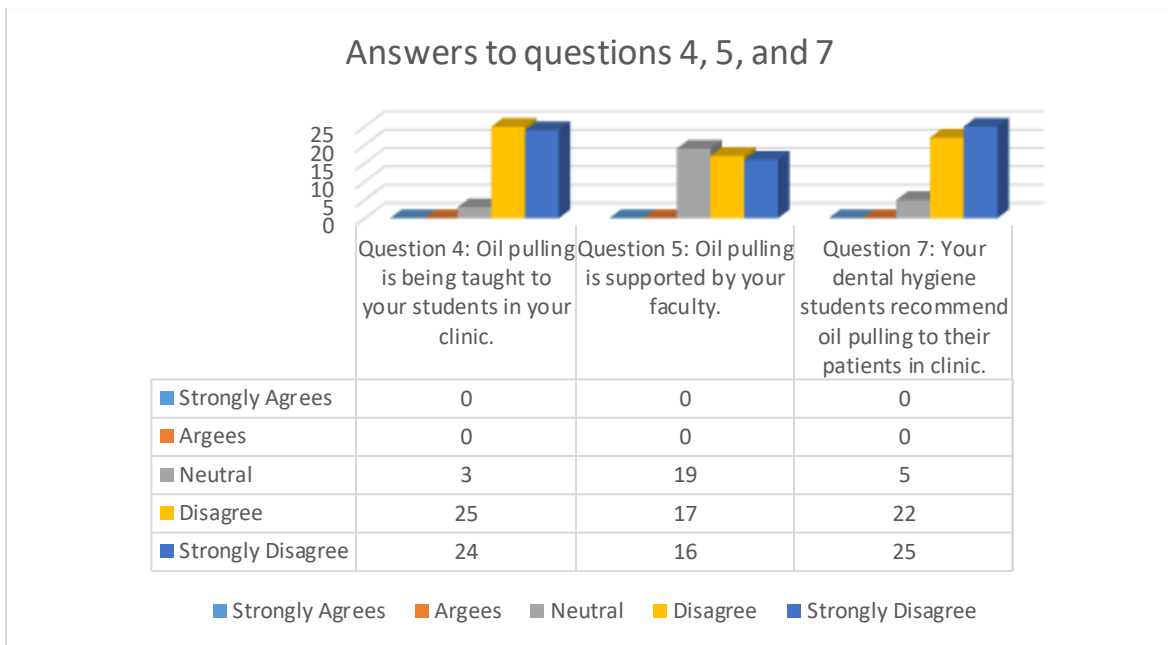
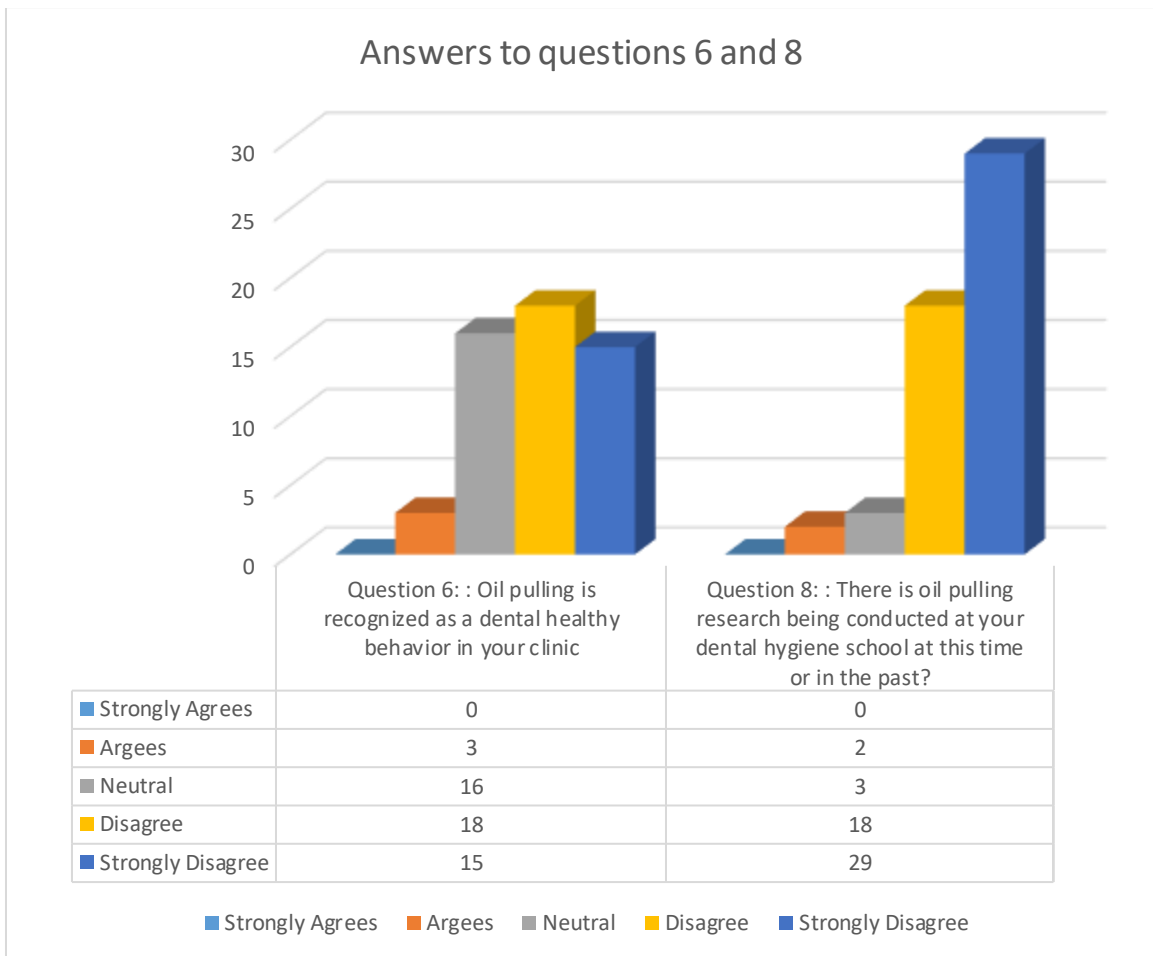


Figure 6 shows answers to question 6 (Oil pulling is recognized as a dental healthy behavior in your clinic) and that question 8 (There is oil pulling research being conducted at your dental hygiene school at this time or in the past). A small margin of agrees were prevalent within only bachelor's and master programs answers, and was found to have a p-values of 0.0172 for question 6 and a p-value of 0.0482 for question 8.

Figure 6: Answers to questions 6 and 8 of the survey



The chi square test p-value was 0.8778. indicating weak evidence against the null hypothesis. When the bachelor's and master's are grouped into one category verses the associates the p-value = 0.9694. The percentage of oil pulling being taught by associate programs was 16.6%, bachelors 20% and masters 20%. The survey reveals a mean of $(16.6\% + 20\% + 20\% / 3) = 18.8\%$ with a 3.4% increases of oil pulling being taught by bachelors and master programs verses associate programs.

Table 1. p-values

Programs	Questions	P-value:
Associate vs. Bachelor's vs. Masters	Oil pulling is being taught in your classes didactically	0.8778
Associate vs. the combining of Bachelor's and Masters	Oil pulling is being taught in your classes didactically	0.9694
Bachelor's and Masters	Oil pulling is recognized as a dental healthy behavior in your clinic	0.0172
Bachelor's and Masters	There is oil pulling research being conducted at your dental hygiene school at this time or in the past?	0.0482

Although results of this study were limited, there is evidence of this statement within the survey. Questions 9 and 10 asked, "have you tried oil pulling yourself, if so how do you feel about it? Leave any comments that you think may be important". These questions allow us some insight regarding the acceptance and feelings that are expressed among the directors of dental hygiene programs across the United States. Some examples to this statement are:

- “We do not teach it, but I do mention it in my theory course. It seems to be a culturally-based habit”.
- “It is BRIEFLY discussed in lecture and a table clinic has been done on it”.
- “This is one of the topics used for evidence based decision making assignments”.
- “A student from last year's class did an extensive literature review on it and shared it in a class presentation. The concept is known”.
- “Need to publish evidenced based research in juried scientific journals”.

Not all the statements recorded in the survey display acceptance towards the practice of oil pulling, some examples of this statement are:

- “As an ethical and scientifically-based healthcare profession, we have an ethical and professional responsibility to place only content into the curriculum that is supported by solid scientific evidence.”Based on the lack of currently available evidence, oil pulling is not recommended as a supplementary oral hygiene practice, and certainly not as a replacement for standard, time-tested oral health behaviors and modalities. (ADA)”.
- “Do not think this is an evidence based technique, a holistic approach with little substantiated research to support”.
- “Most protocols that I've seen suggest 20 minutes for the oil pulling. If they won't brush for 5 minutes, how do we get them to rinse with coconut sludge for 20?”

Limitations

Despite the numerous amounts of research and data obtained nationally, currently data is scarce regarding the teaching of oil pulling. There was limited response to the survey and a comprehensive assessment on the extent in which oil pulling is taught in dental hygiene schools at universities, community colleges, private and proprietary schools throughout the United States was unable to be significantly reached. The survey was only open for a week, perhaps a greater number of surveys responses and longer period for the directors to take the survey may have helped the statistical significance of the research. Essentially there was only a marginal amount of responses received; a small sample size may mask a quantifiable and meaningful result as disreputable. For this study, it was assumed that all participants are over the age of eighteen, currently serve as a Director of a dental hygiene programs and that all provided responses were accurate.

Discussion

In recent years, oil pulling has gained popularity; therefore, it is important for the dental hygiene student to be educated on the practice of oil pulling. The dental hygienist should have knowledge regarding the practice of oil pulling for evidenced based decision making and to correctly answer patient's questions regarding the matter of oil pulling. Oil pulling should be incorporated in the curriculum so hygienist can be better informed of new cultural trends. One of the directors that completed the survey stated, "I had to look up what "oil pulling" is". The integration of teaching oil pulling should be added didactically to prevent a lack of knowledge that can adversely affect clinical judgments when trying to achieve greater patient outcomes. It was not auspicious to see that the general trend was that

oil pulling is not being taught in all dental hygiene schools and that the concept is even completely unknown by some hygiene schools.

Concerning the cultural changes and the adaptation of the internet, the future and education of dental hygiene must be willing to adapt and change to reflect the understanding and ideas of holistic dental care such as the use of oil pulling. As the population and integration of world culture continue to grow within the United States, there is an obvious change in the diversity of patients being seen by hygienist in private, corporate, and public health care offices. The education of dental hygienist must have a strong ethical back ground in cultural competency.

The survey shows, although results of this study were limited, that there may be a slight increase of the acceptance in the teaching of oil pulling in university's that have higher degree completion such as bachelors and graduate programs versus associate programs. Although we failed to reject the null hypothesis due to the number of survey responses, we see a 3.4% increase from the acceptance of teaching oil pulling in higher degree completion programs based on the data received form the survey.

Recommendations

After reviewing the data from the survey, we can see that not all directors are leaning towards the acceptance of oil pulling being taught in hygiene programs This conflicting data for the survey brings up an interesting question regarding the geographical acceptance factor of location and state. Would there be a noticeable trend regarding the state? This is certainly a missing factor in the research and opens the proverbial door to more research needing to be done regarding the acceptance and cultural application of teaching oil pulling didactically throughout the United States.

Conclusion:

This study demonstrates that some dental hygiene programs are teaching oil pulling, however the majority are not. Although the study revealed some insight, more studies are needed as there was limited response to the survey and a comprehensive assessment on the extent in which oil pulling is taught in dental hygiene schools at universities, community colleges, private and proprietary schools throughout the United States was unable to be significantly reached. Additional research is needed in areas including: geographical locations, modalities, holistic and cultural competencies.

Chapter 5

Article for Submission International Journal of Dental Hygiene

Oil Pulling Curriculum in American Dental Hygiene Programs

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Key Words

Oil pulling, Essential oils, Periodontal Disease, directors, Prevalence, cross sectional Studies, Pilot Projects, Survey, holistic, and cultural competencies.

ABSTRACT

Study Design: Cross sectional studies of the benefits of essential oils and holistic dental care being taught at universities, community colleges, private and proprietary schools throughout the United States.

Objective: Evaluate the prevalence of the teaching of oil pulling among associate, bachelor's, and masters programs.

Methods: Directors of community colleges, private and proprietary schools throughout the United States, completing a 10-question survey with validated questions for the teaching of oil pulling.

Results: The teaching of oil pulling was present in 9/52 (5/30 associate programs are teaching oil pulling, 3/15 bachelor's programs are teaching oil pulling, and 1/5 master programs is teaching oil pulling, the sample size revealed a P-value of 0.8778).

Conclusions: The survey gathered the trend in the teaching of oil pulling as, associate (16.6%), bachelor's (20%), and master programs (20%). More studies are needed as there was limited response to the survey and a comprehensive assessment on the extent in which oil pulling is taught in dental hygiene schools at universities, community colleges, private and proprietary schools throughout the United States was unable to be statistically significant.

Clinical Relevance

Although oil pulling is popular in the United States, particularly with social media, there is a lack of research that oil pulling is effective and safe. For this reason, oil pulling is not yet fully accepted by the dental community.

Principle finding; This study revealed that the teaching of oil pulling in associate programs was 16.6%, bachelor's programs 20%, and masters 20%. No statistical significance was determined regarding the teaching of oil pulling at the associate level versus bachelor's and master's level programs.

Practical implications; A understanding of the practice of oil pulling by the dental hygienist may lead to increase options for their patients looking for natural way to treat periodontal disease.

Introduction

Based on the lack of currently available evidence, oil pulling is not recommended as a supplementary oral hygiene practice, and certainly not as a replacement for standard, time-tested oral health behaviors and modalities. The ADA recommends that patients follow a standard oral hygiene regimen that includes twice-daily tooth brushing with fluoride toothpaste and cleaning between teeth once a day with floss or another interdental cleaner, using ADA-Accepted products⁽⁸⁾. Current reports on the potential health benefits of oil pulling have clear limitations. Existing studies are unreliable for several reasons, including the misinterpretation of results due to small sample size, confounders, absence of negative controls, lack of demographic information, and lack of blinding. To date, scientific studies have not provided the necessary clinical evidence to demonstrate that oil pulling reduces the incidence of dental caries, whitens teeth or improves oral health and well-being ⁽¹⁾.

With all the attention surrounding oil pulling and the use of essential oils for treating the oral cavity it is relevant for the dental community to do the proper research regarding the benefits and safety of oil pulling and essential oils.

Study Population and Methodology

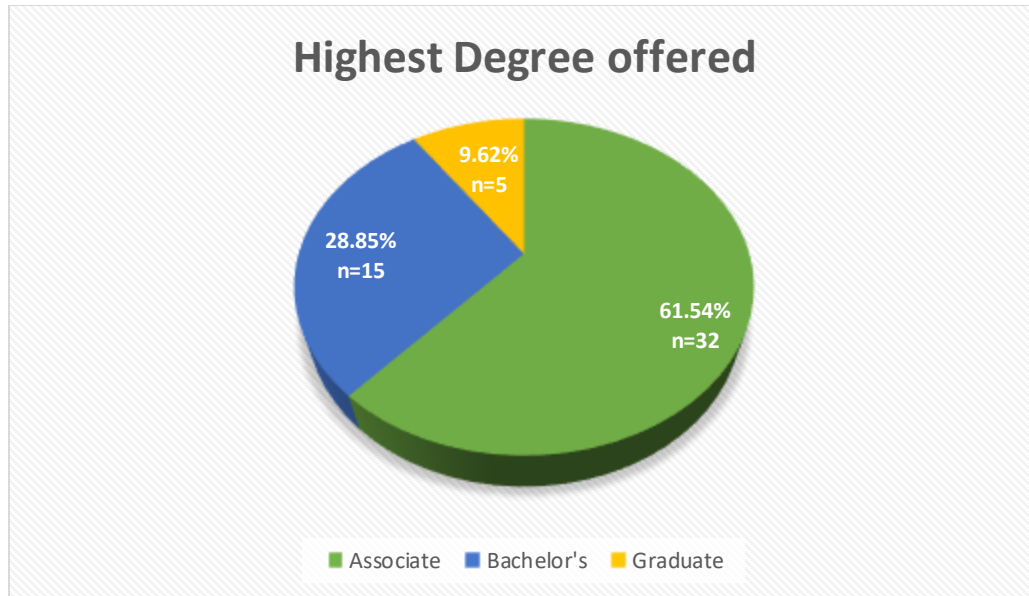
The data was analyzed using the online SurveyMonkey web site and chi square test with P-values to test the null hypothesis. The survey was sent out to the directors of dental hygiene programs within the United States. The list was attained through the American Dental Hygienists' Association (ADHA) website. Although there is only a representation from a small sample size, the survey generated 50 responses out of 314 survey requests (61.54% associate, 28.85% bachelor's, 9.62% graduate). The results of the survey were calculated by SurveyMonkey.com giving us the mean and percentages. The data collected were then charted in a chi square test to generating the statistical significance of the P-value. The statistical significance of Alpha value of .05 was used for P-value.(Appendix C) Study approval was received from the University of New Mexico Institutional Review Board, Human Resource Protections Office.

Results

Three hundred fourteen surveys were emailed and there were fifty-two responses, yielding a response rate of 17%. Although sample size is small, the survey revealed that some dental hygiene programs are teaching oil pulling, However, the majority of dental hygiene programs are not teaching oil pulling.

Question one asked dental hygiene program directors “what is the highest degree offered in your program?” Figure 1 shows of the 52 responses, 32 or 61.54% declared to be an associate program, 15 or 28.85% declared to be a bachelor’s program and 5 or 9.62% declared to be a graduate program.

Figure 1: Question One: Highest Degree Offered



Question 3 of the survey asked participants to respond using a scale to the statement: Oil pulling is being taught in your classes didactically. Figure 2 displays the responses received by the associate program directors. Two programs out of thirty (6.6%) said that they were neutral. Five programs out of thirty (16.6%) of the associate programs who responded are teaching oil pulling didactically in their classes. Twenty-three programs (76.6%) either disagreed or strongly disagreed with the statement indicating they are not teaching this topic.

Figure 2: Associate program directors responses to statement: Oil pulling is being taught in your classes didactically.

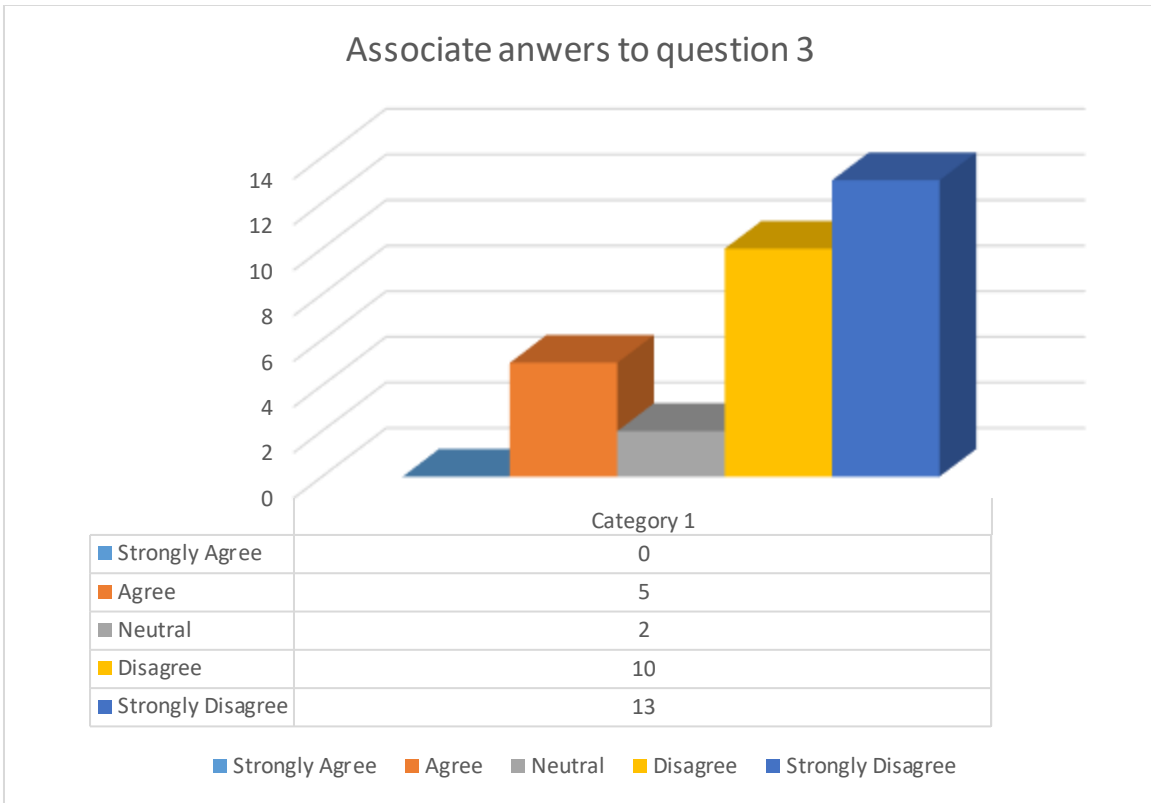


Figure 3 displays the responses received by the bachelor's program directors. The chart reveals that 3 (20%) bachelor's programs are teaching oil pulling, 9 (60%) programs are not and 3 (20%) programs said that they were neutral.

Figure 3: Bachelor program directors responses to statement: Oil pulling is being taught in your classes didactically.

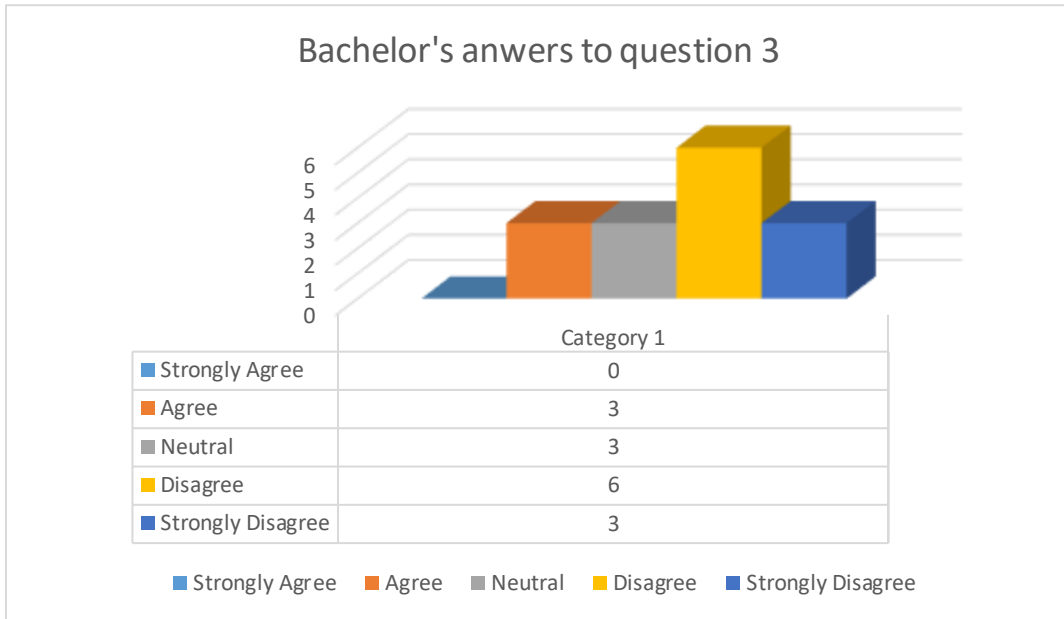


Figure 4 displays the responses received by the master program directors. The chart reveals that 1 (20%) master program is teaching oil pulling didactically in their classes. Three programs (60%) are not. One program remained neutral.

Figure 4 Master’s program directors responses to statement: Oil pulling is being taught in your classes didactically.

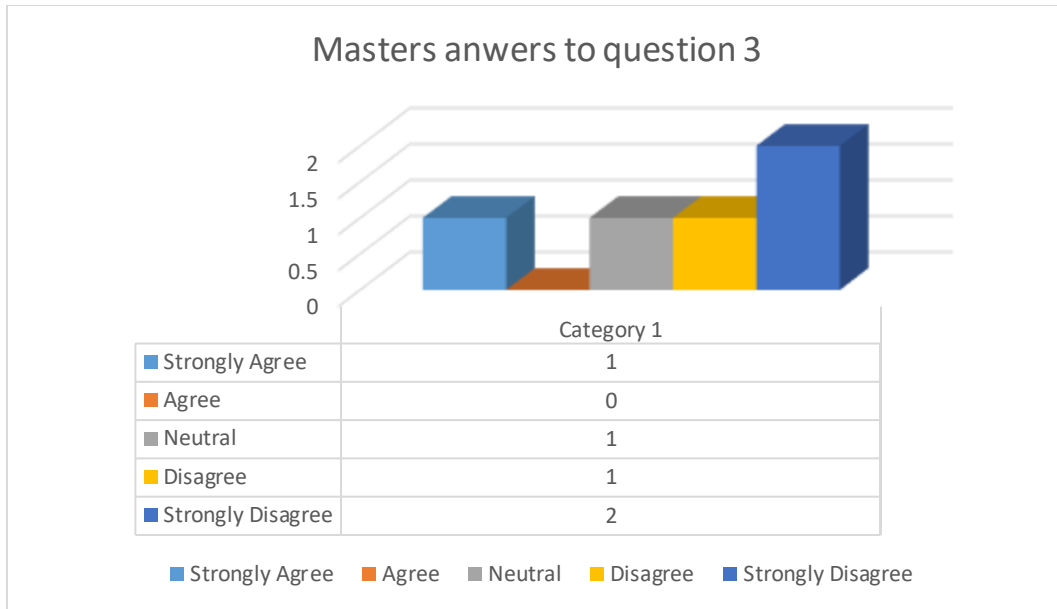


Figure 5 represents responses (n=52) to questions 4, 5 and 7 of the survey. Question 4 revealed that 49 (94.2%) disagreed or strongly disagreed that oil pulling is being taught in their clinics. Question 5 revealed thirty-three (63.5%) disagreed or strongly disagreed that oil pulling is supported by the faculty. Question 7 revealed 47 (90.3%) disagreed or strongly disagreed to having students recommend oil pulling to patients in the clinic.

Figure 5: Answers to questions 4, 5, and 7 of the survey.

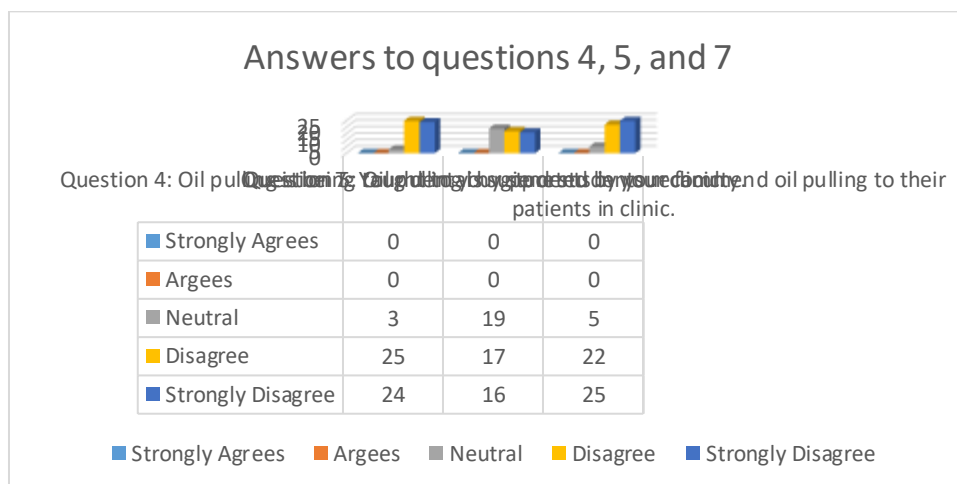
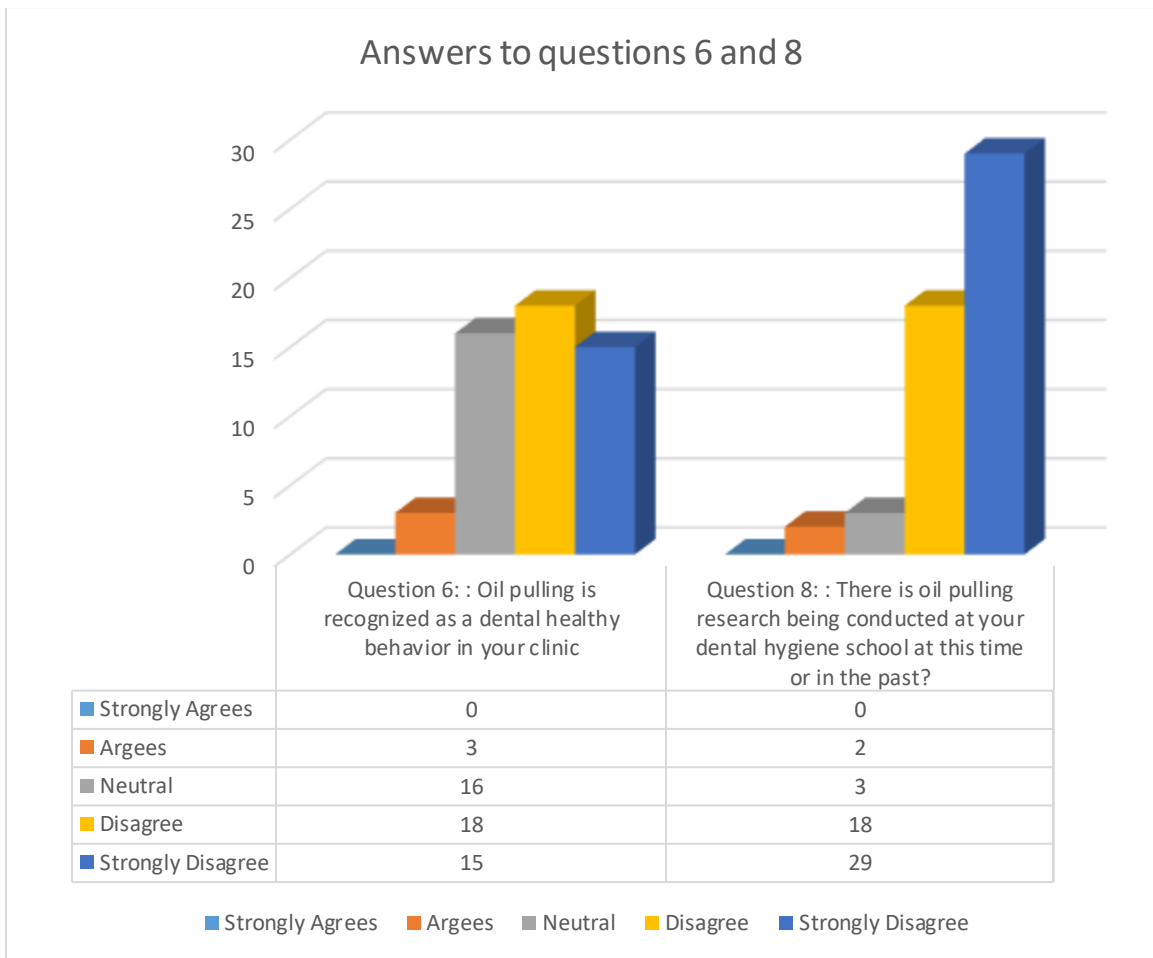


Figure 6 shows answers to question 6 (Oil pulling is recognized as a dental healthy behavior in your clinic) and that question 8 (There is oil pulling research being conducted at your dental hygiene school at this time or in the past). A small margin of agrees were prevalent within only bachelor's and master programs answers, and was found to have a p-values of 0.0172 for question 6 and a p-value of 0.0482 for question 8.

Figure 6: Answers to questions 6 and 8 of the survey



The chi square test p-value was 0.8778. indicating weak evidence against the null hypothesis. When the bachelor's and master's are grouped into one category verses the associates the p-value = 0.9694. The percentage of oil pulling being taught by associate programs was 16.6%, bachelors 20% and masters 20%. The survey reveals a mean of $(16.6\% + 20\% + 20\% / 3) = 18.8\%$ with a 3.4% increase of oil pulling being taught by bachelors and master programs verses associate programs.

Table 1. p-values

Programs	Questions	P-value:
Associate vs. Bachelor's vs. Masters	Oil pulling is being taught in your classes didactically	0.8778
Associate vs. the combining of Bachelor's and Masters	Oil pulling is being taught in your classes didactically	0.9694
Bachelor's and Masters	Oil pulling is recognized as a dental healthy behavior in your clinic	0.0172
Bachelor's and Masters	There is oil pulling research being conducted at your dental hygiene school at this time or in the past?	0.0482

The acceptance of oil pulling appears to be gaining ground among directors of dental hygiene programs. Although results of this study were limited, there is evidence of this statement within the survey. Questions 9 and 10 asked, "have you tried oil pulling yourself, if so how do you feel about it? And Leave any comments that you think may be important". Regarding oil pulling, the questions allow us some insight regarding the acceptance and feelings that are

expressed among the directors of dental hygiene programs across the United States. Some examples to this statement are:

- “We do not teach it, but I do mention it in my theory course. It seems to be a culturally-based habit”.
- “It is BRIEFLY discussed in lecture and a table clinic has been done on it”.
- “This is one of the topics used for evidence based decision making assignments”.
- “A student from last year’s class did an extensive literature review on it and shared it in a class presentation. The concept is known”.
- “Need to publish evidenced based research in juried scientific journals”.

Not all the statements recorded in the survey display acceptance towards the practice of oil pulling, some examples of this statement are:

- “As an ethical and scientifically-based healthcare profession, we have an ethical and professional responsibility to place only content into the curriculum that is supported by solid scientific evidence. "Based on the lack of currently available evidence, oil pulling is not recommended as a supplementary oral hygiene practice, and certainly not as a replacement for standard, time-tested oral health behaviors and modalities. (ADA)”.
- “Do not think this is an evidence based technique, a holistic approach with little substantiated research to support”.
- “Most protocols that I’ve seen suggest 20 minutes for the oil pulling. If they won’t brush for 5 minutes, how do we get them to rinse with coconut sludge for 20?”

Discussion

Although the survey shows that some dental hygiene programs are teaching oil pulling, the survey also reveals that many dental hygiene programs are not teaching the methods of oil pulling. There was limited response to the survey and a comprehensive assessment on the extent in which oil pulling is taught in dental hygiene schools at universities, community colleges, private and proprietary schools throughout the United States was unable to be significantly reached. Essentially there was only a marginal amount of responses received, a small sample size may mask a quantifiable and meaningful result as disreputable. However, it is an acceptable means of assessment when doing a correlational study. Future studies should be done with a larger sample size.

In recent years, oil pulling has gained popularity; therefore, it is important for the dental hygiene student to be educated on the practice of oil pulling. The dental hygienist should have knowledge regarding the practice of oil pulling for an evidenced based decision making and to correctly answer patient's questions regarding the matter of oil pulling. Oil pulling should be incorporated in the curriculum so dental hygienist can be better informed of new cultural trends. Concerning the cultural changes and the adaptation of the internet, the future and education of dental hygiene must be willing to adapt and change to reflect the understanding and ideas of holistic dental care such as the use of oil pulling. As the population and integration of world culture continue to grow within the United States, there is an obvious change in the diversity of patients being seen by dental hygienists in private, corporate, and public health care offices. The education of dental hygienist must have a strong ethical background in cultural competency.

The survey shows, although results of this study were limited, there may be a greater acceptance in the teaching of oil pulling in university's that have higher degree completion such as bachelors and graduate programs versus associate programs. Although the results failed to reject the null hypothesis due to the number of survey responses, an eleven-percent increase from the acceptance of teaching oil pulling in higher degree completion programs was revealed.

Conclusion

The purpose of this study was to learn more about oil pulling being taught at universities, community colleges, private and proprietary schools throughout the United States. Although the study revealed a slight trend, more studies are needed as there was limited response to the survey and a comprehensive assessment on the extent in which oil pulling is taught in dental hygiene schools at universities, community colleges, private and proprietary schools throughout the United States was unable to be significantly reached. Additional research is needed in areas including: geographical locations, modalities, holistic and cultural competencies. More research is needed to assist in the recommendation of oil pulling.

Appendix A



*Human Research Review Committee
Human Research Protections Office*

March 14, 2017

Diana Aboytes
DAboytes@salud.unm.edu

Dear Diana Aboytes:

On 3/14/2017, the HRRC reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Oil pulling
Investigator:	<u>Diana Aboytes</u>
Study ID: Submission ID:	17-103 17-103
IND, IDE, or HDE:	None
Submission Summary:	Initial Study
Documents Approved:	<ul style="list-style-type: none">• IRB 583 Protocol• Survey• Informed consent
Review Category:	EXEMPTION: Categories (2) Tests, surveys, interviews, or observation.
Determinations/Waivers:	Provisions for Consent are adequate. HIPAA Authorization Addendum Not Applicable.

Submission Approval Date: Approval End 3/14/2017 None
Date: Effective Date: **3/14/2017**

The HRRC approved the study from 3/14/2017 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 3/14/2017 is the date the HRRC approved your modifications and, in all cases, represents the date study activities may begin.

Because it has been granted exemption, this research is not subject to continuing review.

Please use the consent documents that were approved and stamped by the HRRC. The stamped and approved consents are available for your retrieval in the "Documents" tab of the parent study.

This determination applies only to the activities described in this submission and does not apply should you make any changes to these documents. If changes are being considered and there are questions about whether HRRC review is needed, please submit a study modification to the HRRC

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for a determination. A change in the research may disqualify this research from the current review category. You can create a modification by clicking Create Modification / CR within the study.

In conducting this study, you are required to follow the Investigator Manual dated April 1, 2015 (HRP-103), which can be found by navigating to the IRB Library.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas F. Byrd". The signature is written in a cursive style with a large initial "T".

Thomas F. Byrd, MD *HRRC Chair*

Appendix B

*1. What is the highest degree offered by your dental hygiene program?

Certificate	Associate	Bachelor's	Graduate program	N/A
<input type="radio"/> Certificate	<input type="radio"/> Associate	<input type="radio"/> Bachelor's	<input type="radio"/> Graduate program	<input type="radio"/> N/A

*2. Is your dental hygiene program a/an:

University	Community college	Private	Proprietary school	N/A
<input type="radio"/> University	<input type="radio"/> Community college	<input type="radio"/> Private	<input type="radio"/> Proprietary school	<input type="radio"/> N/A

3. Oil pulling is being taught in your classes didactically.

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
<input type="radio"/> Strongly Agree	<input type="radio"/> Agree	<input type="radio"/> Neutral	<input type="radio"/> Disagree	<input type="radio"/> Strongly disagree

4. Oil pulling is being taught to your students in your clinic.

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
<input type="radio"/> Strongly Agree	<input type="radio"/> Agree	<input type="radio"/> Neutral	<input type="radio"/> Disagree	<input type="radio"/> Strongly disagree

5. Oil pulling is supported by your faculty.

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
<input type="radio"/> Strongly Agree	<input type="radio"/> Agree	<input type="radio"/> Neutral	<input type="radio"/> Disagree	<input type="radio"/> Strongly disagree

6. Oil pulling is recognized as a dental healthy behavior in your clinic.

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
<input type="radio"/> Strongly Agree	<input type="radio"/> Agree	<input type="radio"/> Neutral	<input type="radio"/> Disagree	<input type="radio"/> Strongly disagree

7. Your dental hygiene students recommend oil pulling to their patients in clinic.

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
<input type="radio"/> Strongly Agree	<input type="radio"/> Agree	<input type="radio"/> Neutral	<input type="radio"/> Disagree	<input type="radio"/> Strongly disagree

8. There is oil pulling research being conducted at your dental hygiene school at this time or in the past?

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
<input type="radio"/> Strongly Agree	<input type="radio"/> Agree	<input type="radio"/> Neutral	<input type="radio"/> Disagree	<input type="radio"/> Strongly disagree

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9. Have you tried oil pulling yourself, if so how do you feel about it?

10. Leave any comments that you think may be important, thanks.

Appendix C

Statistical Analysis Plan & Survey Score Sheet

Hypothesis Test (chi square)

Population= Directors of dental hygiene programs within the United States.

Sample size: Subset of the population that respond (n=?). We will run a chi square test to find the P-value to determine statistical significant of the hypothesis.

Question: Oil pulling is being taught in your classes didactically.

Chi square test

Each director in our sample will answer the questions from a survey. All answers will be based on agree, neutral or disagree. From the responses, we will group answers in order of associate, bachelor's, and master's. We then preform the chi square chart with rows including teaching oil pulling or not teaching oil pulling, then columns including associate, bachelor's, and master's.

Formula for the chi square test:

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

O = the frequencies observed

E = the frequencies expected

\sum = the 'sum of'

From the chi square test, we will test for alpha value .05 as a point of statistical significance to accept or reject the null hypothesis.

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