



Original Article

Public Awareness and Perception in Saudi Arabia Regarding the Use of Various Home Remedies for Oral Health Issues

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ABSTRACT

The use of herbal home remedies for managing dental problems is a common practice. This study aimed to assess the awareness, attitude, and actual use of various home remedies for oral health problems in the Saudi community. A structured, close-ended electronic questionnaire was used to assess participants' knowledge and perceptions of using herbal remedies for oral problems. The questionnaire was distributed through social media platforms and people were invited to participate. All responses were analyzed using descriptive and inferential statistical methods. A total of 434 people participated with a balanced gender distribution. Approximately 58.7% of the participants reported using one or more home remedies for dental or oral health problems. The main reasons for using these remedies were dental pain (78.5%) and teeth whitening (27.1%). The most commonly used herbal remedies included cloves (75.3%), salt and water (72.5%), myrrh (43.4%), and charcoal (19.5%). Around 42.2% of the participants were unsure about the possible side effects of these remedies. More than half and three-fourths of the participants were unsure about the effectiveness of activated charcoal and baking soda for teeth whitening. Similarly, 82.7% were unsure about the effectiveness of turmeric in addressing halitosis. There was no significant correlation between the use of home remedies and gender, age, or education level ($P > 0.05$). Overall, home remedies are commonly used to treat dental problems. Further clinical studies are recommended to investigate the effectiveness of these preparations in managing oral health problems.

Keywords: Dental problems, Home remedies, Oral use, Herbals, Awareness

Introduction

Self-care is an important approach for individuals who lack access to professional oral care, enabling them to manage oral health issues independently [1]. Factors such as oral pain, gum bleeding, bad breath, and cosmetic concerns all contribute to the adoption of self-care practices. In recent years, the desire for an aesthetically pleasing smile has grown significantly. Dental whitening is considered one of the most conservative and safe methods for treating discolored teeth. Tooth discoloration is a common dental issue that leads to both clinical and cosmetic concerns [2]. Research conducted in Saudi Arabia in 2017 examined patients' views on dental aesthetics, dissatisfaction with their tooth color, and dental appearance, which was found to be a prevalent concern. More than half of the participants (57.69%) believed that certain home remedies could effectively achieve a teeth-whitening effect. Sodium bicarbonate and charcoal were the most commonly mentioned remedies [3]. Furthermore, significant differences were found between the whitening effects of homemade herbal treatments and commercial products [4]. Additionally, research by Yiming Li showed that using baking soda toothpaste with

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a manual toothbrush significantly improved stain removal and whitening teeth without any adverse clinical effects, when compared to silica-based toothpaste [5].

Dar-Odeh *et al.* [6] examined the use of natural remedies for oral health problems among female patients in Madinah, Saudi Arabia. Their study revealed that nearly 43% of participants had used natural remedies for oral health issues, with cost being a primary factor. Herbal remedies, particularly cloves, and miswak, were the most commonly used treatments.

Chamomile mouthwash is known for its effective short-term analgesic properties, providing relief from aphthous stomatitis [7]. Its anti-inflammatory benefits also make chamomile mouthwash useful in preventing gingivitis and periodontal disease. However, some allergic reactions have been reported with its use. Prolonged use of herbal anti-inflammatory formulations is generally considered safer than using chemical anti-inflammatory medications [8].

Honey is widely used for treating a variety of oral conditions. It is known to be beneficial in the treatment of oral ulcers, stomatitis, candidiasis, dental caries, gingivitis, plaque, and periodontal disease. The antibacterial, anti-ulcer, anti-inflammatory, and antioxidant properties of honey contribute to its ability to prevent and heal dental and oral health issues.

A clinical study explored the impact of honey consumption on plaque formation in orthodontic patients, along with its antibacterial effects on plaque-related microorganisms. The findings suggest that honey could help reduce tooth decay and gingivitis following orthodontic treatment [9-14].

Garlic, a long-valued herbal remedy, has been used for centuries to treat various health issues. However, it can also have adverse effects. For example, applying crushed garlic overnight to alleviate tooth pain may lead to chemical burns on the oral mucosa [15]. In research by Kanth *et al.* clove oil was found to be the most effective among 10 natural plant products tested for antimicrobial activity against the microorganisms responsible for caries [16].

The overuse of readily available medications has contributed to a rise in adverse effects and the development of resistant strains. Although traditional remedies are less commonly used today, they offer practical solutions with fewer side effects. Increasing awareness of accessible herbal treatments can help prevent and manage oral health issues at an affordable cost without the need for appointments. However, the extent to which home remedies are utilized to address common dental problems such as tooth pain, gum bleeding, tooth discoloration, and bad breath has not been completely studied in Saudi Arabia. Therefore, this research aimed to evaluate the local community's attitudes, knowledge, and awareness regarding the use of various remedies to treat oral health issues.

Materials and Methods

Study design

The study employed a descriptive cross-sectional design utilizing a questionnaire.

Study sample

The study included residents and citizens of Saudi Arabia who were 15 years of age or older.

Sample size

A sample size of 377 participants was initially determined using a 5% margin of error, a 95% confidence level, and a response distribution of 50%, calculated with the Raosoft online sample size tool. To enhance the study's power, the final sample size was increased to 434 participants.

Data collection tool

A structured, close-ended electronic questionnaire consisting of 15 questions was used for data collection. The questionnaire link was shared on social media, inviting participants to complete it online. It included demographic information and educational background, with a focus on assessing participants' knowledge, awareness, and use of home remedies for addressing dental issues before seeking professional care. The questionnaire was validated by two experts, and its reliability was tested through a pilot study, yielding a Cronbach's alpha of 0.85.

Ethical considerations

This study was registered on the REU research center portal, and ethical approval was granted by the Ethical Committee (#SRS/2020/19/190/188). The objectives of the study were communicated to each participant, and

their completion of the questionnaire was regarded as consent to participate. All data collected were kept confidential and were intended solely for publication and research purposes.

Statistical analysis

Nominal data were presented as absolute counts and percentages. To compare frequencies between two groups, either the Chi-squared test or Fisher's exact test was applied, with Fisher's exact test used when the expected frequency was less than 5. Multivariable logistic regression analysis was conducted to identify factors associated with the use of herbal and home remedies by participants. A univariable logistic regression was first performed on baseline data and questions concerning the awareness and effectiveness of these remedies. Factors with a P-value of 0.1 or less from the univariable analysis were included in a stepwise multivariable logistic regression model with backward elimination and a stay P-value threshold of 0.05. Model performance was evaluated using C-statistics, and the area under the receiver operating characteristic curve was reported. The odds ratio and 95% confidence interval were provided. No data were missing. All statistical analyses were carried out using Stata 17, with a P-value of less than 0.05 considered statistically significant.

Results and Discussion

A total of 434 participants completed the survey, with 251 responding affirmatively to the question, "Have you ever used any home or herbal products to treat an oral or dental issue?" The primary reasons for using herbal treatments included toothache (n = 202 (80.5%)), teeth whitening (n = 70 (27.9%)), bad breath (n = 60 (23.9%)), and gum bleeding (n = 67 (26.7%)). Other less common reasons included cold symptoms, immune boosting, and sleep issues (n = 1), ulcers (n = 4), oral fungal infections (n = 2), sore throat relief (n = 1), orthodontic treatment (n = 3), teething in children (n = 2), oral infections (n = 2), and tongue fungal infections (n = 1) (**Figure 1**). The most frequently used herbal and home remedies 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 participants who utilized these remedies considered them practical or moderately effective and didn't report any issues related to their use (**Table 1**).

Table 1. Responses from users of herbal and home remedies to questions regarding the safety and effectiveness of these treatments.

Questions	Herbal users (n = 251)
How would you assess the outcomes of using these remedies to address the issue you experienced?	
Ineffective	5 (1.99%)
Moderately effective	143 (56.97%)
Effective	103 (41.04%)
Did you encounter any issues or adverse effects after using any of these herbal remedies?	
Yes	5 (1.99%)
No	246 (98.01%)

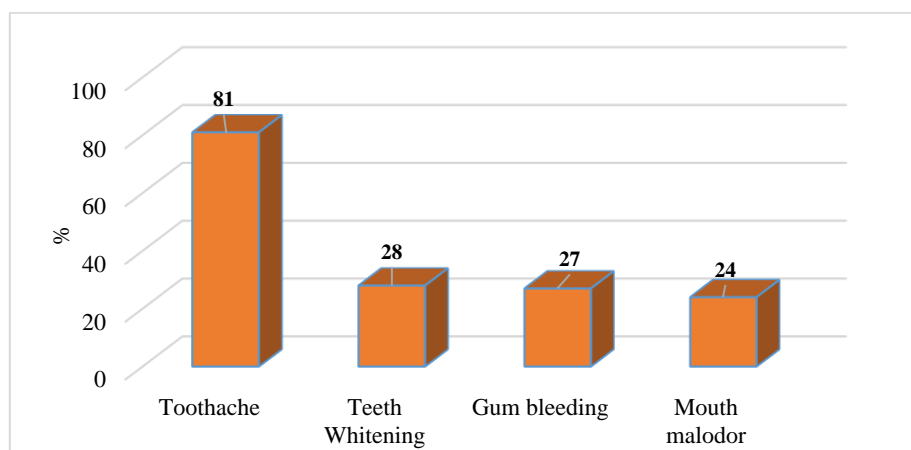


Figure 1. The main reasons for utilizing herbal or home remedies to address dental issues

The group that did not use herbal remedies was significantly younger and had a higher proportion of males compared to the herbal users. However, there was no notable difference in the education levels between the two groups (**Table 2**). When asked, “What would you do if you were dissatisfied with your teeth' color?” the majority of participants responded by stating they would “Visit the dentist for bleaching” (n = 226 (51.1%)), followed by “Use a store-bought at-home bleaching product” (n = 118 (27.2%)), “Try alternative methods or home/herbal remedies” (n = 39 (9%)), and 104 (24%) believed “No action is needed.” As multiple responses were allowed, there was no significant difference between herbal users and non-users in their answers (P = 0.114). Additionally, when asked, “What would you do if you experience tooth pain?” most participants said they would “Visit the doctor” (n = 259 (59.7%)), “Take painkillers” (n = 165 (38%)), and “Use herbal/home remedies like cloves or others” (n = 42 (9.7%)). Again, as multiple answers were allowed, herbal users more frequently selected “Use herbal/home remedies like cloves or others” compared to non-users (P < 0.001). Herbal users also received more information about these remedies from others (P < 0.001) or from the Internet (P < 0.001) than their non-using counterparts. A significant number of herbal users, compared to non-users, believed that these remedies caused fewer side effects than medications (P = 0.024) and that herbal remedies were effective and safe (P < 0.001) (**Table 2**).

Table 2. Differences in baseline characteristics and responses between individuals who use herbal remedies and those who do not.

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 (years)			
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:			
Have you received any prior information from others regarding the use of these remedies for addressing dental issues? (Yes)	67 (36.61%)	170 (67.73%)	< 0.001
Have you come across any information online regarding the use of herbal remedies for oral health issues? (Yes)	50 (27.32%)	130 (51.79%)	< 0.001
The key reason I prefer these home herbal remedies is that they have fewer side effects.	33 (18.03%)	119 (47.41%)	< 0.001
It is more affordable than going to the dentist.	150 (81.97%)	132 (52.59%)	
In your opinion, do these remedies cause fewer side effects compared to medical treatments?			
Not sure	84 (45.90%)	99 (39.44%)	0.024
No	51 (27.87%)	55 (21.91%)	
Yes	48 (26.23%)	97 (38.65%)	
Overall, do you believe that home and herbal remedies are both 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%)	

Herbal users had a higher perception of the effectiveness of turmeric for treating oral malodor (P = 0.044), sodium bicarbonate for teeth whitening (P < 0.001), cloves for pain relief (P < 0.001), and turmeric for teeth whitening (P = 0.037) compared to non-users (**Table 3**).

Table 3. Participants' views on the effectiveness of herbal and home remedies for addressing dental issues.

	Herbal non-users (n = 183)	Herbal users (n = 251)	P-value
How effective do you believe the following preparations are in addressing the problem at hand?			
Turmeric in treating oral malodor			
Not sure	148 (80.87%)	211 (84.06%)	0.044
Ineffective	18 (9.84%)	10 (3.98%)	
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%)	0.051
Ineffective	30 (16.39%)	25 (9.96%)	
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%)	< 0.001
Ineffective	29 (15.85%)	22 (8.76%)	
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%)	

The use of herbal and home remedies was less common among males (OR: 0.28; $P < 0.001$) and more prevalent among participants who had received prior information about these remedies from others (OR: 3.31; $P < 0.001$), believed in their safety and effectiveness (OR: 1.74; $P < 0.001$), used them due to their effectiveness rather than cost (OR: 3.23; $P < 0.001$), and thought that cloves were effective in pain relief (OR: 1.43; $P < 0.001$) (**Table 4, Figure 2**).

Table 4. Multivariable assessment of factors linked to the utilization of herbal and home remedies

Variables	Odds ratio (95% CI)	P-value
Male	0.28 (0.18-0.45)	< 0.001
Prior knowledge from others	3.31 (2.07-5.29)	< 0.001
Belief in the safety and efficacy of herbal remedies	1.74 (1.29-2.34)	< 0.001
The perception that herbal remedies are chosen for their effectiveness	3.23 (1.89-5.52)	< 0.001
View that Clove is effective in relieving pain	1.43 (1.17-1.74)	< 0.001

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

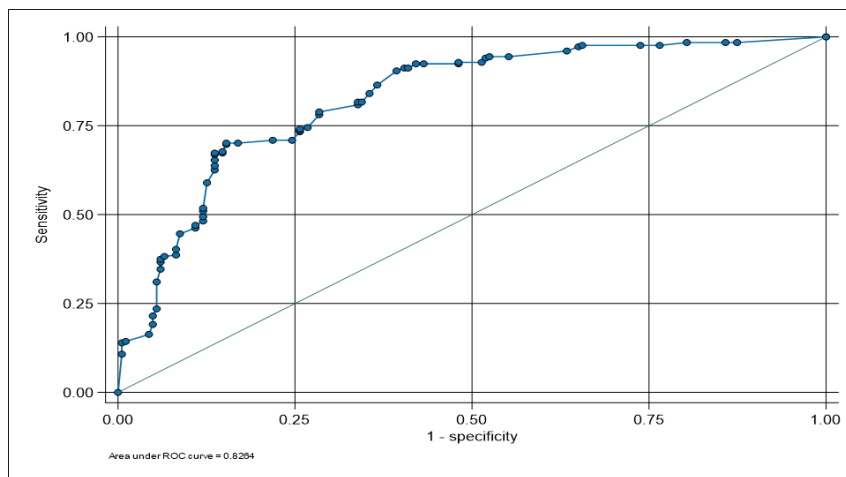


Figure 2. The receiver operating characteristic (ROC) curve illustrates the model's predictive performance for the use of herbal and home remedies in addressing dental problems

A comparison was made between participants using herbal remedies for teeth whitening ($n = 70$) and those using them for other dental concerns ($n = 181$). The findings indicated a higher prevalence of female users in the teeth whitening group ($P = 0.018$). However, no significant differences were observed between the groups in terms of age distribution ($P = 0.192$) or level of education ($P = 0.108$) (**Table 5**).

Table 5. Demographic and background characteristics of participants utilizing herbal and home remedies for teeth whitening

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

A considerable portion of the Saudi Arabian population opts for alternative home remedies to manage dental pain and address oral health concerns such as gingival bleeding and tooth discoloration. This study aimed to explore the prevalence and factors influencing the use of these remedies within the country. A key factor contributing to this preference may be concerns regarding the potential side effects and drug interactions associated with pharmacological treatments. However, limited dental literature has examined the use of these home-based alternatives, the motivations behind their adoption, and their safety considerations. Additionally, research on the benefits, effects, and potential risks of herbal and home remedies in dental care remains scarce, highlighting the need for further investigation into their role in oral health management.

Individuals may turn to these alternative treatments due to both “push” and “pull” factors. Push factors include dissatisfaction with conventional medical approaches, such as concerns over side effects, prolonged waiting times for appointments, perceived ineffectiveness of certain treatments, and time constraints. On the other hand, pull factors involve a belief in the efficacy and safety of natural, holistic, and noninvasive treatment options that align with their philosophies. These approaches encompass a range of therapies, including traditional herbal medicine, Chinese medicine, biofeedback, meditation, physical therapy, chiropractic care, massage, acupuncture, and the application of electric fields [17].

To achieve the study's objectives, an online self-administered questionnaire was employed. The sample primarily consisted of adult diabetic individuals residing in Saudi Arabia. The research exclusively relied on self-reported responses submitted online by participants. In recent years, internet usage in Saudi Arabia has surged, making

web-based research more accessible and efficient. Online survey platforms facilitate faster data collection, seamless data entry, and reduced costs and time. This method may also offer participants a more comfortable experience, allowing them to provide honest responses without external pressures.

Findings from this study indicate a widespread reliance on home remedies for managing oral and dental health concerns among individuals in Saudi Arabia. The growing preference for herbal alternatives in self-medication may stem from factors such as apprehension about visiting dentists, time constraints, or seeking more affordable treatment options. Nearly two-thirds of respondents in this survey cited cost-effectiveness as the primary reason for using these remedies, while about one-third pointed to fewer side effects. More than half of the participants (57.8%) (n = 251) reported using herbal or home-based treatments for oral health issues, with dental pain being the most frequently cited reason (78.5%), followed by teeth whitening (27.1%).

A similar research carried out in Saudi Arabia, which included only female participants, found that 43% of them relied on natural remedies for managing oral health issues. Financial constraints were the primary reason for this preference, reported by 34.1% of respondents. Herbal treatments were the most frequently used, with cloves (71.1%) and miswak (26.7%) being the most common choices. Acute dental pain and halitosis were the leading oral conditions for which these remedies were utilized. In the present study, more than half of the participants (57.8%) (n = 251) reported using herbal or home-based treatments for oral concerns, with dental pain (78.5%) being the primary reason, followed by teeth whitening (27.1%) [6].

One of the major limitations of conventional drug therapies is the risk of side effects, which has contributed to a renewed interest in complementary herbal treatments such as neem leaves, clove oil, and turmeric. These natural remedies have been widely used in households for centuries. Understanding how plant extracts interact with the body and other medications is essential, especially since many of these substances possess anti-inflammatory properties and can aid in preventing bleeding, which is critical in dental care [8].

In this study, the most frequently reported home remedies for addressing oral and dental concerns were Clove (75.3%), water-salt solution (72.5%), and Myrrh (43.4%). Among these, clove oil exhibited the highest effectiveness against microorganisms [16]. Individuals suffering from dental pain don't always opt for professional treatment, as fewer than one in four (22.4%) of those experiencing discomfort sought consultation from healthcare providers [1]. The most frequently cited barriers to seeking dental care included fear of dental drills and injections, as well as the difficulty in securing timely appointments [18].

One of the limitations of this study is its cross-sectional design, which makes it challenging to determine causal relationships. Additionally, interpreting the associations found between variables may be difficult, as they are prone to potential biases [19].

Since the survey questionnaire was distributed through online platforms, accurately assessing how participants responded to the survey items presents a challenge, introducing the possibility of bias in the findings. As a result, the generalizability of the study outcomes may be uncertain.

Conclusion

The use of home remedies for managing oral and dental conditions is widespread. Increasing public awareness regarding the use of herbal treatments for dental issues is essential to minimize potential adverse effects. Conducting clinical studies to assess the efficacy of these preparations in addressing oral health concerns is highly recommended.

Recommendations

It is advisable to conduct both clinical and laboratory research to evaluate the effectiveness of these preparations in treating oral conditions, along with their potential toxicity and side effects. Expanding future studies to include a larger sample size across all 13 regions of Saudi Arabia would provide a more comprehensive understanding of the prevalence and impact of home remedies in oral healthcare.

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Conflict of Interest: None

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Ethics Statement: This study was conducted following the principles outlined in the Declaration of Helsinki and received approval from the Research and Innovation Center of Riyadh Elm University (SRS/2020/19/190/188).

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