

Knowledge, Perceptions, and Practices Regarding Herbal Product Use for Dental Problems Among Dental Patients in Islamabad, Pakistan

Mariam Tariq¹, Zaina Basharat²

¹ Department of Dental Materials, Riphah International University, Islamabad, Pakistan

² Riphah International University, Islamabad, Pakistan

Corresponding Author email: mariam.tariq@riphah.edu.pk

Abstract

Phytotherapy has been used as an adjunct or alternative approach for managing dental complaints, however, limited evidence exists regarding the knowledge, perceptions, and practices related to herbal product use among urban populations in Pakistan. This study aimed to assess the knowledge, perceptions, and practices regarding the use of herbal products for dental problems among dental patients living in urban area of Pakistan. A cross-sectional study was conducted among 100 participants using a convenience sampling technique. Data was collected through a structured questionnaire comprising 15 closed-ended questions, covering participants' knowledge, perceptions, and practices related to herbal product use for dental conditions. Statistical analysis was performed using SPSS, and associations between demographic variables and questionnaire responses were assessed using the Chi-square test. A p-value of <0.05 was considered statistically significant. 66% participants believed that herbal products could treat dental problems and 78% reported using clove oil or salt water for dental pain. However, only 35% were aware of possible side effects, and only 31% consulted a doctor or dentist before using herbal remedies. Nearly one quarter believed that naswar was beneficial for oral health. Significant associations with age and gender were observed, including combined use of herbal and conventional medicine, information-seeking before herbal product use, oral hygiene practices, and herbal use for systemic conditions. These findings highlight the need to improve public awareness of the proper use of herbal products and encourage dentists to routinely ask patients about herbal medicine use during dental consultations to appropriately guide and educate patients.

Keywords: Herbal medicine, dental patients, complementary and alternative medicine, oral health, smokeless tobacco, Pakistan, self-medication, knowledge, perception, practices

1. Introduction

Herbal products are natural substances derived from plant sources that are used for their therapeutic properties. Phytotherapy is the use of these natural herbal products for the treatment of a wide range of human diseases and forms an important part of complementary and alternative medicine (Falzon & Balabanova, 2017). The therapeutic potential is attributed to the presence of active compounds such as flavonoids, alkaloids, phenols and terpenoids, which have antimicrobial, antioxidant, anti-inflammatory, immunomodulatory, anti-diabetic, anti-hypertensive and analgesic properties (Luo et al., 2023). Despite advances in modern healthcare and medicine, the popularity of herbal medicine has increased, due to affordability, ease of use, accessibility, and reduced side effects compared to synthetic medications (Welz et al., 2018).

Herbal products have been used to treat toothache and other oral ailments for centuries. Some popular herbs used in traditional medicine include neem, miswak, clove, aloe vera, tea tree and turmeric, some of which have been added to mouthwashes, toothpastes and other oral products (M. A. Anwar et al., 2025). There is a significant body of evidence that shows that herbal medicine can provide therapeutic benefit for oral conditions, however just like any other medication, herbal medicine must also be used correctly, in correct dosage with proper knowledge (M et al., 2025). Self-medication without awareness of side effects can result in more harm than good including toxicity, allergies and herb-drug interactions (Shi & Klotz, 2012).

Additionally, many dentists are not aware that their patients are self-medicating with herbal medicine and products, which may influence dental treatment outcomes as patients might not disclose use of such products, unless specifically asked. Knowledge of patient perceptions and practice will allow dentists to identify any misconceptions regarding safety and usage of herbal medicine and provide better patient education and advice to those seeking professional care. Few studies have specifically examined this issue among dental patients in urban areas of Pakistan, therefore this study aimed to evaluate the knowledge, perceptions, and practices regarding herbal product use in this population.

2. Methodology

The study was designed as a cross-sectional study, and the study population consisted of dental patients visiting the outpatient department at Islamic International Dental Hospital, Islamabad. Ethical approval was obtained from the Institutional Review Board of Riphah International University (Approval No. IIDC/IRC2026/05/001). Informed consent was obtained before data collection. Demographic details such as age and gender were also recorded.

Patients between the ages of 18 and 65, who could understand both English and Urdu and were currently residing in Islamabad Capital Territory were selected. Those from rural areas, or those from outside of Islamabad, as well as pregnant women, immunocompromised patients and those unable to understand the questionnaire due to language barrier or cognitive impairments were excluded. Pregnant women and immunocompromised patients were excluded because their medical status could influence herbal product use, risk perception, and safety considerations.

A convenience sampling technique was used to recruit the study participants. The sample size of 100 participants was adopted from a previously published study (Nanditha et al., 2026) conducted in a rural population, with a similar study design, and adapted for the current urban setting. Additionally, a sample size of 100 was considered feasible for this exploratory study.

A previously used structured questionnaire (Nanditha et al., 2026) was adopted for this study, with minor modifications to suit the local population. The questionnaire consisted of 15 closed-ended yes/no questions, that were divided into 3 sections. The first section was regarding the knowledge of herbal medicine, the second was on perception and attitude regarding herbal remedies in dentistry and the third was about patient practices of herbal products for dental ailments. Statistical analysis was done using SPSS, using Chi-Squared test. A p-value < 0.05 was considered statistically significant, corresponding to a 95% confidence level.

3. Results

The study consisted of 100 participants, who were divided into 2 groups by gender; 52 females and 48 males. Participants were also divided into three groups by age, those between 19-30, 31-45 and 46-65. Tables 1-3 show the percentage of participants who responded yes and no to each question for each section of the questionnaire, followed by the chi squared statistic and p value

for comparison of responses by age and by gender. There was a statistically significant difference in certain questions by both age and gender.

Table 1. Knowledge of Herbal Products for Dental Care (Q1–Q7)

Question	Yes (%)	No (%)	Age (χ^2)	Age (p)	Gender (χ^2)	Gender (p)
Do you think herbal products can be used to treat dental problems?	66	34	2.3980	0.3015	0.8524	0.3559
Have you ever used herbal products to treat dental problems?	53	47	1.3783	0.5020	3.1706	0.0750
Are you aware of the potential side effects of using herbal products?	35	65	0.6398	0.7262	0.1127	0.7371
Do you think herbal products are more beneficial than conventional dental treatment?	44	56	0.2255	0.8934	0.5747	0.4484
Do you consider smokeless tobacco (naswar) to be good for oral health?	23	77	5.5524	0.0623	0.0004	0.9848
Do you think herbal supplements and allopathic medicines can be taken together safely?	37	63	9.7383	0.0077	3.8943	0.0485
Do you believe peppermint can treat gum disease?	49	51	4.8242	0.0896	1.0181	0.3130

Table 2. Perception and Attitude Toward Herbal Dental Remedies (Q8–Q11)

Question	Yes (%)	No (%)	Age (χ^2)	Age (p)	Gender (χ^2)	Gender (p)
Do you consult a doctor or dentist before using herbal products for dental problems?	31	69	3.1427	0.2078	1.5536	0.2126
Do you consider herbal products/remedies to be cost-effective compared to conventional dental treatment?	66	34	3.8096	0.1489	2.6747	0.1020
Would you recommend herbal products for dental problems to your family members or friends?	59	41	3.6608	0.1603	0.8914	0.3451
Do you research or seek information about herbal products before using them?	38	62	10.9602	0.0042	8.9137	0.0028

Table 3. Practices Involving Herbal Products (Q12–Q15)

Question	Yes (%)	No (%)	Age (χ^2)	Age (p)	Gender (χ^2)	Gender (p)
Do you consider herbal treatments to be a permanent solution for dental problems?	32	68	8.8337	0.0121	0.0239	0.8772
Do you use salt water, clove oil, or similar/traditional herbal remedies to relieve dental pain?	78	22	1.9425	0.3786	0.0452	0.8316
Have you used guava leaves, mint leaves, miswak, or neem for bad breath or oral hygiene?	54	46	7.0048	0.0301	5.6526	0.0174
Do you use herbal products to treat other health-related problems (e.g., hypertension, diabetes)?	49	51	17.3003	0.0002	4.8850	0.0271

The first part of the questionnaire (Table 1) contained seven questions regarding knowledge related to herbal medicine. The results show that 66% of participants believed that herbal products can be used to treat dental problems and 53% reported having used such products to treat dental complaints. Despite this, the percentage of participants who were aware of their side effects was notably low at 35%. Additionally, 44 % believed that herbal medicine was more effective than conventional dental treatment. A noteworthy observation was that 23 percent considered smokeless tobacco (naswar) to be beneficial for oral health. There was no significant difference in responses by age and gender in any of the questions, except in question six, regarding whether or not herbal and allopathic medicine can be taken together safely.

The second part of the questionnaire (Table 2) consisted of four questions regarding patients' attitude towards herbal medicine usage. 31% of participants reported consulting with a dentist or healthcare professional and 38% sought information before self-medicating with herbal medicine and products. 66% considered herbal medicine to be more cost effective compared to conventional dental treatment. There was a significant difference in responses by both age and gender in question number four of this section, regarding whether or not patients sought information before using herbal medicine and products.

The third and last part of the questionnaire (Table 3) had four questions regarding practices of herbal medicine for oral and dental use. 78% reported using salt water or clove oil to relieve dental pain and 49% admitted to using some sort of herbal medicine to treat systemic conditions including diabetes and hypertension. Interestingly, only 32% considered herbal medicine to be a permanent solution to dental problems. There was a significant difference by age in this question but not gender. Additionally, the last two questions of this section also showed significant difference by age and by gender.

4. Discussion

The study evaluated the knowledge, attitude and practices regarding herbal medicine for dental and oral problems in 100 dental patients attending a dental hospital in Islamabad. The findings showed a moderate to high use of herbal medicine, along with gaps in safety knowledge and lack of professional consultation prior to use.

The findings that 66% of participants believed that herbal products could treat dental problems but only 35% were aware of any potential side effects is quite concerning. Plant based products have been used for centuries to treat local and systemic disorders and have been validated to show pharmacological effects (Latif & Nawaz, 2026). 37% of participants also agreed that herbal and allopathic medications could be taken together. Herbal medicines may be perceived to be safe due to their natural origins, but they have the potential to interact with other drugs and medications, causing adverse clinical effects (Ekor, 2014; Izzo & Ernst, 2009).

Allium sativum, *Zingiber officinale* and *Hypericum perforatum* have been shown to alter platelet function and coagulation pathways (Leite et al., 2021), and interfere with prescribed drugs such as warfarin and aspirin (Ge et al., 2014). This can potentially lead to problems with invasive dental procedures such as tooth extractions and maxillofacial surgeries. Additionally, many drugs possess cardiovascular and anti-hypertensive effects including *Nigella sativa* and *Hibiscus* (Kamyab et al., 2021). Such herbs, when taken long term, in conjunction with other antihypertensive drugs may result in an added effect (Nyulas et al., 2024) causing dizziness, syncope and postural hypotension during dental treatment. Additionally, there is an increasing trend of patients using natural products such as coconut oil pulling, lemon, activated charcoal, salt, baking soda, and turmeric to whiten their teeth (Abidia et al., 2023) which have the potential to cause surface roughness of enamel (Maciel et al., 2022).

Many patients do not disclose herbal medicine usage to their dentists; therefore, a comprehensive medical history should be obtained from patients prior to any dental treatment including herbal and conventional drugs and any practices done for maintaining oral health. This is to ensure proper patient education and to avoid any complications during dental treatments. Additionally, 23% of participants believed naswar to be beneficial for oral health which is quite concerning. Naswar is a form of smokeless tobacco popular in South Asia, that is placed in the oral vestibule and has been associated with tooth staining and an increased risk of oral squamous cell carcinoma (Khan et al., 2019).

A significantly high percentage of the participants self mediated with herbal medicine, without consulting with a healthcare professional or seeking any information regarding the product. This is consistent with another study conducted in dental patients in which 56% participants did not seek professional advice before using herbal remedies (Ege et al., 2021). This may reflect the common perception that natural remedies are inherently safe. Within a dental context this could potentially cause patients to delay seeking professional treatment, and worsen the existing condition.

The most prevalent practice reported in this study is the use of clove oil and salt water to treat dental and oral pain. Clove oil has well documented pharmacological effects, including analgesic and antimicrobial properties (Mirpour et al., 2015). Its soothing effect on toothache can be attributed to the presence of eugenol, which is used as a part of standard dental practice (De Grado Gabriel et al., 2023). Additionally salt-water rinses have been documented to reduce gingival inflammation and in one study had effects comparable to chlorhexidine rinses in promoting healing after periodontal surgery (Gupta et al., 2021).

A statistically significant difference across both age and gender regarding safety of combined use of herbal and allopathic medicines, consultation prior to use, and use of herbal products to treat other systemic conditions, indicates beliefs and practices vary across demographic groups. This is corroborated by a similar study (Stjernberg et al., 2006) which found that older age was associated with higher use of herbal medicine. Gender-related differences may be influenced by variations in health-seeking behaviour and cultural roles in healthcare decision-making (M. Anwar et al., 2012; Thompson et al., 2016).

This study has several limitations. First, the sample size was relatively small and was selected using convenience sampling from a single dental hospital, which limits the generalizability of the findings to the broader population of Islamabad or Pakistan. Second, the use of a closed-ended questionnaire may have restricted participants' ability to explain their beliefs and practices in detail. Therefore, future studies with larger samples are recommended.

5. Conclusion

This study aimed to assess the knowledge, perception, and practices regarding herbal product use for dental problems among dental patients attending an outpatient dental hospital in Islamabad, Pakistan. The findings reveal that herbal medicine use for dental complaints is prevalent, with the majority of participants reporting use of clove oil and salt water for dental pain relief. Despite this widespread use, a significant proportion of participants lacked awareness of potential side effects and did not consult a dental professional prior to self-medicating. Of particular concern was that almost one quarter of participants considered smokeless tobacco (naswar) beneficial for oral health, highlighting a critical gap in public health literacy. Statistically significant differences in responses by age and gender were identified across several questions, suggesting that herbal product use and related beliefs are demographically patterned. Dental professionals should incorporate thorough medical history-taking, particularly regarding herbal product use, into routine clinical practice, in order to identify at-risk patients and provide appropriate patient counselling.

Author Contributions

Mariam T: Conceptualization, methodology, formal analysis, data interpretation, manuscript writing (original draft), manuscript review and editing, and supervision.

Zaina B: Data collection and manuscript review.

Data Availability

Data will be available upon request.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Declaration Of Conflicting Interests

The authors declare that there are no conflicts of interest regarding the publication of this article.

Informed Consent and Ethical Approval

Informed consent was obtained from all participants prior to their inclusion in the study. Ethical approval was obtained from IRB at Riphah International University (IIDC/IRC2026/05/001).

References

- Abidia, R. F., El-Hejazi, A. A., Azam, A., Al-Qhatani, S., Al-Mugbel, K., AlSulami, M., & Khan, A. S. (2023). In vitro comparison of natural tooth-whitening remedies and professional tooth-whitening systems. *The Saudi Dental Journal*, 35(2), 165–171. <https://doi.org/10.1016/j.sdentj.2023.01.007>
- Anwar, M. A., Sayed, G. A., Hal, D. M., Hafeez, M. S. A. E., Shatat, A.-A. S., Salman, A., Eisa, N. M., Ramadan, A., El-Shiekh, R. A., Hatem, S., & Aly, S. H. (2025). Herbal remedies for oral and dental health: a comprehensive review of their multifaceted mechanisms including antimicrobial, anti-inflammatory, and antioxidant pathways. *Inflammopharmacology*, 33(3), 1085–1160. <https://doi.org/10.1007/s10787-024-01631-8>

- Anwar, M., Green, J., & Norris, P. (2012). Health-seeking behaviour in Pakistan: a narrative review of the existing literature. *Public Health*, 126(6), 507–517. <https://doi.org/10.1016/j.puhe.2012.02.006>
- De Grado Gabriel, F., Clément, B., Florence, F., Anne-Marie, M., & Damien, O. (2023). Efficacy of articaine or eugenol for pain relief after emergency coronal pulpotomy in teeth with irreversible pulpitis: A randomized clinical trial. *Dentistry Journal*, 11(7), 167. <https://doi.org/10.3390/dj11070167>
- Ege, M., Kurt, M. Y., Ege, B., Koparal, M., & Yildiz, S. (2021). Evaluation of the use and awareness of herbal products of the patients applying to the faculty of dentistry. *Adıyaman Üniversitesi Sağlık Bilimleri Dergisi*, 7(2), 146–157. <https://doi.org/10.30569/adiyamansaglik.913016>
- Ekor, M. (2014). The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Frontiers in Pharmacology*, 4, 177. <https://doi.org/10.3389/fphar.2013.00177>
- Falzon, C. C., & Balabanova, A. (2017). Phytotherapy: An introduction to herbal medicine. *Primary Care*, 44(2), 217–227. <https://doi.org/10.1016/j.pop.2017.02.001>
- Ge, B., Zhang, Z., & Zuo, Z. (2014). Updates on the clinical evidenced herb-warfarin interactions. *Evidence-Based Complementary and Alternative Medicine: eCAM*, 2014(1), 957362. <https://doi.org/10.1155/2014/957362>
- Gupta, S., Jain, A., & Singla, M. (2021). Is saltwater mouth rinse as effective as chlorhexidine following periodontal surgery? *Evidence-Based Dentistry*, 22(4), 130–131. <https://doi.org/10.1038/s41432-021-0227-6>
- Izzo, A. A., & Ernst, E. (2009). Interactions between herbal medicines and prescribed drugs: an updated systematic review: An updated systematic review. *Drugs*, 69(13), 1777–1798. <https://doi.org/10.2165/11317010-000000000-00000>
- Kamyab, R., Namdar, H., Torbati, M., Ghojzadeh, M., Araj-Khodaei, M., & Fazljou, S. M. B. (2021). Medicinal plants in the treatment of hypertension: A review. *Advanced Pharmaceutical Bulletin*, 11(4), 601–617. <https://doi.org/10.34172/apb.2021.090>
- Khan, Z., Suliankatchi, R. A., Heise, T. L., & Dreger, S. (2019). Naswar (smokeless tobacco) use and the risk of oral cancer in Pakistan: A systematic review with meta-analysis. *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco*, 21(1), 32–40. <https://doi.org/10.1093/ntr/ntx281>
- Latif, R., & Nawaz, T. (2026). Medicinal plants and human health: a comprehensive review of bioactive compounds, therapeutic effects, and applications. *Phytochemistry Reviews: Proceedings of the Phytochemical Society of Europe*, 25(3), 2299–2342. <https://doi.org/10.1007/s11101-025-10194-7>
- Leite, P. M., Martins, M. A. P., Carvalho, M. das G., & Castilho, R. O. (2021). Mechanisms and interactions in concomitant use of herbs and warfarin therapy: An updated review. *Biomedecine & Pharmacotherapie [Biomedicine & Pharmacotherapy]*, 143(112103), 112103. <https://doi.org/10.1016/j.biopha.2021.112103>
- Luo, Y., Zeng, Y., Peng, J., Zhang, K., Wang, L., Feng, T., Nhamdriel, T., & Fan, G. (2023). Phytochemicals for the treatment of metabolic diseases: Evidence from clinical studies. *Biomedecine & Pharmacotherapie [Biomedicine & Pharmacotherapy]*, 165(115274), 115274. <https://doi.org/10.1016/j.biopha.2023.115274>
- M, S., Puthiyedath, R., & Pillai, Z. S. (2025). Drug-herb interactions: a challenge and clinical concern in primary healthcare. *Frontiers in Medicine*, 12(1657005), 1657005. <https://doi.org/10.3389/fmed.2025.1657005>

- Maciel, C. R. de O., Amorim, A. A., Oliveira, R. F. de L., Vivanco, R. G., & Pires-de-Souza, F. de C. P. (2022). Whitening efficacy of popular natural products on dental enamel. *Brazilian Dental Journal*, 33(3), 55–66. <https://doi.org/10.1590/0103-6440202204863>
- Mirpour, M., Gholizadeh Siahmazgi, Z., & Sharifi Kiasaraie, M. (2015). Antibacterial activity of clove, gall nut methanolic and ethanolic extracts on *Streptococcus mutans* PTCC 1683 and *Streptococcus salivarius* PTCC 1448. *Journal of Oral Biology and Craniofacial Research*, 5(1), 7–10. <https://doi.org/10.1016/j.jobcr.2015.02.002>
- Nanditha, Farjana, N., Ali, M., Parvathi, Murugan, Nila, & Prathiksha. (2026). Evaluation of knowledge, perception, and practice on the usage of herbal products for dental problems in a rural population of southern India. *Journal of Applied Dentistry and Oral Sciences*, 12(1), 24–30. <https://doi.org/10.1177/30497418251409952>
- Nyulas, K.-I., Simon-Szabó, Z., Pál, S., Fodor, M.-A., Dénes, L., Cseh, M. J., Barabás-Hajdu, E., Csipor, B., Szakács, J., Preg, Z., Germán-Salló, M., & Nemes-Nagy, E. (2024). Cardiovascular effects of herbal products and their interaction with antihypertensive drugs-comprehensive review. *International Journal of Molecular Sciences*, 25(12), 6388. <https://doi.org/10.3390/ijms25126388>
- Shi, S., & Klotz, U. (2012). Drug interactions with herbal medicines. *Clinical Pharmacokinetics*, 51(2), 77–104. <https://doi.org/10.2165/11597910-000000000-00000>
- Stjernberg, L., Berglund, J., & Halling, A. (2006). Age and gender effect on the use of herbal medicine products and food supplements among the elderly. *Scandinavian Journal of Primary Health Care*, 24(1), 50–55. <https://doi.org/10.1080/02813130500475522>
- Thompson, A. E., Anisimowicz, Y., Miedema, B., Hogg, W., Wodchis, W. P., & Aubrey-Bassler, K. (2016). The influence of gender and other patient characteristics on health care-seeking behaviour: a QUALICOPC study. *BMC Family Practice*, 17(1), 38. <https://doi.org/10.1186/s12875-016-0440-0>
- Welz, A. N., Emberger-Klein, A., & Menrad, K. (2018). Why people use herbal medicine: insights from a focus-group study in Germany. *BMC Complementary and Alternative Medicine*, 18(1), 92. <https://doi.org/10.1186/s12906-018-2160-6>