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The Cultural and Medicinal Importance of Tulsi, Rosemary, and Black Seed: A Qualitative Exploration of Public and Herbal Practitioner Perspectives

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Abstract

Introduction: Tulsi, rosemary, and black seed are widely used beyond their original sociocultural context globally. This study aimed to explore the perspectives of the general public and herbal practitioners regarding the cultural and medicinal significance of the three medicinal plants. Contributing to an understanding of how these medicinal plants are identified, sourced, and integrated into healthcare in the UK. **Methods:** A qualitative exploration using structured interviews with the general population (n=20) and herbal practitioners (n=10) investigated cultural beliefs, usage patterns, experience, knowledge, sourcing and identification of different species, and the perceived medical benefits. A convenience sample was recruited, and all interviews were conducted online. Data were analysed thematically using NVivo. **Results:** Both groups reported widespread use of all three plants for general wellbeing and specific health conditions. Cultural and religious significance strongly influenced use among the general population, while practitioners emphasised therapeutic applications. Awareness of species-level variation was limited across both groups; most participants used readily available products without considering species. Although practitioners recognised the importance of correct species for safety and efficacy, they largely relied on trusted suppliers rather than botanical identification. This highlights a disconnect between perceived importance and practical knowledge of plant identity. **Conclusion:** This study demonstrates that medicinal plants have been integrated through a combination of cultural continuity and adaptation to contemporary healthcare needs, in the UK. Limited species awareness, despite its recognised importance, raises the need for considerations for education, practice, and quality assurance of herbal medicine.

Keywords

medicinal plants, plant species, herbal medicines; traditional medicine, tulsi, rosemary, black seed

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Introduction

Tulsi (*Ocimum tenuiflorum* L.- syn.: *Ocimum sanctum* L), rosemary (*Salvia rosmarinus* Spenn.- syn.: *Rosmarinus officinalis* L.), and black seed (*Nigella sativa* L.) are three remarkable medicinal plants known for their distinctive medicinal properties

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and their historical use in specific cultures, most notably, India, the Mediterranean and the Near East, respectively.¹⁻⁴ Each of these plants has unique characteristics and a rich heritage of medicinal and culinary applications, as well as the dynamics of a 'travelling' species.⁵ These three plants showcase the rich tapestry of cultural traditions, ancient wisdom and cultural dynamics in utilizing nature's diversity for both medicinal and culinary purposes. They are also cultivated widely including as ornamental/garden plants. They continue to be appreciated for their potential health benefits used mostly in the self-treatment and serve as a testimony to the enduring significance of natural remedies in different parts of the world. They are widely used by herbal medicinal practitioners who play an important role in healthcare, offering alternative and adjuvant treatments to conventional medicine, which very often remains 'hidden' from mainstream practitioners.^{6,7}

The term herbal practitioner (HP) has been used to encompass medical herbalists and practitioners from traditional systems such as Ayurveda, Unani, Tibetan medicine and Traditional Chinese Medicine (TCM).⁸ These practitioners offer consultations to diagnose and treat various health conditions using herbal medicines. Their role includes personalised assessments and creating tailored herbal formulations for patients. Herbal practitioners often provide an alternative or complementary approach to conventional medicine, helping patients who seek natural and holistic treatment options. Under current UK law, herbal practitioners are allowed to see individual patients, provide diagnoses, and prepare herbal treatments on their own premises; provided that these treatments do not include any banned or restricted substances.⁹ While not all herbal practitioners are registered, the National Institute of Medical Herbalists (NIMH) is the leading professional body of herbal practitioners in the UK.¹⁰ Similarly, British Ayurvedic Medical Council (BAMC) and Association of Traditional Chinese Medicine and Acupuncture UK (ATCM) are self-regulated professional bodies created to try regulate Ayurvedic and TCM practitioners, respectively.

According to a report by the World Health Organization (WHO), there has been a notable increase in the utilization of traditional and complementary medicines globally, with more people turning to herbal practitioners for healthcare needs.¹¹ Similarly, studies in the UK are also providing evidence of the growing interest and use of herbal practitioners and herbal medicines in the UK.¹²⁻¹⁴ This highlights the significant role herbal practitioners play in meeting the diverse healthcare needs of the population and underscores the importance of integrating traditional medicine into mainstream healthcare systems. However, in the UK they are mostly an element of an informal self-care approach and not part of the National Health Service (NHS).¹⁴

The increasing demand for herbal medicines may inadvertently contribute to species adulteration and substitution; which poses significant concerns for the authenticity and efficacy of medicinal plants and their preparations.¹⁵ Studies have documented instances of adulteration and misidentification in herbal products, leading to the unintentional substitution of these species with cheaper or more readily available alternatives.¹⁶ Such substitutions not only compromise the therapeutic benefits but also raise safety and ethical considerations. Orhan (2023) highlighted accidental or intentional adulteration of black seed with other species, potentially exposing consumers to unknown risks.¹⁷ Bhamra et al. (2022) found different varieties of *Ocimum* were grown and used in the UK which linked to migration patterns from India and Africa.³ Shanmughanandhan et al. (2016) also identified different *Ocimum* species and other unrelated species were being sold as tulsi in herbal markets in India, potentially affecting the therapeutic efficacy and safety of products.¹⁸ The use of very different taxa under the same name in one language is common, as exemplified by the use of the concept of 'arnica' in Spanish,¹⁹ and has been labelled as 'plant complexes'.²⁰ These findings underscore the need for stringent quality control measures and the importance of rigorous authentication and quality assurance protocols to safeguard the integrity and effectiveness of medicinal plants.²¹ This leads to the wider question of how a species is recognised, appreciated and used outside its original cultural context. Consequently, this study uses an approach assessing the historical roles and uses of these species and comparing these with 'modern' views and uses of the species

Medicinal and Cultural Significance of Tulsi, Rosemary and Black Seed

Tulsi is primarily found on the Indian subcontinent, particularly in regions of India, Nepal, Sri Lanka, and parts of Southeast Asia. Tulsi, revered as the 'Queen of herbs' and 'Holy Basil', holds a sacred status in Hinduism and is extensively cultivated in home gardens, temples, and medicinal herb gardens across its native regions. Tulsi's leaves are integral to religious ceremonies, symbolizing purity and protection.²² Chemically, tulsi is best known for its bioactive essential oil; rich in eugenol, camphor, and cineole, as well as (other) phenolic compounds such as rosmarinic acid, and apigenin.^{23,24} These determine the quality and the pharmacological properties of tulsi including analgesic, anti-inflammatory, antioxidant, and antimicrobial activities.^{22,25} In Ayurvedic medicine (Indian traditional medicine), the aromatic leaves of tulsi are highly valued for their therapeutic properties, which encompass a wide range of health benefits, including the treatment of respiratory ailments like coughs and colds, as well as promoting overall well-being.²⁶

Rosemary is native to the Mediterranean region, particularly in Spain, Italy, Greece, and North African countries. It is used in various rituals (i.e. to ward off evil spirits and promote good luck) and traditions such as weddings and funerals to symbolize fidelity and remembrance.²⁷ Rosemary is a staple herb, adding flavour and aroma to many dishes, and is particularly popular in dishes like roasted meats and bread, where it adds a savoury depth that is characteristic of

Mediterranean culinary traditions. The aromatic evergreen thrives in sunny, well-drained soils and is often found growing wild along coastal cliffs and hillsides in its native habitats.²⁸ Chemically, rosemary contains a variety of bioactive compounds including phenolic acids, flavonoids, and rosmarinic acid which have antioxidant, anti-inflammatory, and antimicrobial activities.^{2,29} Rosemary essential oil is rich in aromatic compounds such as 1,8-cineole, camphor, and α -pinene, which possess analgesic, anti-inflammatory, and neuroprotective effects.³⁰

Black seed also known as black cumin is native to parts of Africa, the Mediterranean and Southeast Asia. Black seed boasts a culturally rich heritage spanning Middle Eastern, South Asian, and African cuisines for its distinct flavour.³¹ In Islamic traditions, black seed holds profound significance, as the Prophet Muhammad acclaimed black seed as the cure for all illnesses.³² Thus, black seed oil is esteemed for its purported therapeutic properties and is utilized in traditional remedies for a multitude of ailments.³³ Chemically, black seed contains a variety of bioactives such as nigellone, dithymoquinone, thymohydroquinone and thymoquinone which has been identified as the major active constituent.^{1,34} Black seed is used therapeutically for antioxidant, anti-inflammatory, antimicrobial, and cytotoxic/pro-apoptotic activities.^{32,35}

The three plants have been selected for this study due to their different historical origins and similarities in their global spread. Comparing their uses in a specific case study enables novel insights into understanding the 'journeys of medicinal plants' to be explored.

Study Rationale

Studies by Bhamra et al. (2017) and Lazarou and Heinrich (2019) in the UK highlight the pharmacological effectiveness and widespread use of herbal medicines but focused on large-scale, quantitative analyses that emphasize measurable health benefits over cultural context.^{6,7} Lazarou and Heinrich's work highlighted the importance of herbal medicines in the UK and demonstrates the need for rigorous scientific evaluations of herbal medicines, reflecting a growing demand for empirical evidence to support traditional claims. However, the study underscores that, while quantitative data supports the overarching importance of herbal remedies like tulsi, rosemary, and black seed, it lacks insight into their cultural significance and symbolic value within the communities that have long used them.⁷ Similarly, Bhamra et al. (2017) approach herbal medicine from a bio-scientific perspective, offering a comprehensive analysis of these plants' pharmacological profiles through a wide-reaching survey. Their findings provide substantial quantitative data on usage patterns, effectiveness, and safety, reflecting a clinical lens that prioritizes medicinal outcomes over socio-cultural associations.⁶ These studies contribute valuable data on the therapeutic benefits of tulsi, rosemary, and black seed, confirming their utility for various health conditions. However, the focus on quantifiable outcomes limits their scope, as they do not capture the plants' broader cultural and spiritual associations, which play a vital role in their traditional usage.

Existing research on tulsi, rosemary, and black seed in the UK has predominantly focused on their pharmacological properties and patterns of use, with limited attention to how these plants are understood, valued, and integrated within their socio-cultural contexts. In particular, there is a lack of research exploring how both the general public and herbal practitioners perceive these plants in a multicultural, non-native setting, including issues of knowledge transmission, species awareness, and cultural meaning.

To address this gap, this study employed qualitative methods to capture the lived experiences and cultural nuances associated with these medicinal plants, providing a more holistic understanding that extends beyond purely biomedical or quantitative perspectives.

Aim

This study aimed to explore the perspectives of both the general public and herbal practitioners regarding the cultural and medicinal significance of tulsi, rosemary, and black seed in the UK.

Objectives

1. Explore the traditional and current use of tulsi, rosemary and black seed by the general population and herbal practitioners, in the UK.
2. Identify how knowledge of these medicinal plants was obtained and shared.
3. Investigate how these medicinal plants have been sourced, and the perceived impact of species substitution on medicinal and cultural use.

Approach and Methods

Study Design

A qualitative research methodology centred on investigating the cultural and medical significance of these medicinal plants through a structured interview-based approach was used. Structured interviews were conducted with two distinct groups: the general population and herbal practitioners in the UK using convenience sampling, between June 2023 to March 2024, via Microsoft Teams. The study design adheres to the COREQ guidelines for qualitative studies.³⁶ ([Supporting information, S1](#)).

Interview Design

The formulated set of questions, for the structured interviews, aimed to elicit insights into the general utilization of medicinal plants, perceptions of cultural significance, and the medicinal applications of these botanical resources. For the general population, interview questions delved into their everyday use of medicinal plants, participants' perspectives on the cultural importance of these medicinal plants, and whether they used them for medicinal purposes. Interviews with herbal practitioners were structured to gain information on their utilization of medicinal plants in their professional practice. Specific lines of questioning explored the practitioners' methods of incorporating medicinal plants, probing into the decision-making processes regarding the cultivation or procurement of these medicinal plants. In instances where practitioners engaged in the cultivation of medicinal plants, the investigation encompassed the rationale behind selecting varieties (if they preferred any specific variety). For those acquiring medicinal plants externally, the focus shifted towards understanding the criteria employed to ascertain the appropriateness of a given variety for medicinal purposes.

Both groups were shown a series of images comprised of different varieties of the three medicinal plants of interest ([Appendix 1](#)). Participants were asked if they could identify the species, any similarities and differences they knew of and what the impact of different species meant to them. The images were used to explore participants' awareness of species variation, not to confirm actual plant identity. Questions around the importance and impact of species were asked rather than species used.

This dual-pronged approach aimed to comprehensively explore both the general population's perceptions and the practices of herbal practitioners, shedding light on the cultural and medical facets of the usage of these.

Participants Recruitment and Consent

Convenience sampling was used to recruit participants via researchers' networks using social media (i.e. LinkedIn and Facebook). This self-selection approach relied on participants volunteering to take part in the study. There was no prior relationship with the interviewer and participants, which helped to ensure neutrality and minimise the risk of social desirability or response bias during data collection. Participants were asked to email the lead interviewer if they were interested in taking part. The interviewer had to check if participants were part of the general population or practitioner cohort before proceeding. Eligible participants were sent a participant information leaflet (PIL) and a consent form. Written consent was obtained before interviews were scheduled. Interviews took between 30 and 60 minutes to complete online via Microsoft Teams. Inclusion and exclusion criteria: the interviews were restricted to UK participants, aged 18 years or older who could converse in English as no facilities for translation were available.

Ethical Considerations

Ethical approval was granted by Medway School of Pharmacy Research Ethics Committee (REF090121). Interviews were audio recorded and transcribed verbatim, recordings were deleted once transcripts were checked. Written informed consent was obtained before the interviews were scheduled online via Microsoft Teams. Participants were assured of anonymity as identifiable details were not associated with transcripts. All interviews were completed i.e. there was no refusal to continue or dropouts part way.

Data Analysis

For a systematic approach to organizing and interpreting qualitative data, NVivo tool was utilised. It facilitated the creation of hierarchies and relationships between codes, aiding in the development of coherent themes. Interviews were transcribed verbatim by TR and checked for accuracy by SKB. Both researchers independently read and re-read the transcripts, conducted initial coding, and iteratively grouped codes into broader categories based on patterns across the dataset. Themes

were developed and refined through constant comparison within and across transcripts, with regular discussions between the researchers and the wider research team to resolve discrepancies and ensure consistency. This process followed established principles of thematic analysis³⁷ resulting in the final themes presented in Tables 1 and 2. Herbal practitioners were anonymised and coded numerically (e.g., HP01) for analysis.

Rigour and Reflexivity

All the interviews were conducted by TR, between June 2023 to March 2024, online via Microsoft Teams. The interviewer (TR) was a research assistant working on this project and was trained by SKB to ensure interview technique was consistent. The research team comprised individuals with academic backgrounds in pharmacy, ethnopharmacology and anthropology, and an Ayurvedic practitioner. To minimise potential bias, the interviews followed a standardised interview schedule; personal experience/views, culture and religion were not discussed with participants. To ensure reflexivity, independent and repeated review of the transcripts were carried out by (TR and SKB). Findings were discussed amongst the researchers to ensure interpretation of data was not impacted by personal views.

Results

General Population's Perspective

A total of 20 interviews were conducted with participants exemplifying the general population, representing diverse backgrounds including Asian, Arab, Black Afro-Caribbean, Chinese, Caucasian British and Irish. A range of age groups were represented, with 12 female and 8 male participants. Most participants claimed to have learnt about the plants from their families as “it was part of my childhood growing up” [multiple responses]. One participant claimed they learnt about tulsi

Table 1. Thematic Analysis of the General Populations' Knowledge and Use of Tulsi, Rosemary and Blackseed

	Tulsi	Rosemary	Black seed
Cultural use	- Commonly imported from India/ South Asia - Seeds often shared to grow the plant at home - Readily available to buy online and in general stores especially as a tea - Used for skin care, as a cosmetic	- In Mediterranean cuisine, it is a staple herb, often used in cooking - Grows well as an indoor and outdoor plant - Symbol of love and fertility in Europe - Symbolises happiness and remembrance	- Readily available online especially as an oil - Used in cooking especially in Middle eastern cuisine
Religious value	- Religious significance in Hinduism - Commonly used in prayers and offerings during religious ceremonies - Idolised as Goddess as it symbolises purity and protection in Hinduism - Used during funerals	Religious significance in Christianity	- Religious significance in Islam - In Islam - Prophet Muhammad is said to have referred to black seed as a remedy for all diseases except death
Medicinal use	- Antibacterial & Antiviral activity for infections including respiratory and skin disorders - General health and wellbeing - Metabolic disorders e.g. diabetes - Respiratory conditions including sore throat, cough, cold and fever - Topical use for eczema/itchy skin conditions	- Aromatherapy - Digestive disorders - Improves circulation - Improves memory - Topical remedy for skin conditions - Used to for healthy hair	- Antibacterial - Arthritis - Boosts immunity - Digestive disorders - Improves circulation - Mouth freshener - Pain - Respiratory conditions e.g. asthma

Table 2. Thematic Analysis of the Herbal Practitioners' Interviews

	Tulsi	Rosemary	Black seed
Use of medicinal plants in professional practice	• Adaptogenic used for stress and anxiety • Antimicrobial for infections such as chest and skin infections • Boosts immune function • Diabetes • General well being • Helps with coughs and cold symptoms • Reduces high fever • Reduces high cholesterol levels • Weight loss	• Antimicrobial • Digestive issues • Hair growth • Improves blood circulation • Improves memory • Liver tonic • Low mood/depression • Massage oil	• Antimicrobial • Anti-inflammatory • Asthma • Digestive issues • Liver tonic • Weight loss
Personal use of medicinal plants	• General health/well being • Taken as a tea	• Culinary use • Hair oil	• Culinary use
Religious value	• Significance in Hinduism	• Significance in Christianity	• Significance in Islam

from an advertisement for a tea which led them to use it for general health and wellbeing. Two participants identified they learnt about black seed via social media. A male participant originally from China, learnt about Rosemary when he moved to the UK, he said he used rosemary oil for cooking and his hair. Some participants imported products from India, Nepal and Sri Lanka; while the majority of participants sourced products from local stores and online identifying the ease of access to the plants in the UK. Products sourced included seeds, fresh and dried material, teas, oils and pre-formulated cosmetics and medicines. Just one adverse effect was reported with excessive use of rosemary oil which was linked to causing headaches.

Thematic analysis of the interviews revealed several key themes encompassing aspects of cultural, religious and medicinal uses/values (Table 1). The significance of these medicinal plants was underscored by their religious and cultural importance and numerous medicinal benefits. The plants were sometimes used alone but more commonly used alongside other medicinal plants. Participants reported using these medicinal plants in conjunction to conventional medicines too, especially in those with chronic health conditions such as diabetes and skin disorders (e.g. eczema).

Participants were shown a series of photographs of the different varieties of the three medicinal plants, tulsi, rosemary and black seed (Appendix 1). The majority of the participants were not aware of the different species or varieties of the medicinal plants. Most of the participants claimed to use whatever was available, some mentioned they used whatever their families and older generations had been using, or what was shared with them and accessible, while others said they used whatever they could buy. The species of the medicinal plants was not considered when using the products for cultural or medicinal purposes. Participants did not think plant species was important as this was not a concept they had thought of before.

Sharing seeds and plant cuttings was common between friends and families. A large proportion of participants tried cultivating tulsi, rosemary and black seed plants at home, with varying degrees of success in the UK. Many complained about suboptimal conditions for growing tulsi and black seed, in particular, as they do not survive in the cold damp UK climate. A participant mentioned his persistence in trying to grow a black seed plant from the seeds in the UK but they didn't thrive he said; *"the plant usually grows shorter than what I expect, the seeds I get are much less in the quantity and the plant catches some kind of a disease before it dies"* [Male, age 40]. Rosemary on the other hand was commonly grown with ease in the UK; many kept the herb as a potted plant indoors and some even grew it in abundance outdoors. While sharing of plants and seeds was a common practice it was focused on the appearance of the plants rather than the diverse varieties and cultivars which were available. Some of the participants noted that the medicinal plants, when cultivated in the UK, exhibited variations in appearance and aroma compared to their prior observations. A 35-year-old female participant stated, *"I always bring the cuttings of the tulsi plant from my family in India, after some months the new leaves of the plant starts to look different and they completely lose the aroma as well!"*

Herbal Practitioners' Perspective

Interviews with 10 herbal practitioners were conducted including Western herbal practitioners, Ayurvedic practitioners, Chinese medicine practitioners, an aromatherapist, a phytotherapist and a naturopath. A range of age and ethnic groups were represented in the sample.

All practitioners were aware of and had used the three plants, in their practices for different ailments for example “*tulsi for boosting the immune system*” [Ayurvedic practitioner, HP03], “*rosemary for hair growth and improving circulation*” [Western herbal practitioner, HP02], and “*black seed for digestive issues*” [TCM practitioner, HP05]. The use of both tulsi and black seed in diabetes was commonly discussed. As was the use of tulsi and rosemary for relieving stress/anxiety and improving low mood. Every practitioner had experience in the use of these herbal medicines, demonstrating a comprehensive awareness and practical use within their professional practices (Table 2).

Most of the practitioners stated they often used these medicinal plants in combination with other medicinal plants or as a supplement to conventional medicines, in their professional practice. Many practitioners used these plants in the form of tinctures, teas or in pre-formulated herbal medicines. The majority of practitioners confirmed they had never heard their patients reporting any side effects of these medicinal plants. Just one practitioner identified issues of poor compliance and unpalatable taste of herbal medicines. The qualitative assessment of the interviews shed light on different aspects of use in personal and professional practice (Table 2). Personal use was often attributed to general health, so the medicinal plants were either consumed as food (black seed and rosemary) or as a tea (tulsi).

When asked about the importance of medicinal plant species, all of the herbal practitioners agreed the species was important as it could impact the therapeutic effects, “*species is important as some species maybe toxic...I would be worried for my patients if the wrong species was used*” [Naturopath, HP07]. Upon viewing the images shared (Appendix 1) a few practitioners were successfully able recognise distinct varieties of tulsi. However, none of the practitioners were able to identify the different varieties black seed and rosemary; which demonstrated a lack of awareness/ knowledge of the different species. Practice and use of the plants was not correlated to awareness of species, as education and training was not explored. Herbal practitioners highlighted there was no real way of identifying species used for treatment other than using trusted and reputable suppliers. Most practitioners indicated a consistent practice of purchasing medicinal plants from reliable suppliers. However, they acknowledged that consideration of whether the medicinal plant variety is suitable for medicinal purposes or to ask about the variety of the herb, did not typically cross their minds. One participant stated, “*I always buy rosemary from a popular trusted online source, that’s why it never came to my mind to check for the species or a variety.*” [Phytotherapist, HP09]. A few of the practitioners brought seeds to grow their own medicinal plants in their gardens.

Discussion

The study has uncovered that tulsi, rosemary and black seed are important in the UK, to both the general population and herbal practitioners; for the cultural, culinary, and medicinal values associated. These medicinal plants were commonly used to improve general wellbeing as well as for specific health conditions, to treat a range of minor and more serious ailments (i.e. common cold to diabetes respectively). The knowledge and use of these medicinal plants continue to be exchanged via families through the generations⁷; but the influence of social media was documented as a new way of learning of herbal medicines, by participants in this study. While each medicinal plant was known and used for a range of health conditions, there was a distinct association with a specific religion attributing to their high cultural value and significance which is also still important to the UK population today.^{3,26,32}

The uses recorded, most notably by the practitioners, are only very partially linked to those recorded in the original cultural contexts. For example, the concept that tulsi acts as an adaptogen merges the emerging role of adaptogens (originally developed in the Soviet Union) as health care products. With concepts related to diverse everyday medical challenges practitioners face, including fast emerging health problems such as diabetes but also minor self-limiting conditions such as fever and cough. Consequently, the practitioners’ uses are not based on the respective traditions, but on the health needs they tackle in their practice. On the other hand, the interviews with the general population point to a recognition of the traditional practices and a general interest in these species which are now part of the UK’s diverse culture.

The use of medicinal plants requires careful identification of species and varieties to ensure safety and efficacy of use. Wang et al. (2023) identify the need for stringent control over the species as contaminants and adulterants can lead to harmful adverse effects.³⁸ However, this remains a difficult challenge as herbal practitioners confirmed they relied on sourcing medicinal plants from trusted suppliers without means to verify the specific species or variety of the plants. This can lead to the use of incorrect or suboptimal plant materials, which may compromise treatment outcomes or even pose health risks. A study by Sahoo et al. (2010) highlighted that improper species identification is a common issue in herbal medicine, often due to practitioners’ over-reliance on suppliers.³⁹ The increased demand for herbal medicines is putting pressure on suppliers which has seen cases of cheaper alternatives being substituted.⁴⁰ Jürges et al. (2018) carried out extensive work to authenticate tulsi and its related species; their work uncovered how genetic variations seen in plants are associated with globalisation and the difficulties in discriminating between species.¹⁵ Using molecular

techniques, they created an authentication assay but the accessibility and use in practice has not been implemented. The time and resources needed to authenticate species can be a deterrent and has subsequently led to adulterate species being used.

Cultural traditions play a significant role in the use of medicinal plants among migrant populations who bring seeds from their native countries or obtain them from friends and families. This practice is driven by the cultural and medicinal values attached to certain plants. However, when these plants are grown in different geographical areas natural variance will occur.⁴¹ The general population lacked awareness about the specific species or variety they were cultivating. It has been well documented that migrants often bring seeds from their homelands to maintain traditional medicinal practices, yet they may be unaware of the ecological and botanical differences in the new environment.⁴² This can result in the cultivation of plants that are not well-suited to the new region or even lead to the growth of invasive species. Additionally, there is often a lack of proper identification, which can result in the use of the wrong species or varieties, potentially diminishing the plants' medicinal efficacy or causing adverse effects.⁴³ This highlights the need for increased awareness and education regarding plant species and varieties when transferring and cultivating traditional medicinal plants in non-native regions. The practice of purchasing these medicinal plants by many practitioners from suppliers introduces a dimension of uncertainty. The practitioners, in many instances, may lack awareness regarding the geographical origin and specific varieties of the medicinal plants procured. This knowledge gap raises concerns about the potential divergence between the intended medicinal properties and the actual characteristics of the medicinal plants acquired. A concept to consider for further investigation would be to explore if this "lack of knowledge" of species was linked to practitioners' training being pharmacology/therapeutics focused rather than botany/pharmacognosy.

The acceptance of tulsi and black seed into British medicinal culture represents an expansion of the traditional pharmacopoeia that had previously favoured European medicinal plants like rosemary. Tulsi and black seed bring a rich tapestry of healing philosophies to the UK, aligning with the British trend towards integrative medicine, which combines conventional and alternative approaches.⁴⁴ The search for novel ingredients has also contributed to their integration. Scientific data (albeit limited) provide an evidence base and rationale for traditional uses and aligns with contemporary British values of evidence-based medicine.^{6,7} This blend of traditional knowledge with modern medical assessment has allowed these "newcomer" plants to gain legitimacy and become a part of the cultural landscape, enhancing British medicobotanical diversity.

As illustrated by participants in this study, tulsi, in particular, has become increasingly popular as a potted herb, symbolizing a bridge between British gardening and diasporic cultural practices, especially among South Asian communities in the UK.⁷ Black seed, though less commonly grown, is widely available in British health stores and pharmacies, both as seeds and as an oil, often used in health foods and supplements.¹ The related species *N. damascena* is an ornamental plant found regularly in summer gardens. Through these channels, tulsi, rosemary, and black seed converge in British households and gardens, symbolizing a cultural synthesis where diverse botanical traditions enrich modern British health and lifestyle practices. Their journey from distinct origins to British homes reflects both the resilience of traditional knowledge and the adaptive nature of botanical culture in the UK.

Tulsi, rosemary and black seed hold cultural and medicinal significance, yet there exists a conspicuous lack of awareness regarding the diverse varieties within these herbal species. Notably, attempts to cultivate these medicinal plants in the UK face challenges stemming from the geographical conditions and soil compositions compared to their indigenous regions. Consequently, there is a tangible likelihood that the varieties cultivated in the UK differ from their originals, potentially leading to variations in their medicinal attributes.

Strengths and Limitations

The strengths of this study are that it provides novel qualitative insights into the cultural and medicinal use of tulsi, rosemary, and black seed within a multicultural UK context, incorporating perspectives from both the general public and a diverse group of herbal practitioners. Some limitations include the use of convenience sampling which can lead to a volunteer bias. This could further lead to a positive bias in responses; hence, the lack of reported negative experiences may reflect reporting bias. There was a relatively small sample size (although data saturation was reached) which may limit the transferability of the findings; however, this is common with qualitative research. As such findings are context-specific and may not be generalisable beyond similar populations. While the inclusion of image-based prompts offered a useful approach to exploring awareness of species variation, this may have introduced a bias in interpretation.

Conclusion

The dynamics of the changing uses respond to the everyday needs (in this case in the UK) and to changing healthcare needs (like responses to emerging health problems). These perspectives and practices show recontextualised roles of the three medicinal plants. In light of these complexities, there emerges a compelling need for assessing the species' role in greater detail including an assessment of benefits and risks of such self-care.

Also, further bioscientific inquiry to optimize and standardize the cultivation and utilization of tulsi, rosemary, and black seed is needed. Such studies should address the intricacies of environmental variations, ensuring that the herbal varieties maintained and used align with their traditional and medicinal significance.

This refined approach is vital for advancing the knowledge base and promoting a more informed and empirical evidence-based utilization of these culturally and medicinally significant plants. This study points to the need to move beyond the understanding of plant contexts to an understanding how these species can contribute to better healthcare and especially self-care.

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Ethical Considerations

Medway School of Pharmacy Ethics approval was obtained.

Consent to Participate

Written consent was obtained in advance of the interviews being conducted.

Author Contributions

The study was conceptualised and designed by SKB, TR and MH. TR was trained in interview techniques by SKB; TR conducted all the interviews. TR and SKB conducted the data analysis. All authors contributed to the formulation of this manuscript which has been reviewed by all co-authors. All authors have read and agreed to the published version of the manuscript.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

data will be made available upon request from the corresponding author.

AI Declaration

AI was not used in the production of this manuscript.

Supplemental Material

Supplemental material for this article is available online.

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Appendix

Appendix 1 – Images of Tulsi (Figure 1), Rosemary (Figure 2), and Black Seed (Figure 3) Shown to Participants During Interviews

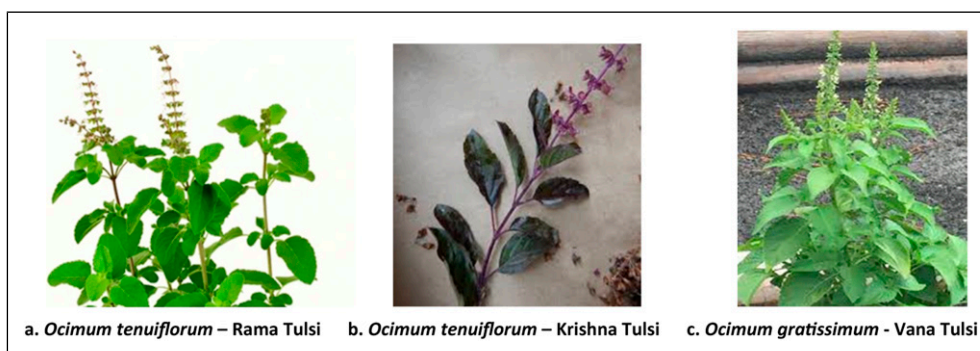


Figure 1. Varieties of tulsi

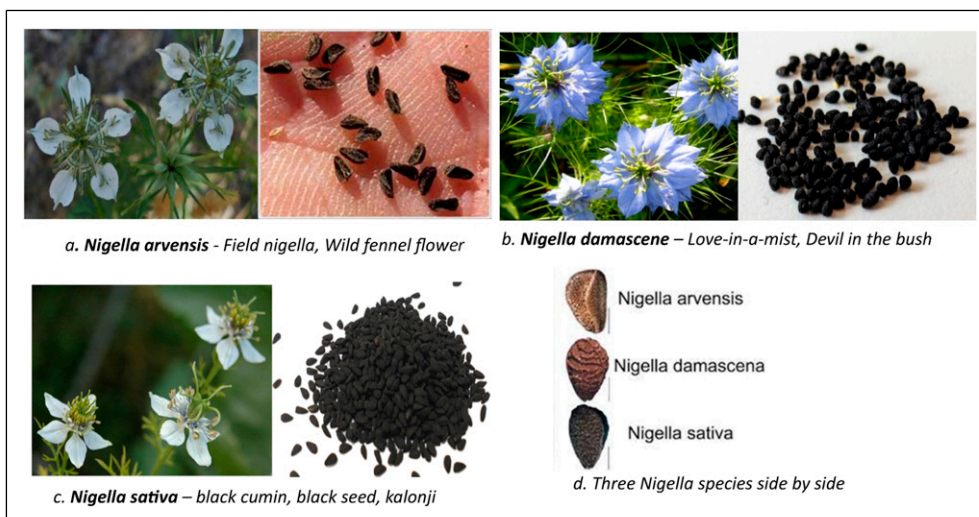


Figure 2. Varieties of *Nigella*, image courtesy – Anderas, G. et al,2013



Figure 3. Varieties of Rosemary, image courtesy - The daily CEO

Abbreviations

ATCM	Association of Traditional Chinese Medicine and Acupuncture UK
BAMC	British Ayurvedic Medical Council
HP	Herbal practitioners
NIMH	National Institute of Medical Herbalists
PIL	Participant information leaflet
TCM	Traditional Chinese Medicine
WHO	World Health Organization