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A Mini Review of Medicinal Plants Effective Against Head Lice: A Traditional Medicine Approach to Skin and Hair Hygiene

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ABSTRACT

This study reviews the use of medicinal plants with antiparasitic properties for treating head lice (Pediculus humanus capitis), a common health concern, particularly among children and in densely populated settings. It underscores the importance of traditional medicine in utilizing these plants as a natural and effective approach to maintaining skin and hair hygiene. The review examines the mechanisms of action of these medicinal plants in promoting overall skin and hair health. To conduct the study, keywords such as "medicinal plants," "Iran," "head lice," and "traditional medicine" were used for literature searches across databases including Google Scholar, SID, Magiran, PubMed, and Scopus, as well as traditional medicine texts and online resources. The findings indicate that 24 native medicinal plant species in Iran are traditionally used for controlling head lice. The analysis reveals that medicinal plants used against head lice predominantly belong to the Lamiaceae, Myrtaceae, and Arecaceae families. Decoction is the most common preparation method (50%), with leaves being the most frequently used plant part (54.55%). These findings highlight the significance of leaf-based remedies and decoction in traditional medicine for head lice treatment. Traditional Iranian medicine, with its emphasis on natural remedies, offers promising treatment options with minimal adverse effects.

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Introduction

Environmental health plays a pivotal role in the prevention and control of diseases linked to environmental factors, including lice infestations (Prüss-Üstün et al., 2016). Lice, especially head lice (Pediculus humanus capitis), spread through direct contact or by sharing personal items such as combs, hats, and pillows (Light et al., 2008). Practicing personal and environmental hygiene—such as regularly washing clothes and linens with hot water and frequently cleaning living spaces—is highly effective in reducing the transmission of lice. Moreover, educating families and schools can be instrumental in early detection and preventing the spread of these parasites (Baghdadi et al., 2021).

Head lice are a common ectoparasite in humans and have historically been a recognized public health issue (Campos Nogueira et al., 2021). This insect rapidly spreads by feeding on host blood and laying

eggs near hair roots, with a high prevalence, especially among children and adolescents (Fu et al., 2022). Despite improvements in sanitation and the development of novel treatment methods, lice infestations persist in many communities, particularly in educational and densely populated settings (Fu et al., 2022). The rapid transmission of lice through direct and indirect contact with personal items like combs, hats, and pillows poses challenges in controlling this parasite (Flores-Genuino et al., 2020). Head lice treatment encompasses medicinal, mechanical, household, and preventive methods. Medical treatments typically involve shampoos and topical solutions containing agents such as permethrin, ivermectin, and malathion, specifically designed to eliminate lice. Mechanical methods, such as regular combing, also aid in removing lice. In addition, personal hygiene and routine washing of linens and clothing are crucial preventive measures. The choice of treatment should be based on the infestation severity and the individual's condition (Ogbuefi et al., 2021). Today, chemical treatments are the most common approach to lice control. However, concerns regarding parasite resistance to these compounds and potential side effects (Mounsey et al., 2023) have drawn researchers' attention toward traditional medicine and medicinal plants (Changaee et al., 2024). In Iranian traditional medicine and other cultural practices, various plants with antiparasitic and anti-inflammatory properties are used to treat lice infestations (Changaee et al., 2024).

This study aims to review the effects of medicinal plants in the treatment of head lice, examining existing documentation in the field of traditional medicine and its applications in skin and hair health. Offering a comprehensive perspective in this area may contribute to the development of complementary and sustainable strategies for managing parasitic infestations.

Methodology

In the present review study, a comprehensive search was conducted to identify medicinal plants used for treating lice in traditional Iranian medicine. Initially, keywords such as lice, medicinal plants, traditional medicine, and herbal treatments were employed in various combinations to maximize the identification of relevant studies. The literature search was performed across reputable scientific databases, including Google Scholar, PubMed, Scopus, as well as local databases such as SID and Magiran. Additionally, reputable texts and resources in the field of traditional Iranian medicine were utilized as supplementary sources to obtain comprehensive information.

The studies included in this review comprised original articles, systematic reviews, and narrative reviews that investigated the effects of medicinal plants on lice treatment. To identify suitable studies, the titles and abstracts of articles were initially screened. Subsequently, the full texts of those articles that aligned with the study objectives were downloaded for more detailed examination.

Inclusion criteria for this study encompassed sources that explored the effects of medicinal plants on lice, studies conducted in Iran or related to medicinal plants utilized in traditional Iranian medicine, and articles published within the last decade. Conversely, articles that explicitly focused on the effects of chemical medications without reference to medicinal plants were excluded from the review.

Results

The findings from studies in traditional medicine indicate that 24 medicinal plant species native to Iran are effective in treating head lice. These plants are utilized in Iranian traditional medicine as effective options for managing head lice. Detailed results are presented in Table 1 (Ayatollahi, 2022; Babazadeh et al., 2020; Attar Neishabouri, 2022; Avicenna, 2006; Kashafi, 2009; Heydari, 2014; Sadeghi, 2016; Mazaheri, 2019; Derakhshandeh, 2020; Mortezavi, 2021).

Results for herbal family shown Alliaceae: 6.67%, Arecaceae: 3.33%, Oleaceae: 3.33%, Lamiaceae: 26.67%, Myrtaceae: 13.33%, Rosaceae: 6.67%, Geraniaceae: 3.33%, Meliaceae: 3.33%, Rutaceae: 3.33%, Apiaceae: 3.33%, Lauraceae: 3.33%, Lythraceae: 3.33%, Asteraceae: 6.67%, Rhamnaceae: 3.33%.

These patterns can guide more targeted identification of medicinal plants in traditional medicine. Based on the analysis, the various forms of medicinal plant application are as follows: Decoction is the most common form, with 14 instances (50%), indicating it as the predominant method of use. Oil follows with 6 instances (23.33%), highlighting its importance in treatment. Essential oils have been used in 4 cases (10%), dough (3.33%), and pastes in 2 cases (3.33%). These findings suggest that decoction plays a crucial role as the primary preparation method for medicinal plants used against head lice. Regarding plant parts utilized, Bulb: 8.33%, Fruit: 16.67%, Leaf: 33.33%, Seed: 4.17%, Flower: 12.5%, Bark: 4.17%, Aerial parts: 16.67%, Leaf, Fruit: 4.17%. These patterns emphasize the key role of leaves in the therapeutic properties of these plants, and a precise understanding of these parts may enhance treatment strategies in traditional medicine.

These findings suggest that decoction plays a crucial role as the primary preparation method for medicinal plants used against head lice. Regarding plant parts utilized, leaves are the most frequently used, with 12 cases (54.55%), followed by fruits with 5 cases (22.73%). Flowers and aerial parts were each used in 3 cases (13.64%). Seeds and peels were each used in one case (4.55%). These patterns emphasize the key role of leaves in the therapeutic properties of these plants, and a precise understanding of these parts may enhance treatment strategies in traditional medicine.

Discussion

Head lice infestation is a common issue in public health, especially prevalent among children and individuals living in crowded environments. While chemical and pharmaceutical treatments are often effective for this problem, due to drug resistance and the side effects associated with these treatments, many people seek more natural alternatives that are gentler on the skin and hair. In this regard, traditional Iranian medicine, with its rich use of native medicinal plants, plays a vital role in providing natural and effective methods for controlling head lice. This discussion examines some of these medicinal plants and their mechanisms of action.

Onions and garlic are known for their sulfur compounds, which have antibacterial and antifungal properties. Compounds like allicin, found in garlic, help destroy the structure of lice exoskeletons and eliminate their eggs (Riswanda et al., 2024; Samiasih et al., 2023). Coconut oil is another effective natural remedy that, by creating a sticky layer on the lice, prevents air from reaching them and suffocates them, while also acting as a moisturizer for the scalp (Connolly et al., 2009). Olive oil, with its moisturizing and suffocating properties, kills lice and simultaneously nourishes the scalp (Herawati, 2023). Rosemary oil, rich in phenolic compounds with anti-inflammatory properties, not only reduces lice but also promotes hair growth (Veal, 1996). Tea tree oil, a plant with strong antibacterial and antifungal properties, has long been used in traditional medicine to treat head lice, with proven effects on reducing lice and their eggs (Di Campli et al., 1992).

Table 1: Native Medicinal Plants of Iran Effective Against Head Lice

Persian name	English name	Scientific name	Herbal family	Part used	Type used
Piaz	Onion	Allium cepa	Alliaceae	Bulb	Decoction
Sir	Garlic	Allium sativum	Alliaceae	Bulb	Decoction
Nargil	Coconut	Cocos nucifera	Arecaceae	Fruit	Oil
Zeytoun	Olive	Olea europaea	Oleaceae	Leaf	Leaf
Rozmary	Rosemary	Rosmarinus officinalis	Lamiaceae	Leaf	Essential Oil
Derakhte chay	Tea tree	Melaleuca alternifolia	Myrtaceae	Leaf	Oil
Maryam goli	Sage	Salvia officinalis	Lamiaceae	Leaf	Decoction
Sib	Apple	Malus domestica	Rosaceae	Fruit	Dough
Shamdani	Geranium	Pelargonium spp.	Geraniaceae	Leaf	Oil
Okaliptus	Eucalyptus	Eucalyptus spp.	Myrtaceae	Leaf	Essential Oil
Cherish	Neem	Azadirachta indica	Meliaceae	Leaf	Oil
Espand	Rue	Ruta graveolens	Rutaceae	Leaf	Decoction
Badam talkh	Bitter Almond	Prunus amygdalus	Rosaceae	Fruit	Oil
Anison	Anise	Pimpinella anisum	Apiaceae	Seed	Decoction
Ostokhodous	Lavender	Lavandula angustifolia	Lamiaceae	Flower	Essential Oil
Mikhak	Clove	Syzygium aromaticum	Myrtaceae	Flower	Decoction
Darxhin	Cinnamon	Cinnamomum verum	Lauraceae	Bark	Decoction
Avishan shirazi	Shirazi Thyme	Thymus vulgaris	Lamiaceae	Aerial parts	Decoction
Hanna	Henna	Lawsonia inermis	Lythraceae	Leaf	Paste
Dermaneh	Wormwood	Artemisia absinthium	Asteraceae	Aerial parts	Decoction
Sedr	Ziziphus	Ziziphus jujuba	Rhamnaceae	Leaf, Fruit	Decoction
Pouneh	Pennyroyal	Mentha pulegium	Lamiaceae	Aerial parts	Decoction
Mourd	Myrtle	Myrtus communis	Myrtaceae	Leaf	Decoction
Babouneh	Chamomile	Matricaria chamomilla	Asteraceae	Flower	Decoction

Sage, with components like camphor and tannins, acts as a natural disinfectant and helps reduce lice populations (Mohammed et al., 2018). Apple cider vinegar, with its acidity, aids in breaking down lice eggs and, through its strengthening effects, keeps the scalp healthy (Gandhi, 2019). Eucalyptus, known for its cineole compounds and cooling effect, helps reduce lice and soothes the scalp (Toloza et al., 2010). Neem, with its antiseptic and antibacterial components, is a natural insecticide that effectively controls lice (Heukelbach et al., 2006). Espand (wild rue), a plant commonly used in Iranian culture as a disinfectant, repels lice and reduces scalp infections (Gill, 1924). Bitter almond, containing natural toxic compounds, serves as a natural insecticide (Salimi et al., 2021). Anise, with its antibacterial compound anethole, is beneficial in lice treatment (Veal, 1996). Lavender, with its strong aroma and soothing properties, reduces scalp itching and inflammation caused by lice, preventing further spread (Barker et al., 2010). Clove, rich in eugenol, has insecticidal properties and effectively kills lice (Choi et al., 2010). Cinnamon, due to its antibacterial and antifungal characteristics, controls and soothes the scalp, aiding in lice reduction (Ghavami et al., 2017). Shirazi thyme oil, containing thymol, has strong antibacterial effects that contribute to lice control (Veal et al., 1996). Henna, with its cooling and anti-inflammatory properties, is also used in controlling head lice and improving scalp health (Al-Zayyadi, 2020). Wormwood, containing compounds like santonin, is known as a natural insecticide effective in treating head lice (Mac-Mary et al., 2012). Pennyroyal, due to its antibacterial and antifungal components, effectively reduces lice populations and improves scalp condition (Arserim et al., 2021). Chamomile, with anti-inflammatory and disinfectant effects, reduces scalp itching and inflammation and contributes to lice control (Chauhan et al., 2021).

Conclusion

Native medicinal plants of Iran, with their natural and potent properties, offer a suitable alternative to chemical treatments in head lice control. These plants are particularly beneficial for individuals who prefer natural remedies or experience skin sensitivities, providing a safe and effective option.

Declarations

Conflict of interest

The authors have no competing interests to declare that are relevant to the content of this article.

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Consent for publications

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Authors' contributions

Sajad Mazloomi: Conceptualization, original draft writing, writing (including reviewing and editing), and formal analysis.
Hedayat Heydarizadeh: Conceptualization, supervision, and project administration.
Masoumeh Tahmasebi: Conceptualization, original draft writing, investigation, writing (including reviewing and editing).

Ethical considerations

Ethical issues (including plagiarism, misconduct, data fabrication, falsification, double publication or submission, redundancy) have been completely observed by the authors.

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