

SAUDI POPULATION'S AWARENESS AND ATTITUDE TOWARD USING DIFFERENT HOME REMEDIES TO TREAT ORAL PROBLEMS

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ABSTRACT

Using herbal home remedies to treat and alleviate dental problems is a common practice. This study aimed to assess the local community's actual use, attitude, and awareness toward the different remedies for treating oral problems. A structured, close-ended, self-administered electronic questionnaire assessed the attitude, awareness, and knowledge towards using home herbal remedies to treat oral problems among Saudi citizens. The link to the online questionnaire was distributed through social media, inviting participants to fill it out. All the collected responses were analyzed by applying descriptive and inferential statistics. A total of 434 subjects participated in this study, with equal gender distribution.. Almost (58.7%) of participants used one or more home remedies in treating dental or oral problems. Dental pain (78.5%) and teeth whitening (27.1%) were the main reasons for using herbal remedies. The most commonly used herbal remedies were cloves (75.3%), salt and water (%72.5), Myrrh (43.4%), and charcoal (19.5%). Nearly (42.2%) were uncertain about the side effects. More than half and three-fourths were uncertain of the efficacy of activated charcoal powder use in teeth whitening and the efficacy of baking soda powder use for teeth whitening. Similarly (82.7%) were uncertain of the efficacy of using turmeric to eliminate halitosis. No significant relation was observed between the use of any home remedy and gender, age group, or level of education ($p>0.05$). Home remedies are widely used in managing dental and oral problems. Clinical studies that investigate the effect of such preparations in treating oral problems are recommended.

Key words: Home remedies, Herbs, Oral use, Awareness, Dental problems.

Introduction

Self-care is one-way individuals without access to professional care can actively manage oral health issues [1]. In addition to oral pain, bleeding gums, bad breath, and aesthetic demands, all increase self-care behaviors. The demand for an aesthetic smile has grown during the last few years. Dental bleaching is considered the most conservative and biologically safe treatment for discolored teeth. Tooth discoloration is a frequent dental finding associated with clinical and esthetic problems [2]. A study conducted in 2017 in Saudi Arabia investigated patients' perception of the dental aesthetic, dissatisfaction with dental appearance, and tooth color, a common finding. More than half of the participants believed some remedies could be used successfully at home to provide a teeth-bleaching effect (57.69%). When asked to name what they know of these remedies, sodium bicarbonate, followed by charcoal, was the most frequently mentioned material [3]. Moreover, statistically significant differences were observed in the tooth-whitening ability of homemade herbal and commercially available agents [4]. In addition, Yiming Li found that using baking soda dentifrice with a manual brush

has a positive effect on stain reduction and increasing teeth whiteness without any clinical adverse effects compared to silica-based dentifrice [5].

Dar-Odeh *et al.* investigated natural remedies used for oral diseases among female patients in Madinah, Saudi Arabia. The results showed that almost 43% of the participants had used natural remedies to treat oral diseases. The most commonly cited reasons were financial. Most of the natural remedies used were herbal, with cloves and miswak being the most frequently reported [6].

Chamomile mouthwash has an excellent short-lasting analgesic effect on aphthous stomatitis [7]. When used as a mouthwash, chamomile can effectively prevent gingivitis and periodontal disease of its anti-inflammatory properties; however, allergic reactions have been reported. The use of herbal anti-inflammatory formulations for a more extended period was found to be safer than that of chemical anti-inflammatory drugs [8].

Honey is a low-cost natural product manufactured by honeybees from plant nectar and sweet deposits. Honey

treats oral ulcers, candidiasis, stomatitis, dental caries, plaque, gingivitis, and periodontal disease. Pure, natural honey may heal tooth disorders. Honey's antibacterial, anti-inflammatory, anti-ulcer, and antioxidant qualities help prevent dental and oral illnesses. In a controlled clinical investigation, researchers examined the effects of eating honey on orthodontic patients' plaque production and honey's antibacterial properties on plaque microorganisms. Honey may reduce tooth cavities and gingivitis after orthodontic treatment [9-14].

Garlic is a valuable herbal medicine used for centuries to treat various ailments. Along with its benefits come some adverse effects. It has been reported that crushed garlic can cause a chemical burn of oral mucosa when placed overnight to treat toothache [15]. In a study by Kanth *et al.* to determine the antimicrobial properties of 10 naturally available plant products against oral microorganisms causing caries, clove oil was the most effective of all products against microorganisms [16].

Frequent use and abuse of presently accessible treatment drugs have resulted in a rise in undesirable effects and the emergence of resistant strains. Traditional remedies are seldom utilized but must be reinstated since they are practical and have few adverse effects. Awareness of traditionally accessible herbal treatments can prevent and treat oral disorders at an affordable cost without waiting for appointments. How far home remedies are used to resolve dental problems of tooth pain, gingival bleeding, teeth discoloration, and halitosis has not been thoroughly investigated in Saudi Arabia. Hence, this study aimed to assess the local community's attitude, awareness, and oral health knowledge of the use of different remedies in treating oral problems.

Materials and Methods

Study design

It was a descriptive cross-sectional study based on the questionnaire.

Study sample

The study sample comprised residents and citizens aged above 15 years residing in Saudi Arabia were considered in this study.

Sample size

A minimum sample of 377 subjects was calculated based on the 5% margin of error, and 95% confidence level, assuming a response distribution of 50%. This sample size was estimated using the Raosoft online sample size calculator. However, to improve the power of the study, a final sample size of 434 subjects was calculated.

Data collection tool

An electronic structured close-ended questionnaire containing fifteen questions was utilized as a data collection

tool. The link to this online questionnaire was distributed through social media, inviting participants to fill it out online. In addition to the demographic data and level of education, the questionnaire is designed to investigate the participant's use and their knowledge and awareness of home remedies for treating some dental problems before seeking professional help. Two experts validated the questionnaire. The reliability of the questionnaire was established by pilot testing, and Cronbach's alfa was found to be 0.85.

Ethical considerations

This proposal was registered in the REU research center web portal, and Ethical Committee approval was obtained (#SRS/2020/19/190/188). The purpose of the study was explained to each subject, and completing the questionnaire was considered consent for participation. All collected data were confidential and for research and publication purposes only.

Statistical analysis

Nominal data were described as absolute numbers and percentages. The Chi-squared or Fisher exact tests were used to compare the frequency between the two groups. Fisher exact test was used if the expected frequency was below five. Multivariable logistic regression analysis was used to study the factors associated with herbal and home remedies used by the participants. A univariable logistic regression analysis was performed for baseline data and questions related to awareness and effectiveness of herbal and home remedies. Factors with a P-value of 0.1 or less in the univariable analysis were included in a stepwise multivariable logistic regression with a backward elimination and a stay P-value of 0.05. Model discrimination was tested with C-statistics, and the area under the receiver operator curve was reported. We reported the odds ratio and the 95% confidence interval. There were no missing data. All analyses were performed using Stata 17 (Stata Corp- College Station, TX, USA). A P-value of less than 0.05 was considered statistically significant.

Results and Discussion

The survey was distributed to 434 participants; 251 responded "Yes" to the question, "Have you ever used any home or herbal products to treat one of your oral and dental problems?". The most common purposes for using herbal medications were toothache (n= 202, 80.5%), teeth whitening (n= 70, 27.9%), mouth malodor (n= 60, 23.9%), and gum bleeding (n= 67, 26.7%). Other rare indications were cold symptoms, increased immunity and overcoming insomnia (n= 1), ulcers (n= 4), oral fungal infection (n= 2), sore throat relief (n= 1), orthodontic treatment (n= 3), teething in children (n= 2), oral infections (n= 2), and tongue fungal infection (n= 1) (**Figure 1**). Moreover, the most common herbal and home remedies used were cloves (n= 194, 77.3%), salt and water (n= 180, 71.7%), Myrrh (n= 125, 49.8%), activated charcoal (n= 50, 19.9%), sodium

bicarbonate (n= 23, 9.2%), turmeric (n= 20, 8%), lemon (n= 12, 4.8%), chamomile (n= 12, 4.8%) and vinegar (n= 10, 4%). Most of the participants who used herbal or home remedies thought they were practical or moderately effective and did not suffer problems related to their use (**Table 1**).

Table 1. The response of the herbal and home remedies users to the questions related to the effectiveness and safety of these remedies

Questions:	Herbal users (n= 251)
How would you rate the results of using these remedies to solve the problem you suffered from?	
Ineffective	5 (1.99%)
Moderately effective	143 (56.97%)
Effective	103 (41.04%)
Have you experienced any problems or complications after using one of these herbal preparations	
Yes	5 (1.99%)
No	246 (98.01%)

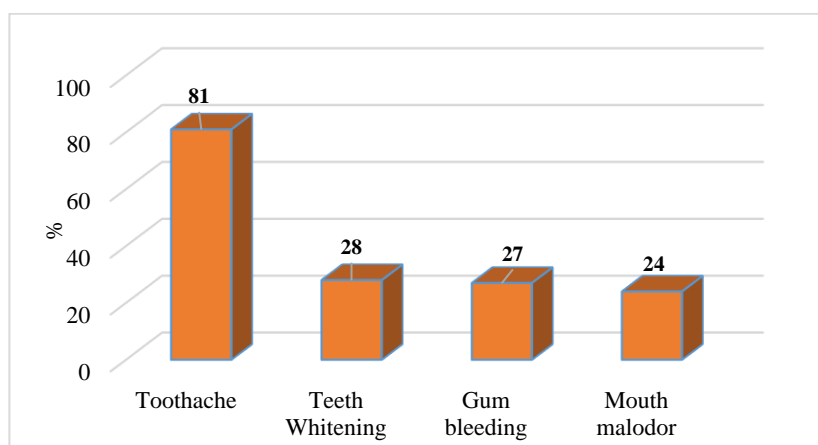


Figure 1. The primary purpose of using herbal or home remedies for dental problems

The herbal non-users group had significantly more males and were younger than herbal users. On the other hand, there was no difference in education between groups (**Table 2**). Most participants answered the question "What would you do if you are unsatisfied with your teeth' color?" by "Go to the dentist for bleaching in the clinic" (n= 226, 51.1%), "Use an at-home-bleaching product from the pharmacy" (n= 118, 27.2%), "Use alternative methods and home or herbal preparations" (n= 39, 9%) and 104 (24%) stated that "No action is necessary." The survey allowed multiple answers to this question, and there was no difference in response between herbal users and non-users (P= 0.114). Furthermore, most participants replied to the question "What

would you do when you feel toothache?" by "Go to the doctor" (n= 259, 59.7%), "Take painkillers" (n= 165, 38%), and "Use herbal/home remedies such as cloves or others" (n= 42, 9.7%). Multiple answers were allowed to this question, and herbal users responded more with "Use herbal/home remedies such as cloves or others" than herbal non-users (P< 0.001). Herbal users received more information about herbal remedies from others (P< 0.001) or the Internet (P< 0.001) than herbal non-users. Herbal users significantly thought compared to herbal non-users that the use of these remedies had fewer side effects than medications (P= 0.024) and that the herbal remedies are safe and effective (P< 0.001) (**Table 2**).

Table 2. Comparison of the baseline characteristics and responses between herbal users and non-users

Variables	Herbal non-users (n=183)	Herbal users (n= 251)	P-value
Baseline characteristics:			
Males	135 (73.77%)	82 (32.67%)	<0.001

Age group (Year)			
15- 30	99 (54.10%)	86 (34.26%)	
31- 40	35 (19.13%)	60 (23.90%)	<0.001
41- 50	32 (17.49%)	55 (21.91%)	
More than 50	17 (9.29%)	50 (19.92%)	
Education level			
Less than secondary school	4 (2.19%)	5 (1.99%)	
Secondary school	34 (18.58%)	40 (15.94%)	0.829
University degree	127 (69.40%)	184 (73.31%)	
Postgraduate studies	18 (9.84%)	22 (8.76%)	
Awareness:			
Do you have any previous information from other people about the use of these preparations to solve dental problems? (Yes)	67 (36.61%)	170 (67.73%)	<0.001
Have you received information on the Internet about herbal remedies for treating oral problems? (Yes)	50 (27.32%)	130 (51.79%)	<0.001
The main reason I use these home herbal preparations is			
Fewer side effects	33 (18.03%)	119 (47.41%)	<0.001
It costs less than a visit to the dentist	150 (81.97%)	132 (52.59%)	
Do you think using these preparations has fewer side effects than medical preparations?			
Not sure	84 (45.90%)	99 (39.44%)	0.024
No	51 (27.87%)	55 (21.91%)	
Yes	48 (26.23%)	97 (38.65%)	
In general, do you think that the use of home and herbal preparations is safe and effective			
Not sure	117 (63.93%)	136 (54.18%)	<0.001
No, harmful	54 (29.51%)	9 (3.59%)	
Yes, safe	12 (6.56%)	106 (42.23%)	

The perception about the effectiveness of turmeric in treating oral malodor (P= 0.044), sodium bicarbonate in teeth whitening (P< 0.001), cloves in alleviating pain (P< 0.001),

and turmeric in teeth whitening (= 0.037) was higher in herbal users compared to non-users (**Table 3**).

Table 3. The perception of participants about the efficacy of herbal and home remedies in treating dental problems

	Herbal non-users (n=183)	Herbal users (n= 251)	P-value
To what extent do you think the following preparations effectively treat the problem in question?			
Turmeric in treating oral malodor			
Not sure	148 (80.87%)	211 (84.06%)	
Ineffective	18 (9.84%)	10 (3.98%)	0.044
Moderately effective	13 (7.10%)	17 (6.77%)	
Effective	4 (2.19%)	13 (5.18%)	
Activated charcoal in teeth whitening			
Not sure	101 (55.19%)	127 (50%)	
Ineffective	30 (16.39%)	25 (9.96%)	0.051
Moderately effective	31 (16.94%)	55 (21.91%)	
Effective	21 (11.48%)	44 (17.53%)	
Sodium bicarbonate in teeth whitening			
Not sure	145 (79.23%)	181 (72.11%)	
Ineffective	29 (15.85%)	22 (8.76%)	<0.001
Moderately effective	4 (2.19%)	28 (11.16%)	
Effective	5 (2.73%)	20 (7.97%)	

Lemon in teeth whitening			
Not sure	126 (68.85%)	184 (73.31%)	0.166
Ineffective	34 (18.58%)	28 (11.16%)	
Moderately effective	16 (8.74%)	26 (10.36%)	
Effective	7 (3.83%)	13 (5.18%)	
Clove in alleviating pain			
Not sure	79 (43.17%)	32 (12.75%)	<0.001
Ineffective	10 (5.46%)	6 (2.39%)	
Moderately effective	38 (20.77%)	107 (42.63%)	
Effective	56 (30.60%)	106 (42.23%)	
Turmeric in teeth whitening			
Not sure	132 (72.13%)	197 (78.49%)	0.037
Ineffective	33 (18.03%)	23 (9.16%)	
Moderately effective	14 (7.65%)	20 (7.97%)	
Effective	4 (2.19%)	11 (4.38%)	

Herbal and home remedies use was lower in males (OR: 0.28; P< 0.001) and higher if the participants had previous information from people about the herbal remedies (OR: 3.31; P<0.001), if they believed that herbal remedies are safe

and effective (OR: 1.74; P< 0.001), if the cause of use was the effectiveness of the remedies rather than the cost (OR: 3.23; P<0.001) and if they believe that Clove is effective in alleviating pain (OR: 1.43; P<0.001) (**Table 4, Figure 2**).

Table 4. Multivariable analysis of factors associated with herbal and home remedies use

Variables	Odds ratio (95% CI)	P-value
Male	0.28 (0.18- 0.45)	<0.001
Previous information from other people	3.31 (2.07- 5.29)	<0.001
Their thought that herbal remedies were safe and effective	1.74 (1.29- 2.34)	< 0.001
Their thought that herbal remedies were used because they were effective	3.23 (1.89- 5.52)	<0.001
The perception that Clove is effective in pain	1.43 (1.17- 1.74)	<0.001

NB: The area under the curve (AUC)= 0.83

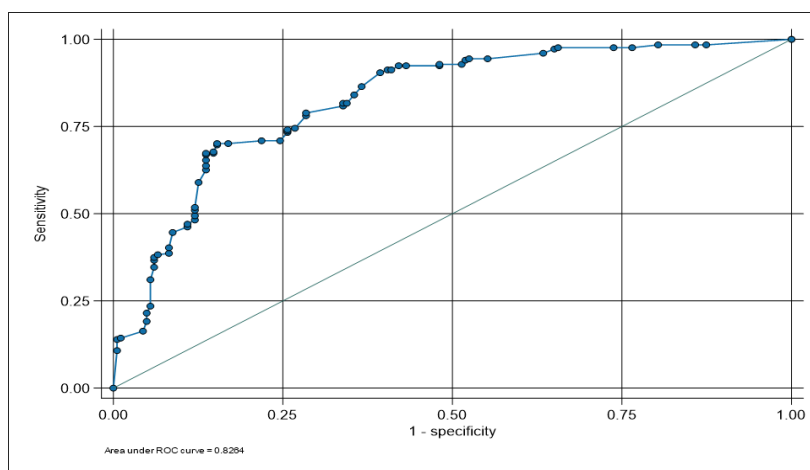


Figure 2. Receiver operator curve (ROC) of the model predicting the use of herbal and home remedies in managing dental problems

We compared herbal users for teeth whitening (n= 70) and other purposes (n= 181). Participants who used herbal and home remedies for teeth whitening were mostly females (P=

0.018); however, there was no significant difference in age group and education level between groups (P= 0.192 and 0.108, respectively) (**Table 5**).

Table 5. Characteristics of participants who use herbal and home remedies for teeth whitening

Other herbal users (n= 181)	Herbal users for teeth whitening (n= 70)	P-value
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Females	114 (62.98%)	55 (78.57%)	0.018
Age group (Years)			
15- 30	62 (34.25%)	24 (34.29%)	
31- 40	38 (20.99%)	22 (31.43%)	0.192
41- 50	40 (22.10%)	15 (21.43%)	
More than 50	41 (22.65%)	9 (12.86%)	
Education level			
Less than secondary school	4 (2.21%)	1 (1.43%)	
Secondary school	34 (18.78%)	6 (8.57%)	0.108
University degree	125 (69.06%)	59 (84.29%)	
Postgraduate studies	18 (9.94%)	4 (5.71%)	

A significant percentage of the population in Saudi Arabia prefers alternative home remedies to relieve dental pain and treat other oral problems such as tooth discoloration and gingival bleeding. The present study aimed to investigate the usage of such remedies in Saudi Arabia. The belief that pharmacological treatment has side effects and interactions could be the possible reason for such practice. The use of such home alternatives and the belief behind their use and safety issues are lacking in the dental literature. Furthermore, there is a void in dental literature on herbal and home remedies' use, benefits, effect, and side effects. There are many more opportunities for further research on the utility of herbal remedies for oral diseases.

There may be both "push" and "pull" reasons behind using these alternative medications. Push reasons comprise dissatisfaction with conventional medicine due to side effects, long clinic waiting lists, ineffective treatments, and lack of time. Pull reasons include a belief in the safety and effectiveness of natural, holistic, noninvasive options that sync with their philosophy. Treatments include traditional herbal or Chinese medicine, meditation, biofeedback, physical therapy, massage, chiropractic, acupuncture, and electric fields [17].

An online self-administered questionnaire was utilized for this purpose. The Sample was mainly comprised of adult diabetic subjects living in Saudi Arabia. The study relied exclusively on a self-reported questionnaire answered online by the patients themselves. The number of Internet users in Saudi Arabia has increased rapidly in the last few years. Online survey services make web-based studies much easier and faster. Advantages of web-based- studies include ease of data collection, data input, and minimal cost and time. The participants may find this survey more convenient since they could respond to questions freely and honestly without worrying.

The present study revealed a wide use of home remedies in managing dental and oral problems among the population in Saudi Arabia. The increasing utilization of herbs for self-medication by patients or individuals could be attributed to the patient's fear of visiting dentists, lack of time, or looking for a cheaper treatment. Around two-thirds of the participants in this survey attributed the usage to the low cost and about one-third to the fewer side effects. More than half

of the participants (57.8%) (n=251) had used herbal or home remedies to treat oral problems, and the most common reason for their use was to treat dental pain (78.5%), followed by teeth whitening (27.1%)

In a similar study conducted in Saudi Arabia, including female patients only, 43% of the participants used natural remedies to treat oral diseases. The most commonly cited reasons were financial (34.1%). Most of the natural remedies used were herbal, with cloves (71.1%) and miswak (26.7%) being the most frequently reported. Acute dental pain and halitosis were the most frequently cited oral conditions associated with this use. More than half of the participants (57.8%) (n=251) had used herbal or home remedies to treat oral problems, and the most common reason for their use was to treat dental pain (78.5%), followed by teeth whitening (27.1%) [6].

The major drawback of conventional drug therapies is the associated side effects. It has led to renewed interest in using complementary herbal medicines such as clove oil, neem leaves, and turmeric, which have been popular household remedies for centuries. It is of utmost importance to understand the interactions of plant extracts with the body and other medications, as many of these extracts have anti-inflammatory effects and prevent bleeding, which is essential in dental treatment [8]. In our study, the most commonly used home remedies for managing dental and oral problems were Clove (75.3%), followed by water-salt (72.5%), and Myrrh (43.4%). Clove oil was the most effective herbal against microorganisms [16]. Individuals experiencing dental pain do not always seek relief by visiting a dentist. Less than one-quarter (22.4%) of subjects experiencing dental pain had consulted health professionals [1]. The most common reasons for not seeking dental treatment were fear of dental drills and needles and long appointments [18].

Limitations of the study included the cross-sectional nature of the study design in which it is difficult to establish the cause and effect. Moreover, the association identified between the variables might be challenging to interpret and Susceptible to biases [19]. The survey questionnaire was distributed using online tools; it will be difficult to describe precisely how the population responded to the survey items,

thereby incorporating the bias into the study. Hence generalizability of the results may be doubtful.

Conclusion

There is wide use of home remedies in managing dental and oral problems. The public knowledge of herbal use for treating dental problems should be enhanced to raise awareness and minimize unwanted side effects. Clinical studies that investigate the effect of such preparations in treating oral problems are recommended.

Recommendations

Clinical and laboratory investigations that evaluate the effect of such preparations in treating oral problems are recommended, in addition to their side effects and toxicity issues. Further studies with a larger sample size from all 13 regions will be needed to get a much deeper insight into using home remedies for oral problems in Saudi Arabia.

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Conflict of interest: None

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Ethics statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Research and Innovation Center of Riyadh Elm University (SRS/2020/19/190/188).

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