

Title: **The Use of Traditional Herbal Medicines Amongst South Asian Diasporic Communities in the UK**

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### **Key words**

Ethnopharmacology; Herbal medicines; Traditional medicine; Polypharmacy; Urban ethnobotany.

### **Abstract**

Migrant South Asian (SA) communities in the UK have brought with them their own traditional forms of medicine, yet little is known about their current use of herbal medicines (HMs) in the UK. The aim of the study was to explore the origins, use and transmission of knowledge of traditional HMs used by diasporic SA communities in the UK.

A researcher administered questionnaire was used for data collection ( $n = 192$ ). An opportunity sampling technique was used recruit participants across several locations in Birmingham and Leicester. Two thirds of participants ( $n = 126$ ) stated they used HMs to maintain their health and to treat various health conditions such as digestive problems, skin conditions and diabetes. Almost two thousand actively used HMs were documented including 123 plant species which were identified. Participants imported HMs from abroad as well as sourcing them locally and even growing some of their own plants. Up to 82% ( $n = 87$ ) of participants who took prescription medicines did not tell their healthcare professionals about any HMs they consumed; this raises concerns about peoples knowledge of herb-drug interactions, compliance and effect on prescribed medicine regimens. Similar studies to explore the use of HMs by other ethnic groups is imperative to help optimise pharmaceutical care of patients.

## **1. Introduction**

It is estimated that in some developing countries more than 80% of the population depend on herbal medicines (HMs) for primary health care (WHO, 2008). However, the use of HMs is not limited to developing countries; over the past few decades interest in HMs in developed countries has been rising (Ernst and White, 2000; Pharmaceutical Press, 2013). The UK HMs market is relatively strong, especially with a diverse ethnic population that is interested in non-Western alternatives (Ministry of Foreign Affairs, 2014). Wachtel-Galor and Benzie (2011) suggest some of the reasons people use HMs include: cost (i.e. more affordable than conventional therapies), part of peoples' traditional background, HMs are perceived to have less adverse effects than chemical alternatives, to replace or supplement Conventional Western Medicines (CWM), and the notion of natural medicines being safer.

Sandhu and Heinrich (2005) note that, “*in the past decades a significant immigration from outside Europe has influenced European societies in a multitude of ways*” and observe that immigrants have brought their own culture, culinary skills, and traditional herbal remedies with them. The ethnic diversity in the UK means there is a great wealth of knowledge of HMs and variety of HMs are available for use. The increasing migration of people from the Indian subcontinent countries of India, Pakistan and Bangladesh (South Asia) to the UK has created large South Asian (SA) populations in the UK (Khunti et al., 2009). Results from the 2001 census revealed that SA ethnic minorities formed 3.9% of the UK population; this increased to over 5.3% in the 2011 census (Office for National Statistics, 2012). SA communities have a rich heritage of traditional herbal medicine; Ayurveda, Siddha and Unani are some of the most common systems of traditional medicine native to South Asia. The SA ethnic group is very diverse and composed of different cultures and religions all with their own interpretations of traditional herbal medicine yet little is known about their use of HMs in the UK.

There is a common misconception that HMs are natural and therefore safe and free from harmful effects (Ipsos MORI, 2008). However, there remains a lack of clinical evidence to support the safety and efficacy of many HMs, especially of products which are unregulated but used for medical purposes (Heinrich, 2015). There could be risks associated with the simultaneous consumption of HMs with CWM such as herb-drug interactions and adverse effects. The incidence of herb-drug interactions are still not fully known, and there is no reliable body of information to assess the potential problems (Wachtel-Galor and Benzie, 2011; Williamson et al., 2013). People who consume HMs

alongside CWM may not be aware of the risks associated with combining two medical systems together. Furthermore, it raises the question as to whether people who use HMs share the information about their use of HMs with their healthcare professionals (HCPs).

Hatfield (2007) identifies that the use of medicinal plants is part of our heritage, but fears this valuable knowledge is on the brink of extinction. Pieroni et al. (2010) claims that while most ethnobotanical research is currently conducted in exotic places, a gradual shift towards exploring herbal medicine traditions in '*back yards and urban environments*' will occur. They go on to say that ethnobotanists began to explore the use of plants by migrant populations in the late 1990s in North America; this was driven by an increasing interest in the use and perception of traditional HMs. In the UK, surveys to explore the use of HMs have been conducted (Ipsos MORI, 2008; Mintel, 2009); however, there is limited research into the use of HMs by SA communities in the UK (Bhopal, 1986; Sandhu and Heinrich, 2005; Pieroni et al., 2010).

The primary aim of this project was to, "*explore the origins, use, and transmission of knowledge of traditional herbal medicines used amongst SA diasporic communities in the UK*". The documentation of the immense knowledge of HMs which indigenous and local communities have passed on orally over generations has been a research focus in many regions of the world and clearly, there is a risk of losing this knowledge if not documented. The change of knowledge and practice in diasporic communities remains poorly explored (Vandebroeck and Balick, 2014; Pardo de Santayana, 2015) especially in the context of the relationship between participants who use herbal medicines and their healthcare professionals. This investigation looked at how two medical systems co-

exist in the UK. By incorporating concepts and approaches from ethnopharmacology and pharmacy practice this study has been able to document some of this precious information about the current use of HMs by SA communities in the UK.

## **2. Background and Methods**

### **2.1 Study area and participants**

The participant inclusion criteria for this research was South Asian (SA) adults including participants of Indian, Pakistani or Bangladeshi descent living in the UK (Office for National Statistics, 2012). There is no existing database which permits randomised or systematic identification of a suitable population of SA origin (i.e. the sampling frame); therefore, an opportunity sampling technique was used. For this reason there was no pre-defined target of gender or age group to survey. The sampling method used followed established practice in other similar studies whereby the target research population was directly approached in anticipation of recruiting more participants (Sandhu and Heinrich, 2005; Pieroni et al., 2010).

In total two hundred questionnaires were administered and returned across several locations in Birmingham and Leicester (one hundred questionnaires in each city); two cities the primary researcher knew well. The Census statistics suggested that Birmingham and Leicester would provide a reliable base for the field work as 7% of the population of England are now of SA origin; hence, the data would have wider applicability (Office for National Statistics, 2012). Statistics revealed that over 30% of the residents in Birmingham are from an ethnic minority group. The SA communities of interest in Birmingham have increased from 17.9% in 2001 to 22.5% in 2011 (Office for National Statistics, 2012). The demographic profile of Leicester, in 2007, revealed that

approximately 40% of Leicester's population were from an ethnic minority background (Leicester City Council, 2007). The 2011 Census suggests that the minority population of Leicester has risen to 54.9%, 35.8% of SA background (Office for National Statistics, 2012).

## **2.2 Data collection**

The questionnaire was designed to collect a range of quantitative and qualitative responses using a mixture of open and closed questions to explore people's perceptions and use of HMs. The questionnaire was split into four segments: the first section looked at participants' use and knowledge of traditional HMs, where HMs were sourced from and where participants learnt about HMs. This gave participants the opportunity to share in depth information about their knowledge, experience and views of HMs. The second section focused on participants' use of prescription medication and whether or not participants shared information about their use of HMs with their healthcare professionals (HCPs). The third part investigated how participants managed minor ailments and participants views of the safety and efficacy of HMs. The final section summarised participants' demographics (i.e. participants age, gender, personal and parents place of birth, ethnicity, religion and occupation).

This explorative study was conducted between September 2013 and November 2014. De Montfort University (DMU) ethical approval was obtained before the questionnaires were distributed. Initially the questionnaire was designed for participants to complete themselves; however, after conducting a pilot study the primary researcher concluded it was more appropriate to administer the questionnaire personally. Although this process was time consuming for the researcher the benefits outweighed the drawbacks. Advantages of the researcher administering the questionnaires included: the chance to

build rapport with the participants – gaining trust and better responses to questions, a higher response rate, more complete questionnaires returned, and clarification of questions therefore less invalid responses (Dornyei and Taguchi 2010). Furthermore, as the researcher was fluent in Punjabi, Hindi and Urdu it was easier to engage participants who could not understand, read or write English.

### **2.3 Botanical Validity and Authentication**

Since this study, was in essence, a survey, no voucher specimens could be collected. The botanical validity of herbal remedies used was documented, wherever possible, by assessing the label claims on products available and mentioned by participants. Consequently, adulteration and substitution might be possible, although this was not assessed as part of this study. All botanical names were validated taxonomically by using resources such as the Medicinal Plant Names Service (MPNS) <http://mpns.kew.org/mpns-portal/> and <http://www.theplantlist.org/>.

### **2.4 Data Analysis**

The Statistical Package for the Social Sciences (SPSS) software, version 21, was used to input the data from the questionnaires and analyse the results. The software enabled data to be coded; thus, allowing both quantitative and qualitative responses to be analysed. Microsoft Excel 2010 was used to create the graphical representations.

## **3. Results and Discussion**

Although, two hundred surveys were conducted across several locations in Birmingham and Leicester, eight were discarded as they were incomplete, leaving a total of one hundred and ninety two surveys for analysis. The sample was comprised of 69% (n=132)

female and 31% (n=60) male participants from a mixture of age ranges; with a larger proportion of participants in the 61 years plus group (30%, n=59).

The vast majority of participants (85%, n=163) said that HMs were part of their traditional family and cultural heritage. The family remains the primary source for transmitting traditional knowledge of HMs, as 80% (n=101) of participants claimed to have learnt about HMs from their family. In addition, 82% (n=157) of participants said they would seek advice from their family first for minor ailments; this signifies the importance of the family support network which has a vital role in transmitting traditional knowledge of HMs (Chhetri, 1994). Bhatia et al. (2014) recognised that knowledge of HMs has developed through age old experience and has been orally transmitted from one generation to another; hence, if the knowledge of HMs is not communicated with younger generations or documented, there is a risk of it being forgotten. This research has documented some of this important traditional knowledge (Appendix 1). Despite the family being the most common way of learning about HMs, some participants (20%, n=25) claimed to have learnt about HMs from their friends, religion, school, the television, radio, internet and social media (Facebook, Twitter and YouTube); these results identified diverse ways of learning about HMs.

Participants' knowledge of HMs was assessed by calculating the number of different herbal remedies, products or ingredients they recalled throughout the questionnaire. Just 5% (n=10) of participants were unable to list any herbal products; the average number of products recalled per person was ten, while the highest number of items recalled by one participant was thirty six. Results of the independent sample t-test revealed there was a significant difference ( $p=0.001$ , 2-tailed) in the knowledge of HMs between male and female participants; the mean (M) number of responses per female participant was 11 (SD



= 7.01), while for males  $M = 7$  ( $SD = 6.18$ ). Throughout history, across different cultures around the world, women have often had the responsibility of the families' health and prosperity (Chaudhury and Rafei, 2001; Hegg, 2013). This also seems to be the case amongst SA communities which could explain why female participants had more knowledge of HMs in comparison to male participants. The Mintel report (2009) also claims that females have more knowledge of HMs in comparison to males. A comparison of age and knowledge of HMs was conducted using an ANOVA test (one-way between-groups); it uncovered a statistically significant ( $p = 0.0003$ ) difference in knowledge between the different age groups, suggesting older participants had more knowledge of HMs than younger participants (Table 1). Despite this participants from all age groups did have an awareness of the potential uses of many different HMs.

The data highlighted participant's wealth of knowledge of HMs. Overall 1965 herbal remedies/ingredients/products with various medicinal uses were listed. The most popular item recalled by 109 participants (57%) was turmeric (*Curcuma longa* L.); its immune boosting properties, antibacterial effects for wound healing, and anti-inflammatory action in arthritis were frequently mentioned by participants. Several formulations of how to take turmeric were recorded, the most popular method (cited 45 times) for consuming turmeric orally was to mix a spoon of turmeric in warm milk (with the optional addition of butter or oil, honey and black pepper). Other frequently mentioned items included: ginger (*Zingiber officinale* Roscoe), ajwain (carom seed, *Trachyspermum ammi* L.), garlic (*Allium sativum* L.), tulsi (Holy basil, *O. tenuiflorum* L.), neem (*Azadirachta indica* A.Juss.), and black seed (*Nigella sativa* L.).

Ginger was mentioned for its use in arthritis due to its anti-inflammatory action which can help with the pain and loss of mobility caused by the condition. The notion that ginger

is *garam* and thus improves circulation was documented. *Garam* is a concept which was used by participants to classify ingredients which warm up the body, when translated into English it literally means 'hot'. In Ayurvedic and other traditional medical systems the term describes substances which heat the blood or warm the body temperature. Participants identified ingredients such as: *ajwain*, cumin, cloves, cinnamon, coconut, cardamoms, dates, garlic, karela, peanuts and turmeric as also being *garam*. According to the research participants, when *garam* ingredients are consumed in excess the side-effects of an overheated internal system can include: nose bleeds, dizziness, palpitations, sweating, itching, and gastric disturbances (e.g. diarrhoea or acid reflux). Nevertheless, the importance of consuming *garam* foods in proportion was highlighted for keeping the body healthy, and was said to be useful for treating conditions such as arthritis and diabetes. It was claimed that some *garam* foods should be avoided during pregnancy due to the risk of a miscarriage; for example, mangos and papaya during the first few months, while tulsi should be avoided throughout the entire pregnancy

The availability of SA ingredients to formulate HMs, and of commercial HMs is increasing in the UK, making it easier to obtain and use traditional remedies; as portrayed by participants in this study. Asian and Western chain supermarkets, health stores, and online retailers are trying to cater for the needs of migrant communities, in the UK, by stocking ethnic ingredients. However, some herbal products, such as neem and tulsi, were identified as being difficult to source in the UK; therefore, participants claimed they had to obtain products from other places such as the internet or abroad.

SA countries are rich sources of natural remedies and are renowned for their long standing use of HMs. Pieroni et al. (2010) claimed that HMs are embedded in the cultural heritage of SAs and is a representation of identity of migrant communities. Participants were asked

if HMs were part of their traditional family and cultural background to determine the current status of such traditions amongst SA populations in the UK, and to determine whether or not the knowledge of HMs is being passed onto generations born in the UK. In this study the majority of participants were first generation immigrants (n=108) or second generation citizens (n=75) in the UK. The significant majority of participants in this study (85%, n=163) said HMs were part of their heritage; this suggests that SA communities in the UK are aware of the traditional use of HMs, regardless of whether or not they use HMs themselves (Figure 1). Only 15% (n=29) of participants said HMs were not part of their traditional family background. The results revealed that most of the participants who said HMs were not part of their traditional family and cultural background were in the 18-30 years age group (n=15, of which 12 participants were second generation citizens), born in the UK (n=16), with at least one parent also born in the UK. As only a small number of participants claimed HMs were not part of their traditional family background, claims such as a loss of transmission of knowledge to SAs in the UK cannot be made; although, during data collection one participant did suggest that this was the case. Participant 39 commented on how Westernised her own children had become that they did not even let her use HMs which she knew worked, they only used Conventional Western Medicines (CWM) and never considered the use of HMs despite it being part of their heritage. It was also noted that two participants claimed their families only ever used CWM; thus, they were not aware of traditional or cultural practices of HMs.

When participants were asked if they took any regular prescribed medication, 55% of participants (n=106) claimed to take prescription medication for a variety of health conditions such as: asthma, arthritis, cardiovascular disease, diabetes, and thyroid

disorders. Participants who consumed HMs alongside their CWM were then asked if they shared this information with their HCPs; 69% (n=73) revealed they did not tell their doctor, while 82% (n=87) said they did not tell their pharmacist (Figure 2). Some participants feared they would be treated differently or not at all if their HCPs knew they were taking HMs at the same time as CWM. Participants commented on language and cultural barriers which prevented them from sharing information about their use of HMs with their HCPs; concepts such as *garam* (substances which ‘warm the body’ and acting as a stimulant) and *bhye* (internal imbalance causes symptoms such as increased salivation and nausea) which do not exist in Western medicine were difficult to explain to HCPs.

Herbal interactions can either alter drug pharmacokinetics (affecting the drugs absorption, distribution, metabolism and elimination) or pharmacodynamics (imitating or inhibiting a drugs mode of action). During the analysis of the data, several potential interactions between HMs participants used and CWM participants were prescribed were identified. Garlic was used for treating earache, thinning the blood, improving circulation and arthritis pain. Garlic has an enzyme inducing effect; therefore, it can reduce the effectiveness of drugs metabolised by CYP 3A4. In addition, its blood thinning properties could increase the risk of bleeding if consumed alongside anticoagulant or antiplatelet drugs. A crucial discovery of this research is that a large number of participants (n=87) do not tell their HCPs about their use of HMs. Various reasons for not sharing information about the use of HMs with HCPs were documented by participants, including: a fear of being labelled as backwards or old fashioned, treated differently or not treated at all, HCPs not understanding problems patients presented with (i.e. due to language and cultural barriers), and not seeing their HCPs to share this information with them. Some

participants in this study did not think it was important to share information about their use of HMs as they regarded them as being natural and therefore safe; this was also documented in the Ipsos MORI report (2008) where respondents did not think HCPs needed to know about their use of HMs. In order for HCPs to optimise patients' pharmaceutical care plans it is imperative for them to be aware of alternative medicines patients may be using. In extension to this research HCPs perspectives of HMs were also explored, a manuscript is in preparation.

#### **4. Conclusion**

The diasporic SA communities in the UK are an ethnic minority which remain highly underrepresented in ethnopharmacological research. This study has provided an insight into the current knowledge and use of HMs by migrant SA communities in the UK. It has uncovered that traditional HMs still have an important role in preventing, managing and treating health conditions. Valuable traditions are evidently still passed on verbally through generations and some of this knowledge has now been documented.

The study discovered that participants are using both traditional and conventional medicines simultaneously in the UK. This could lead to a risk of herb-drug interactions, adverse effects and also reduced compliance with prescribed regimens (Pharmaceutical Press, 2013). The research highlights the importance of integrative medicine, whereby we need to acknowledge and understand how to manage people using two parallel health systems with no cross-reference between them.

#### **5. Acknowledgements**

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**Table 1: Average number of herbal medicines cited by participants**

<b>Age</b>	<b>Number of participants</b>	<b>Average number of herbal medicines cited</b>
<b>20 or under</b>	43	6
<b>21 - 30 years</b>	47	8
<b>31 - 40 years</b>	10	12
<b>41 - 50 years</b>	12	13
<b>51 - 60 years</b>	21	13
<b>61 years +</b>	59	12
<b>Total</b>	192	10

**Appendix 1 – Top 50 herbal remedies recalled by South Asian participants**

<b>Family scientific name</b>	<b>English name</b>	<b>Traditional name</b>	<b>Traditional medicinal uses</b>	<b>Method of consumption</b>	<b>Number of citations</b>
<i>Allium sativum</i> L.	Garlic	<i>Lassan</i>	Antibacterial/ infections Arthritis Digestion Earache Improves circulation Skin conditions Thins the blood	-Infuse cloves in oil and instil into the ear for ear infections or apply to painful joints -Clove rubbed directly on to the skin -Used in cooking	77
<i>Allium cepa</i> L.	Onion	<i>Ghanda / pyaaz</i>	Arthritis General health Sickness	-Juice an onion and drink it if feeling sick -Rub onto affected joints for pain relief -Used in cooking	14
<i>Aloe vera</i> (L.) Burm.f.	Aloe vera	<i>Kwar</i>	Arthritis Burns Diabetes Eczema Itchy skin Skin conditions	-Apply sap into skin -Juice to drink -Used in cooking -Herbal formulations available (tablets, creams)	172
<i>Ajuga intergrifolia</i> Buch.-Ham	Bugleweed	<i>Thora/ kori buti</i>	Gout Menstrual problems	-Infused in water	3
<i>Amomum subulatum</i> Roxb.	Cardamom (Big)	<i>Elachi (Bhadi)</i>	Digestion Indigestion Nausea Reduces phlegm and mucus	-Chew whole -Infused in tea or water -Used in cooking	6
<i>Areca catechu</i> L.	Betel nut	<i>Supari</i>	Digestion Stimulant	-Nut is crushed and chewed -Incorporated in Paan -Used in cooking	5

Family scientific name	English name	Traditional name	Traditional medicinal uses	Method of consumption	Number of citations
<i>Azadirachta indica</i> A.Juss.	Neem	<i>Neem/ Nim</i>	Blood purifier Diabetes Skin conditions	-Infused in tea or water -Leaves rubbed onto the skin or infused in bath water -Tablets -Juice	52
<i>Brassica juncea</i> (L.) Czern.	Mustard	<i>Saron</i>	Dry skin Pain	-Apply oil to affected areas -Seeds used in cooking -Oil used as a base for numerous other conditions	34
<i>Capsicum annuum</i> L.	Chilli pepper	<i>Mirch</i>	Digestion Pain	-Make a paste with salt and turmeric and apply to joints. -Used in cooking	5
<i>Cicer arietinum</i> L.	Gram flour	<i>Besan</i>	Healthy alternative to wheat flour Skin cleanser	-Face mask made using yoghurt, honey, turmeric and lemon -Used in cooking	16
<i>Cinnamomum verum</i> (L.) Farw.	Cinnamon	<i>Dalchini</i>	Arthritis Colds Cough Digestion Cholesterol	-Infused in tea or water	84
<i>Citrus limon</i> (L.) Osbeck.	Lemon	<i>Nimbu</i>	Cough Skin lightener Sore throat	-Mix juice with honey and hot water (can add cinnamon, ginger or black pepper) -Rub lemon slice over skin to lighten or remove scars -Drink the juice -Infuse in water	49

Family scientific name	English name	Traditional name	Traditional medicinal uses	Method of consumption	Number of citations
<i>Cocos nucifera</i> L.	Coconut	<i>Nariyal</i>	General health Hair health and growth Skin conditioner	-Oil applied to hair and skin -Used in cooking -Consumed as part of diet –fresh, juice, milk, dried	10
<i>Coriandrum sativum</i> L.	Coriander	<i>Thunia or dhania</i>	Diabetes Digestion	-Seeds infused in water -Leaves/ seeds used in cooking	15
<i>Crocus sativus</i> L.	Saffron	<i>Kesar</i>	Digestion Enriches blood	-Infused in milk -Used in cooking	6
<i>Cuminum cyminum</i> L.	Cumin	<i>Jeera</i>	Arthritis	-Used in cooking -Dry roast in hot pan and chew/ mix with other ingredients	39
<i>Curcuma longa</i> L.	Turmeric	<i>Haldi</i>	Arthritis Cancer General health Immune boosting effects Inflammation Pain relief Skin conditions Sore throats/ cough Wound healing	-Mixed with milk, or hot water. -Make a paste using oil or water -Mix with honey and chew for a cough, or apply as a paste for skin problems	224
<i>Elettaria cadamomum</i> (L.) Maton.	Cardamom (small)	<i>Elachi (choti)</i>	Digestion Indigestion Nausea Reduces phlegm and mucus	-Chew whole -Infused in tea or water -Used in cooking	48
<i>Ferula assa-foetida</i> L.	Asafoetida	<i>Hing</i>	Digestion Reduces gas	-Used in cooking	12

Family scientific name	English name	Traditional name	Traditional medicinal uses	Method of consumption	Number of citations
<i>Foeniculum vulgare</i> Mill.	Fennel	<i>Saunf</i>	Bloating Constipation Cough Digestion	-Chew seeds -Infuse in tea -Used in cooking	42
<i>Glycyrrhiza glabra</i> L.	Liquorice	<i>Mulathi</i>	Cough Digestion	-Root boiled in tea -Herbal tablets -Sweets available	19
<i>Juglans regia</i> L.	Walnuts	<i>Karoth</i>	Arthritis Cholesterol Diabetes Essential fatty oil	-Eat a few daily -Grind and mix with other ingredients -Used in cooking	5
<i>Lagenaria siceraria</i> (Molina) Standl.	Bottle gourd	<i>Lauki</i>	Diabetes Digestion Weight loss	-Juiced -Used in cooking	3
<i>Laurus nobilis</i> L.	Bay leaf	<i>Tej patha</i>	Diabetes Digestion	-Used in cooking	7
<i>Linum usitatissimum</i> L.	Linseed/ flaxseed	<i>Alsi /ulsi</i>	Arthritis Cholesterol Constipation Diabetes Pain Strength/ energy	-Make into a mixtures called <i>pajiri</i> mixed with fruits and nuts -Roast on a hot pan and grind into a powder and take a spoon with water/ chew	10
<i>Mentha arvensis</i> L.	Mint	<i>Puthna</i>	Digestion Indigestion	-Leaves infused in water or tea -Used in cooking	144
<i>Momordica charantia</i> L.	Bitter gourd	<i>Karela</i>	Blood purifier Diabetes Vitamins	-Fresh karela juiced -Juice and tablets available -Used in cooking	58

Family scientific name	English name	Traditional name	Traditional medicinal uses	Method of consumption	Number of citations
<i>Moringa oleifera</i> Lam.	Drumsticks	<i>Moringa</i>	Arthritis Diabetes Vitamins & minerals	-Soaked in water overnight then liquid consumed next day -Used in cooking	4
<i>Murraya koenigii</i> (L.) Spreng	Curry leaf	<i>Limbro</i>	Diabetes Digestion	-Used in cooking	15
<i>Myristica fragrans</i> Houtt.	Nutmeg	<i>Jaifal</i>	Digestion	-Used in cooking	8
<i>Nigella sativa</i> L.	Onion / black seeds	<i>Kalonji</i>	Arthritis Diabetes Pain	-Seeds incorporated in cooking -Oil rubbed onto affected joints	22
<i>Ocimum tenuiflorum</i> L.	Holy Basil	<i>Tulsi</i>	Asthma Antibacterial Coughs and colds Diabetes	-Chew leaves -Infused in tea or water -Rub on to skin -Capsules, creams, oil& juice available	94
<i>Ocimum basilicum</i> L.	Basil	-	Boosts immune system	-Used in cooking	12
<i>Olea europaea</i> L.	Olive	Olive	Arthritis Ear wax/ infections Skin conditions e.g. eczema	-Apply oil to skin -Oil/ whole olives used in cooking -Warm oil and instil drops into ears (can add garlic to the oil if infection present)	40
<i>Papaver somniferum</i> L.	Poppy seeds	<i>Kaskas</i>	Arthritis Pain Digestion Diarrhoea	-Chew seeds -Infused in tea or water -Used in cooking	4

Family scientific name	English name	Traditional name	Traditional medicinal uses	Method of consumption	Number of citations
<i>Phyllanthus emblica</i> L.	Indian gooseberry	<i>Amla/ olay</i>	Healthy hair Strength/ stamina Digestion	-Fruit preserved in syrup can be eaten -Herbal formulations available e.g. oil and tablets	25
<i>Piper betle</i> L.	Betel leaf	<i>Paan leaf</i>	Digestion	-Leaf is used to wrap other ingredients which make Paan.	3
<i>Piper nigrum</i> L.	Black pepper	Kali mirch	Coughs & colds Digestion	-Chew the peppercorns -Infused in milk or tea -Used in cooking	52
<i>Plectranthus amboinicus</i> (Lour.) Spreng.	Indian borage	<i>Kapuraveli leaves</i>	Colds Congestion	-Soaked in water with black pepper & sugar candy for sore throat	3
<i>Prunus dulcis</i> (Mill.) D.A.Webb.	Almonds	<i>Badam</i>	Energy Mental stamina/ memory Skin and hair vitality	-Eat a few daily/ soak in water before eating -Used in cooking -Oil massaged on skin or in hair	22
<i>Rosa centifolia</i> L.	Rose water/ petals Sweet preserved rose petals	<i>Gulab jal</i> <i>Gulkand</i>	Constipation Digestion Eye health & vision Skin cleanser Reduces spots	-Instil drops into eyes -Apply directly on to skin -Leaves eaten as required -Used in cooking	25
<i>Rosmarinus officinalis</i> L.	Rosemary	Rosemary	Asthma/ chest problems	-Infused in tea or water -Used in cooking	9
<i>Sesamum indicum</i> L.	Sesame seeds	<i>Thil</i>	Improves circulation Reduce urinary frequency Warms blood	-Used in cooking -Mix seeds with <i>jaggery</i> -Oil to be applied topically	14

Family scientific name	English name	Traditional name	Traditional medicinal uses	Method of consumption	Number of citations
<i>Spinacia oleracea</i> L.	Spinach	<i>Palak</i>	Good for the blood Internal strength Source of iron	-Used in cooking	25
<i>Syzygium aromaticum</i> L.	Clove	<i>Long</i>	Pain Headache Toothache	-Infused in tea -Clove placed next to painful tooth	72
<i>Terminalia chebula</i> Retz.	Black Myrobalan or Indian Gall Nut	<i>Hardar</i>	Constipation Diarrhoea Digestion Liver protection	-Fruit preserved in sugar syrup -Powder taken with milk/ water -Herbal formulations	15
<i>Trachyspermum ammi</i> (L.) Sprague	Carum seeds/ Bishop's weed	<i>Ajwain</i>	Constipation Digestive aid Headache Indigestion	-Seeds to be chewed -Infused in tea or water -Soaked in water -Used in cooking	229
<i>Trigonella foenum- graecum</i> L.	Fenugreek	<i>Methi</i>	Arthritis Diabetes Digestion	-Leaves used in cooking -Seeds infused in water	66
<i>Viola odorata</i> L.	English violet	<i>Banaksha</i>	Coughs and colds	-Syrup -Tablets -Infused in tea or water	5
<i>Zingiber officinale</i> Roscoe	Ginger	<i>Adarak / Sond</i>	Arthritis Colds Digestion Pain Inflammation	-Mix with honey, hot water, and lemon -Chew it whole -Used in cooking -Infused in tea or water	179



