ARTICLES

Effect of Oil Pulling on some Health Problems of the Female Students in Kuwait University

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Abstract:

Purpose: To test the ability of oil pulling to improve existent health conditions in a female student population.

Methods: Questionnaires designed to elicit currently-experienced health problems suffered were completed by 250 subjects before and after up to three months of oil pulling and by 102 control subjects at equivalent times. For analysis, the various health problems were grouped into 'skin related problems', 'neurological related problems', 'digestive related problems', 'mouth related problems', 'respiratory related problems', 'bone related problems', and 'other' problems.

Findings: Subjects recorded a large number of symptoms and conditions. Eighty-four percent of sufferers reported a benefit of oil pulling. For all of the grouped categories except 'respiratory' and 'other', the mean reduction in suffering was significantly greater (at the 0.001 level) for experimental subjects versus control subjects. One hundred and eight one (72.4%) of subjects reported adverse effects, but these vanished after a few days in 150 (82.9%).

Research Limitations: Subjects were entirely female university students; results may be different for other groups. Many of the symptoms and conditions reported were rather non-specific, can show considerable temporal variation, and were not verified clinically.

Practical implications: Oil pulling may be useful in maintaining oral health and, therefore, general health. A judgment on what emphasis, if any, it deserves in oral health education awaits further research, but at least in countries such as India, where there is a long tradition of its use, it may well be presented as an alternative to the usual recommendations.

Originality: This appears to be the first scientific survey of its kind.

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Introduction

Despite worldwide efforts in educating people in oral hygiene, using and emphasizing mainly tooth brushing and flossing, globally oral infections including tooth decay and periodontitis remain probably the most common infection. This fact assumes more and more importance with ever increasing reports of linkages between oral disease and systemic disease.

This is especially true ofperiodontitis (Otomo-Corgel et al, 2012). Three mechanisms for this linkage have been proposed: metastatic spread of infections from the oral cavity as a result of transient bacteremia, metastatic injury from the effects of circulating oral microbial toxins, and metastatic inflammation caused by immunological injury induced by oral microorganisms (Thoden van Velzen et al, 1984; Okuda and Ebihara, 1998; Han and Wang, 2013; van Dyke and van Winkelhoff, 2013). Numerous studies support an association between periodontitis and cardiovascular disease (Humphrey et al, 2008; Cullinan and Seymour, 2013).Schenkein and Loos (2013) reviewed inflammatory mechanisms linking periodontal diseases to cardiovascular diseases and concluded that such mechanisms may be thought to act in concert to increase systemic inflammation in periodontal disease and to promote or exacerbate atherogenesis but that proof that the increase in systemic inflammation attributable to periodontitisimpacts inflammatory responses during atheroma development, thrombotic events or myocardial infarction or stroke is lacking.

There is good evidence that improved oral hygiene and frequent professional oral health care reduce the progression or occurrence of respiratory disease among high-risk adults, and fair evidence of an association of pneumonia with oral health in others (Azarpazhooh and Leake, 2006). It is likely that pathogens first colonize oral surfaces before aspiration (Li et al, 2000). Azarpazhooh and Leake (2006) admitted poor evidence of a weak association between chronic obstructive pulmonary disease and oral health, but Linden et al (2013) found no studies supporting the association.

Linden et al (2013) found there is little published evidence that periodontitis is a risk factor for rheumatoid arthritis, though Ogrendik (2009) claims an etiological association.

A variety of viruses and bacteria have been implicated in acute asthma exacerbations, but the role of common oral bacteria is unconfirmed (Papadopoulos et al, 2011). In fact, it has been suggested that colonization of the oral cavity by microbes might play a protective role in allergic disease (Arbes et al, 2006).

In one study (Jeffcoat et al, 2003), pregnant women with severe periodontal disease were 7.5 times more likely to go into labor prematurely. Further studies are needed before any relationships between osteoporosis, jaw bone loss and periodontal disease are elucidated (Guiglia, 2013).

On the other hand, diabetes mellitus and periodontitis are definitely interrelated (Pradhan and Goel, 2011; Lalla and Papapanou, 2011; Cullinan and Seymour, 2013).Though Kamer et al (2008) postulated a possible role of periodontal diseases in Alzheimer's disease, Linden et al (2013) found only weak evidence for mild cognitive impairment.

On the other hand, Linden et al (2013) found a definite association between periodontitis and chronic kidney disease.

They also found a modest positive association between obesity and prevalent periodontal disease, but point out that both could be related to unhealthy lifestyle. The evidence for an association of metabolic syndrome with periodontitis is limited to one study (d'Ainto et al, 2008).

Periodontitis has been identified as a possible risk factor for orodigestive and pancreatic cancer and possibly other cancers (Linden et al, 2013).

A study by Sheu and Lin (2013) provided evidence for an association between chronic periodontitisand multiple sclerosis in female, but not male, subjects.

The higher incidence of periodontal disease and caries in patients with Parkinson's disease (Cicciù et al, 2012) is probably due to difficulty of such patients in maintaining oral hygiene.

To date, a direct causal role of periodontal infection in the development and/or progression of systemic diseases is not established (Akshata et al, 2012). It should be remembered that virtually all available data on dental focal infection depends on the fact that

prevalence and incidence of the disease in question is significantly higher in patients with periodontitis than in those without and that several other criteria need to be fulfilled before causal links can be established (Slots, 1998). Further research must be done before the potential for oral infections to cause conditions in other parts of the body can be established.

Nonetheless, the evidence may be great enough to make us further increase our efforts to educate people in methods that will prevent oral infections. Perhaps, too, it is time to consider other simple methods which may be more appropriate in some societies.

Oil pulling has been used extensively as a traditional Indian folk remedy for many years for strengthening teeth, gums, and the jaw and to prevent decay, oral malodor, bleeding gums, dryness of the throat, and cracked lips (Asokan et al, 2009). In Ayurveda, oil pulling is claimed to cure about 30 systemic diseases (Singh and Purohit, 2011).

Fife (2008; p.108) describes the process in detail. Essentially, it consists of swishing a vegetable oil through and around the teeth and around the mouth for 15-20 minutes and then expectorating.

Some studies have suggested that this process may assist in treating gingivitis (Amith et al, 2007; Asokan et al, 2009) and halitosis (Asokan et al, 2011a). Oil pulling has been traditionally used in the treatment of periodontal disease, although the evidence for its usefulness is purely anecdotal (Surathu and Kurumathur, 2011).

In vitro attempts to elucidate possible mechanisms of oil pulling therapy have had mixed results. While DuraiAnand et al (2008) and Thaweboon et al (2011) found some edible oils had some antibacterial properties, Asokan et al (2011b) found they were not antibacterial but did produce emulsification and saponification which could aid mechanical removal of bacteria and films. On the other hand, Hannig et al (2012) found that edible oils did not reduce bacterial colonization of enamel in situ.

The few published studies on the effectiveness of oil pulling in preventing or treating systemic diseases do not meet accepted criteria for scientific evidence (Fife, 2008; pp. 90-92).

This study was designed to test the ability of oil pulling to improve existent health conditions in a female student population.

Materials and Methods

A questionnaire was designed and circulated to students in various classes of the College of Education at Kuwait University and modified in accord with their comments. After the researcher explained the oil pulling method to them, students were invited to participate by completing a questionnaire in which they were queried on various symptoms and conditions from which they might be suffering; carrying out oil pulling until the end of semester (about three months); and completing another questionnaire designed to elucidate any benefits participants felt they had derived from oil pulling. They were asked not to otherwise vary their dental hygiene routine while using oil pulling. After 250 students had been so recruited, another group of 102 students were recruited to act as a control group by completing both questionnaires but not carrying out oil pulling. Both groups consisted entirely of female students and the demographic variables of both groups were substantially similar.

A three level scale (no, little, great) was used for both questionnaires, but for analysis, the latter two categories were combined into one. The frequency of the variables was calculated using SPSS for Windows version 19. Reported health problems were grouped into 'skin', 'neurological', 'digestive', 'mouth', 'respiratory', 'bone', and 'other' domains for statistical analysis. Analysis of pre- and post-test variables was carried out using t-test or one-way analysis of variance as appropriate.

Results

Participants reported a wide range of health problems. The most commonly reported were hair loss (87.2%), skin dryness (74.4%), dark circles under the eyes (70.4%), lethargy (73.1%), and abdominal 'gas' (74.0%). Eighty-four percent felt better after using oil pulling. The most dramatic benefits were recorded for hair loss (76.6%), pale face (72.9%), brittle nails (71.8%), skin allergy (71.1%), headache (82.8%), lethargy (81.4%), dizziness (80.7%), insomnia (80.6%), fatigue and tiredness (73.3%), abdominal gas (81.6%), stomach pain (75.0%), irritable bowel syndrome (71.2%), difficulty in digesting food (71.2%),

vomiting and nausea (70.9%), bad breath (94.0%), yellow teeth (86.8%), tooth pain (84.1%), sensitive teeth (77.8%), white spots inside mouth (72.0%), jaw pain (70.8%), asthma (75%), bone pain (77.2%), backache (75%), and joint pain (72%). When the results were combined into the seven major domains, benefits were greatest for 'neurological', followed by 'skin' and 'mouth'.

Almost identical numbers of participants did oil pulling for up to ten minutes (126/250; 50.4%) or for more than ten minutes (124/250; 49.6%). The great majority (224/250; 89.6%) performed it once a day. The majority (178/250; 71.2%) chose olive oil, 38 (15.2%) used sesame oil, and 34 (13.6%) used coconut oil.

Table (1)
t-test with respect to experimental & control groups

Pre-test minus Post-test for Various Problems Students Suffered with	Experimental & Control Groups	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Skin Related	Experimental	250	0.195	0.128	7.473	130.978	<0.001*
	Control	102	0.025	0.215			
Neurological Related	Experimental	250	0.247	0.173	7.954	143.123	<0.001*
	Control	102	0.034	0.247			
Digestive Related	Experimental	250	0.101	0.099	4.192	144.457	<0.001*
	Control	102	0.038	0.139			
Mouth Related	Experimental	250	0.184	0.176	7.191	350	<0.000*
	Control	102	0.028	0.201			
Respiratory Related	Experimental	250	0.069	0.108	-.406	130.303	0.686
	Control	102	0.077	0.184			
Bone Related	Experimental	250	0.133	0.180	3.289	122.208	<0.001*
	Control	102	0.010	0.360			
Other	Experimental	250	0.006	0.039	0.331	117.099	0.741
	Control	102	0.002	0.090			

Note:

* shows significant difference at 0.001, i.e. *p* 0.001

Table (1) shows the t-test comparison of the experimental and control groups for the different domains of health problems, all of which were statistically significant at the 0.001 level except for 'respiratory' and 'others'.

Table (2)
t-test with respect to number of minutes oil pulling was done in each of the sessions

Pre-test minus Post-test for Various Problems Students Suffered with	Number of minutes in each of the sessions	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Skin Related	Up to 10 mins	126	0.186	0.127	-1.159	248	0.248
	> 10 mins	124	0.204	0 > 128			
Neurological Related	Up to 10 mins	126	0.233	0.170	-1.355	248	0.177
	> 10 mins	124	0.262	0.175			
Digestive Related	Up to 10 mins	126	0.087	0.088	-2.306	237.108	0.022*
	> 10 mins	124	0.116	0.108			
Mouth Related	Up to 10 mins	126	0.154	0.159	-2.672	239.597	0.008**
	> 10 mins	124	0.213	0.189			
Respiratory Related	Up to 10 mins	126	0.061	0.095	-1.169	234.600	0.244
	> 10 mins	124	0.077	0.119			
Bone Related	Up to 10 mins	126	0.119	0.163	-1.232	238.918	0.219
	> 10 mins	124	0.147	0.196			
Other	Up to 10 mins	126	0.004	0.045	-.0622	248	0.535
	> 10 mins	124	0.007	0.033			

Note:

* Shows Significant Difference at 0.05, i.e. p 0.05

** Shows Significant Difference at 0.01, i.e. p 0.01

Using oil pulling for more than 10 minutes produced significantly greater benefit for 'digestive' and 'mouth related' problems but not for the other categories Table (2).

Table (3)
t-test with respect to number of times oil pulling was done in each day

Pre-test minus Post-test for Various Problems Students Suffered with	Number of Times	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Skin Related	Once	224	0.195	0.127	-0.129	248	0.897
	Twice	26	0.198	0.135			
Neurological Related	Once	224	0.236	0.164	-2.475	28.440	0.020*
	Twice	26	0.344	0.216			
Digestive Related	Once	224	0.095	0.097	-3.072	248	0.002**
	Twice	26	0.157	0.104			
Mouth Related	Once	224	0.171	0.170	-3.454	248	0.001***
	Twice	26	0.294	0.192			
Respiratory Related	Once	224	0.065	0.105	-1.408	29.154	0.170
	Twice	26	0.102	0.126			
Bone Related	Once	224	0.131	0.179	-0.478	248	0.633
	Twice	26	0.149	0.194			
Other	Once	224	0.006	0.041	0.095	248	0.924
	Twice	26	0.005	0.025			

Note:

* Shows Significant Difference at 0.05, i.e. p 0.05

** Shows Significant Difference at 0.01, i.e. p 0.01

*** Shows Significant Difference at 0.001, i.e. p 0.001

Doing oil pulling twice a day was significantly better than doing it once a day for 'neurological', 'digestive', and 'mouth' problems Table (3).

Table (4)
one-way ANOVA with respect to number of weeks oil pulling was done

Pre-test minus Post-test for Various Problems Students Suffered with	Number of weeks oil pulling was done	N	Mean	SD	Sig.
Skin Related	Up to 2 weeks	95	0.162	0.132	
	3-4 weeks	94	0.203	0.107	
	More than 4 weeks	61	0.234	0.139	0.002*
Neurological Related	Up to 2 weeks	95	0.206	0.171	
	3-4 weeks	94	0.258	0.161	
	More than 4 weeks	61	0.295	0.180	0.005*
Digestive Related	Up to 2 weeks	95	0.087	0.098	
	3-4 weeks	94	0.100	0.091	
	More than 4 weeks	61	0.125	0.109	.069
Mouth Related	Up to 2 weeks	95	0.143	0.147	
	3-4 weeks	94	0.173	0.177	
	More than 4 weeks	61	0.263	0.193	< 0.001**
Respiratory Related	Up to 2 weeks	95	0.070	0.111	
	3-4 weeks	94	0.059	0.098	
	More than 4 weeks	61	0.084	0.117	0.347
Bone Related	Up to 2 weeks	95	0.139	0.186	
	3-4 weeks	94	0.117	0.165	
	More than 4 weeks	61	0.148	0.196	0.536
Other	Up to 2 weeks	95	0.000	0.000	
	3-4 weeks	94	0.005	0.025	
	More than 4 weeks	61	0.014	0.073	0.083

* Significant Difference at 0.005, i.e. *p*.005;

** Significant Difference at 0.001, i.e. *p* 0.001

For most categories, the benefit achieved correlated with the

number of weeks for which oil pulling was carried out, but significantly so only for 'skin', 'neurological', and 'mouth' problems Table (4).

Table (5)
one-way ANOVA with respect to type of oil used

Pre-test minus Post-test for Various Problems Students Suffered with	Type of oil used	N	Mean	SD	Sig.
Skin Related	Coconut oil	34	0.212	0.170	0.582
	Olive oil	178	0.195	0.115	
	Sesame oil	38	0.180	0.141	
Neurological Related	Coconut oil	34	0.297	0.198	0.160
	Olive oil	178	0.236	0.169	
	Sesame oil	38	0.255	0.161	
Digestive Related	Coconut oil	34	0.117	0.115	0.065
	Olive oil	178	0.105	0.101	
	Sesame oil	38	0.068	0.062	
Mouth Related	Coconut oil	34	0.215	0.191	0.063
	Olive oil	178	0.190	0.177	
	Sesame oil	38	0.125	0.147	
Respiratory Related	Coconut oil	34	0.109	0.164	0.063
	Olive oil	178	0.064	0.098	
	Sesame oil	38	0.058	0.083	
Bone Related	Coconut oil	34	0.140	0.226	0.733
	Olive oil	178	0.136	0.178	
	Sesame oil	38	0.112	0.145	
Other	Coconut oil	34	0.004	0.021	0.582
	Olive oil	178	0.007	0.045	
	Sesame oil	38	0.000	0.000	

No type of oil used was significantly better Table (5).

Table (6)
t-test with respect to amalgam filling

Pre-test minus Post-test for Various Problems Students Suffered with	Amalgam Filling in the Teeth	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Skin Related	Yes	123	0.195	0.116	-0.035	248	0.972
	No	127	0.195	0.138			
Neurological Related	Yes	123	0.254	0.170	0.618	248	0.537
	No	127	0.241	0.175			
Digestive Related	Yes	123	0.101	0.100	0.013	248	0.990
	No	127	0.101	0.098			
Mouth Related	Yes	123	0.214	0.190	2.693	237.105	0.008*
	No	127	0.154	0.158			
Respiratory Related	Yes	123	0.078	0.113	1.337	248	0.182
	No	127	0.060	0.103			
Bone Related	Yes	123	0.136	0.168	0.274	248	0.785
	No	127	0.130	0.192			
Other	Yes	123	0.007	0.051	0.639	248	0.523
	No	127	0.004	0.022			

Note:
* shows significant difference at 0.01, i.e. $p < 0.01$

Students with amalgam fillings benefited significantly more for 'mouth related' problems Table (6), as did those with ceramic fillings, who also benefited in 'digestive' problems Table (7).

Table (7)
t-test with respect to ceramic filling

Pre-test minus Post-test for Various Problems Students Suffered with	Amalgam Filling in the Teeth	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Skin Related	Yes	140	0.209	0.128	1.904	248	0.058
	No	110	0.178	0.126			

cont| Table (7)
t-test with respect to ceramic filling

Pre-test minus Post-test for Various Problems Students Suffered with	Amalgam Filling in the Teeth	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Neurological Related	Yes	140	0.264	0.168	1.772	248	0.078
	No	110	0.225	0.177			
Digestive Related	Yes	140	0.116	0.099	2.628	248	0.009*
	No	110	0.083	0.097			
Mouth Related	Yes	140	0.215	0.184	3.255	245.666	0.001**
	No	110	0.144	0.159			
Respiratory Related	Yes	140	0.077	0.106	1.308	248	0.192
	No	110	0.059	0.110			
Bone Related	Yes	140	0.138	0.170	0.532	248	0.595
	No	110	0.126	0.193			
Other Related	Yes	140	0.006	0.031	0.340	248	0.734
	No	110	0.005	0.048			

Note:
* Shows significant difference at 0.01, i.e. *p* 0.01;
** Shows Significant Difference at 0.001, i.e. *p*.001

Though it appeared to confer considerable benefits, the method also seemed to produce undesirable effects in many users, with 182/250 (72.8%) reporting at least one such effect. Headache was reported by 78 (31.2%), vomiting by 63 (25.2%), stomach ache by 36 (14.4%), jaw pain by 26 (10.4%), and other symptoms by 75 (30%). However, for 150 (82.9%) of the participants, these effects disappeared after a few days. Nonetheless, this may partly account for the relatively high dropout rate, with 95 (38%) carrying out the procedure for two weeks or less, and only 24.4% persisting for more than four weeks.

Discussion

As in the *Andhra Jyoti*surveycited by Fife (2008; pp.90-91),

respondents reported a wide variety of symptoms and conditions which were improved by oil pulling. Again as in that survey, many of the symptoms and conditions reported were rather non-specific, can show considerable temporal variation, and were not verified clinically.

However, the high number of trial respondents reporting benefits and the significantly higher numbers of those in the experimental group than in the control group doing so in most of the categories is at least suggestive.

The evidence in this study is strongest for 'mouth related' problems, especially in those using oil pulling twice a day for more than four weeks, and in those with fillings. As mentioned in the introduction, periodontitis has been associated with a number of systemic diseases. It is possible that at least some of the instances of bleeding gum (84/250; 33.6%) and gum inflammation (80/250; 32.0%) recorded in the study were incipient periodontal disease. If so, the high rate of benefit accorded to oil pulling of 81.0% and 82.5% respectively may warrant further investigation, since an ability of oil pulling to lessen oral infection may also lessen the likelihood of several systemic diseases (Li et al, 2000).

In summary, it appears that good oral hygiene is important not only for good oral health but also for good health in general. Much more study needs to be done before oil pulling can be suggested as an alternative to, or replacement for, present methods of maintaining oral hygiene, but it may be a useful adjunct or alternative in those willing and able to persist with it. This could apply particularly to India, where the practice has a very long tradition.

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