Rev Bras Farmacogn 24(2014): 197-205

Revista Brasileira de Farmacognosia
BRAZILIAN JOURNAL OF PHARMACOGNOSY
www.journais.elsevier.com/revista-brasileira-de-farmacognosia/

Original article

Ethnopharmacology in Ireland: an overview

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ARTICLE INFO

Article history:
Received 30 October 2013
Accepted 6 April 2014

Keywords:
Ethnopharmacology
Ireland
Asteraceae
Scrophulariaceae
Lamiaceae

A B S T R A C T

The aim of this review was to extract information of the book *Medicinal Plants in Folk Tradition: An Ethnobotany of Britain & Ireland* published in 2004 by Allen and Hatfield, to give an overview of plants with medicinal potential and their applications. This study attempts to attest, observe and comment on the diversity of plants, as well as the accompanying information which inevitably is vital for the future development of herbal medicines for human therapy. Initially, the information in relation to medicinal plants in Ireland only was extracted from the above-mentioned book and organised in tables. Afterwards, it was analysed through the construction of maps and the positioning of each piece of information in specific geographical regions of the country. Its division into provinces was taken into consideration as well as into counties within the provinces. These maps and graphs illustrate the most predominantly reported botanical families identified and utilised (Asteraceae, Scrophulariaceae and Lamiaceae), and to the most frequently cited medicinal uses were attributed to topical applications. As a result we can see that the uses of traditional medicines vary among these different geographical areas of the country. Not only different uses were reported but also different plants used to treat the same condition, or different conditions treated with the same plant depending on the county. Various phytopharmaceuticals date back several decades and despite the existing evolving technology, without a doubt herbal medicines can and still do provide exceptional and efficacious outcomes like many of the conventional remedies available today.

Introduction

Ethnopharmacology is the study of indigenous medical systems that connects the ethnography of health and healing with the physiologic relevance of its medicinal practices. The scientific rigor of ethnobotanical research has increased dramatically in the past two decades with the aim of understanding how and why people of a particular culture make use of indigenous plants in their local environment (Weldegerima, 2009).

Irish folk medicine has a rich and vibrant history, enriched with the various documented uses of plants, which are often unique to a particular geographical region or cultural area. Roughly half the worlds' pharmaceutical products in use today are plant-derived (Allen and Hatfield, 2004).

Although contemporary medicine may be available in most countries today, herbal medicines have often kept popularity due to historical and cultural reasons. Furthermore, as the mass of underdeveloped countries inevitably do not have access to the more up-to-date

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0102-695X/$ - see front matter
http://dx.doi.org/10.1016/j.bjp.2014.04.002

medicines available, traditional medicine is largely relied on for the treatment of diseases and injuries. According to the WHO, 'about 4000 million people in developing countries believe in the efficiency of plant remedies and use them regularly' (Alzweiri et al., 2011).

The book, *Medicinal Plants in Folk Tradition: An Ethnobotany of Britain & Ireland,* not only provided us with vital foundation from which expansion and further development can be made, but also enables the comparison between modern medicine culture and its traditional uses recorded decades ago, by means of comparison between which plant was used in the past and what is the current drug of choice to treat similar conditions.

The historical dimension of the ethnobotany studied by Allen and Hatfield is of great importance in contemporary approaches to traditional plant knowledge. In this study we aimed to elucidate the remarkable range of ailments treated with folk medicine and the counties where the most medicinal preparations and types of presentations are commonly employed. With further investigation of the most relevant pharmacological activities of various phytochemicals present, we hope to shed light on the reason behind their use and whether there is undiscovered potential worthy of future research. Assessing several references to various medicinal plants in Ireland can often highlight the differences in cultural and ethnic backgrounds, the types of medicinal plants and reasons of use.

This study was carried out as an attempt to preserve ancestral knowledge regarding ethnobotany, despite the loss of traditional knowledge between generations since folk medicine has proved to be invaluable in certain countries.

Materials and methods

The information, regarding Ireland from the book *Medicinal Plants in Folk Tradition: An Ethnobotany of Britain & Ireland* was collected and organised in tables and presented on graphs, figures and maps. The purpose was to compare distribution patterns of folk medicine treatments throughout the counties of Ireland to garner a rough view of the therapeutic applications comparable to current herbal medicine. The information acquired from this book was used as the basis from which the results could be generated. The information relating exclusively to Ireland was extracted and the results presented in Chart 1. The information gathered was put to individual maps of Ireland representing:

1) The counties/provinces where cited plants were located. For the purpose of this study, a particular plant species was only recorded once for a cited county regardless of the number of different uses mentioned.

2) The mentioned uses were sorted according to target body system. The six body systems considered were digestive system, respiratory system, central nervous system, cardiovascular system, urinary system, and others for the cases in which a particular ailment didn't apply for any of the above mentioned body systems.

3) The form of presentation used. As it is virtually impossible to gather all types of presentations of every medicinal plant used in traditional medicine due to lack of available knowledge, they could not be accurately represented on a county map.

A review of the existing literature was then preformed using Science Direct, EMBASE and PubMed online scientific databases which provided relevant information. From these searches, the main plant species as their current applications were observed.

Results

Ireland can be considered a small country compared to the majority of European and other countries worldwide; however it has a remarkable plant diversity. Despite Allen and Hatfield's attempt to encompass all the plants used in folk medicine, it most certainly is possible that more are yet to be discovered for their potential pharmacological activity. A total of 200 medicinal species belonging to 78 different families were documented in this book for Ireland alone.

Plant families and species

Numerous conclusions can be drawn related to the medicinal plants used in folk medicine in Ireland, from the information contained in the book above-mentioned.

Chart 1
Relevant information collected for Wild Rose from the book.

Scientific name	Plant family	Common name	Counties cited in	Uses	Presentation	Other relevant information, including pictures
Rosa sp.	Rosaceae	Wild Rose	Donegal	Cough treatment	Juice of the plant was drunk - solution	

The fifteen plant families most widely cited are presented in Fig. 1. The families Asteraceae, Scrophulariaceae and Lamiaceae were the most cited; and plants of the Asteraceae family were reported in 29 out of the 32 counties evaluated. Other families such as Rosaceae, Araliaceae, Apiaceae, Plantaginaceae, Boraginaceae and Brassiacaceae, to mention just a few, were also reported although less frequently.

Similarly the fifteen most widely reported plant species are presented in Fig. 2. It is important to note that each plant was only recorded once per county regardless of the number of uses attributed. For example, *Allium ursinum* (A.U) was reported to be used in 14 different counties. The four prominent plant species reported by Allen and Hatfield include *Rumex acetosa* (R.A), *Rumex obtusifolius* (R.O), *Hedera helix* (H.H), and *Menyanthes trifoliata* (M.T).

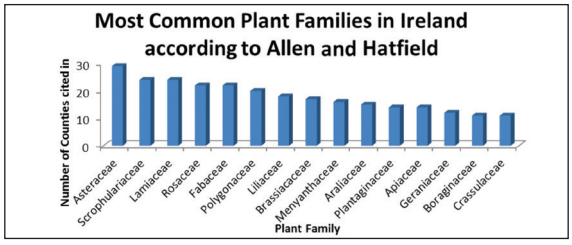


Figure 1 - Fifteen most reported plant families used for traditional medicine in Ireland.

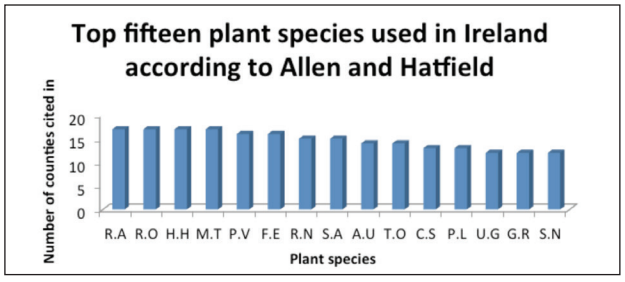


Figure 2 - Fifteen most reported plant species described as traditional medicines in Ireland. R.A, *Rumex acetosa*; R.O, *Rumex obtusifolius*; H.H, *Hedera helix;* M.T, *Menyanthes trifoliate*; P.V, *Prunella vulgaris*; F.E, *Fraxinus excelsior*; R.N, *Rorippa nasturtium*; S.A, *Senecio aquaticus*; A.U, *Allium ursinum*; T.O, *Taraxacum officinale*; C.S, *Cytisus scoparius*; P.L, *Plantago lanceolata*; U.G, *Ulex gallii*; G.R, *Geranium robertianium*; S.N, *Scrophularia nodosa*.

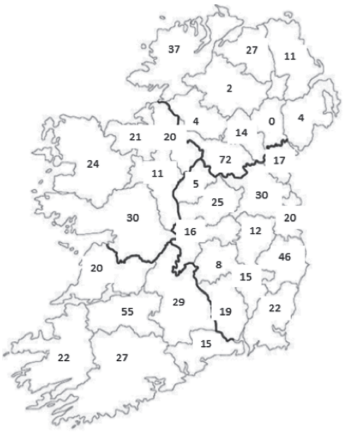
Applications and presentations

The reported plants were used to treat a wide spectrum of illnesses including disorders of the digestive, respiratory, urinary, cardiovascular and central nervous system; and the most frequently cited medicinal uses were topical applications. This data, covers a wide range of ailments such as eczema, rashes, warts, burns, wounds, among others. Although it is virtually impossible to register all forms of presentation for each condition, due to the lack of studies on the uses of plants in folk medicine, it can be seen from the results that the most frequently quoted preparation of medicinal plants were decoctions and infusions. Nevertheless, direct application of the plant material, pastes and ointments were also common methods of administration that remain used the same way nowadays.

Distribution of uses

In Fig. 3 the distribution pattern among counties across the country of the medicinal plants cited is presented. Cavan and Limerick are the two counties with the highest number of medicinal plants used in folk medicine mentioned, recording a total of 72 and 55 species respectively. On the other hand, Tyrone and Armagh, both counties in the province of Ulster, were expected to feature a higher number of plants based on area and population, however two and zero citings were recorded, respectively. Plants recorded having 'Ulster' as their origin were not listed in the county map but were in the province map. Therefore, although Armagh was not mentioned in particular in the book, applications in that region may have been recorded. A remarkable pattern noticed was the high number of citings recorded on the western coast, particularly from those counties bordering the Atlantic Ocean. These counties are located far away from the capital city of Dublin which could possibly be an explanation for this occurrence. Dublin may have been the first place where contemporary medicine was introduced and hence a delay in the spread of these medicines may have prolonged the use of traditional medicinal plants amongst these coastal counties.

From Fig. 4, it is evident that Northern Ireland has much less history of using plants for medicinal purposes than the Republic of Ireland. If the two predominantly contributing counties in Ulster are removed, that of Cavan recording 72 different plant species and Donegal with 37 citations, the



County	No.	County
Armagh	20	Clare
Tyrone	20	Leitrim
Fermanagh	21	Sligo
Drown	22	Kerry
Longford	22	Wexford
Laois	24	Mayo
Roscommon	25	Westmeath
Antrim	27	Derry
Kildare	27	Cork
Monaghan	29	Tipperary
Waterfotd	30	Galway
Carlow	30	Meath
Offaly	37	Donegal
Louth	46	Wicklow
Kilkenny	55	Limerick
Dublin	72	Cavan

Figure 3 - Number of different plant species cited per county in Ireland according to Allen and Hatfield (2004).

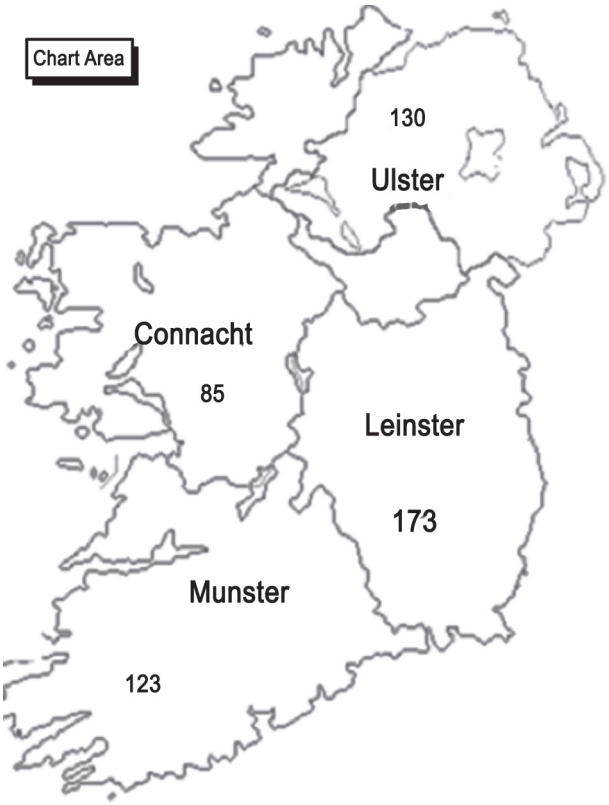
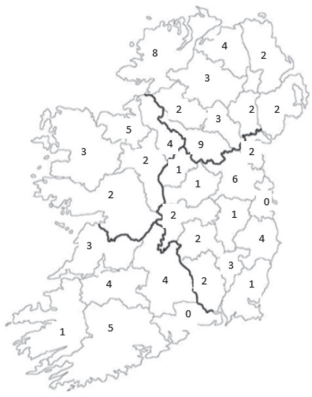


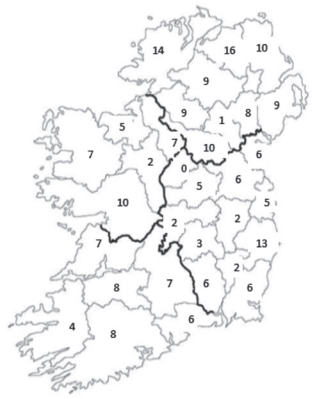
Figure 4 - Number of different plant species shown per province in Ireland according to Allen and Hatfield (Allen and Hatfield, 2004).



No.	County	No.	County
0	Waterford	2	Fermanagh
0	Dublin	3	Mayo
1	Cork	3	Monaghan
1	Wexford	3	Tyrone
1	Kildare	3	Clare
1	Westmeath	3	Carlow
1	Longford	4	Limerick
2	Kilkenny	4	Tipperary
2	Laois	4	Leitrim
2	Offaly	4	Wicklow
2	Louth	4	Derry
2	Galway	5	Cork
2	Roscommon	5	Sligo
2	Antrim	6	Meath
2	Down	8	Donegal
2	Armagh	9	Cavan

	Number of Species Cited
Total (Ireland)	93
Leinster	25
Munster	17
Ulster	35
Connacht	16

Figure 5 - Number of recorded digestive system uses per county in Ireland according to Allen and Hatfield. The table shows the distribution per provinces in the country.



No.	County	No.	County
0	Longford	7	Clare
1	Monaghan	7	Mayo
2	Roscommon	7	Leitrim
2	Carlow	7	Tipperary
2	Offaly	8	Limerick
2	Kildare	8	Armagh
3	Laois	8	Cork
4	Kerry	9	Fermanagh
5	Westmeath	9	Tyrone
5	Sligo	9	Down
5	Dublin	10	Cavan
6	Waterford	10	Antrim
6	Kilkenny	10	Galway
6	Meath	13	Wicklow
6	Louth	14	Donegal
6	Wexford	16	Derry

	Number of species cited
Total (Ireland)	213
Leinster	56
Ulster	86
Munster	40
Connacht	31

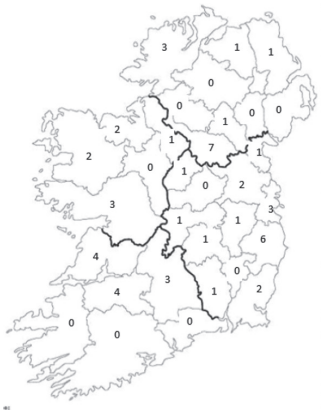
Figure 6 - Number of recorded respiratory system uses as per county in Ireland according to Allen and Hatfield. The table shows the distribution per provinces in the country.

province is only left with 29 different plant species registered. Connacht also has a relatively low number of recorded plant species when compared to Leinster. This could be explained as a result of the failure communication spreading of the uses formerly originated in Dublin. The remarkably high number in Leinster of 173 different plant species reported could possibly be due to the higher population close to the capital. The relative remoteness of the north-western corner of the country could account for the remarkably large number of plant species used in Donegal (37). Remedies originating in this area could have acquired a faithful following which failed to spread due to socio-economic isolation? For example, wild rose was used as a cough remedy in Donegal but failed to spread to the surrounding counties, similar to *Hedera helix* which was used on bad sprains exclusively in Donegal.

In Fig.5, Cavan and Derry counties account for the most medicinal plants used to treat digestive disorders, recording 9 and 8 applications, respectively. The most common digestive diseases recorded in folk medicine were constipation, diarrhoea and jaundice, all of which were cited in counties across Ireland. A particularly unusual recording was the application of *Senecio jacobaea* in Antrim for the treatment of bowel hives in children. It is noteworthy the lack of use of herbal drugs to treat digestive ailments in both Dublin and Waterford.

Fig. 6 shows that the number of different respiratory disorders treated is extremely high. This could be due to the Irish climate allowing coughs, colds and other respiratory related conditions. It is evident on the map, inland counties have a significantly lower number of ailments treated than coastal counties, which could be related to coastal cold and windy conditions. The most popular treated ailments were coughs, colds and sore throats, and with whooping cough in high numbers.

Fig. 7 demonstrates that a lot of counties throughout Ireland did not use medicinal plants in folk tradition to cure cardiovascular ailments. However, Cavan, Meath, Clare and Tipperary are among the most highly scored counties. The most prevalent symptoms or cardiovascular diseases recorded were 'heart trouble' and heartburn. Numerous medicinal



No.	County	No.	County
0	Cork	1	Leitrim
0	Kerry	1	Monaghan
0	Waterford	1	Derry
0	Roscommon	1	Antrim
0	Carlow	2	Wexford
0	Westmeath	2	Meath
0	Down	2	Mayo
0	Armagh	2	Sligo
0	Fermanagh	3	Tipperary
0	Tyrone	3	Dublin
1	Offaly	3	Galway
1	Kildare	3	Donegal
1	Laois	4	Limerick
1	Kilkenny	4	Clare
1	Longford	6	Wicklow
1	Louth	7	Cavan

	Number of species cited
Total (Ireland)	51
Leinster	19
Ulster	13
Munster	11
Connacht	8

Figure 7 - Number of recorded cardiovascular system uses as per county in Ireland according to Allen and Hatfield. The table shows the distribution per provinces in the country.

No.	County	No.	County
0	Offaly	1	Wexford
0	Laois	1	Limerick
0	Kildare	1	Tipperary
0	Longford	2	Cork
0	Louth	2	Kerry
0	Mayo	2	Waterford
0	Leitrim	2	Clare
1	Tyrone	2	Kilkenny
1	Antrim	2	Westmeath
1	Armagh	2	Fermanagh
1	Down	2	Monaghan
1	Sligo	2	Donegal
1	Roscommon	2	Galway
1	Meath	3	Wicklow
1	Dublin	3	Derry
1	Carlow	6	Cavan

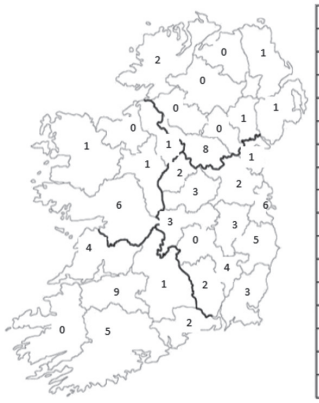
	Number of species recorded
Total	44
Leinster	11
Ulster	19
Munster	10
Connacht	4

Figure 8 - Number of recorded urinary tract system uses as per county in Ireland. The table shows the distribution per provinces in the country.

plants were also frequently employed to 'cleanse the blood'. For example, *Convallaria majalis*, commonly known as Lily of the Valley was reported to be used in Antrim and Cavan for heart trouble whereas *Allium ursinum* was used to treat hypercholesterol and to lower the formation of blood clots.

The distribution of plants used for topical diseases is presented in Fig. 8, where a great number of different uses exist compared with other body systems. For example, in Wicklow alone thirteen different topical disorders where medicinal plants could be considered useful were recorded. This large number may coincide with the lack of hygiene in the past (Weatherall and Chee, 2006) allowing the population more susceptible to skin diseases. The most commonly recorded topical illnesses included rashes, burns, warts, ringworm, wounds and bruises. However, other less common disorders were recorded, like the application of an ointment made from *Alchemilla vulgaris* to treat impetigo in Kildare. The treatment of chilblains in the South-Eastern part of the country may have been caused by the climate or the diet in this area.

In Fig. 9 medicinal plants used to treat various disorders of the urinary/reproductive system are presented. Cavan recorded the most number of uses, citing applications for six different disorders in total. The most commonly recorded disorder is for problems associated with the kidneys. Among kidney disorders, renal and biliary stones are the most mentioned by Allen and Hatfield, however, as it could have proven difficult for the Irish population to distinguish among different kidney diseases, the same description for different kidney diseases could have been used in traditional medicine. Among the many plants used for kidney problems *Gernium robertianum* was cited to be used in Cavan, Meath, Aran Islands, Limerick, Carlow, and Kerry. Among the rarest recordings was *Agrimonia eupatoria* which was used for bed-wetting in Wicklow.



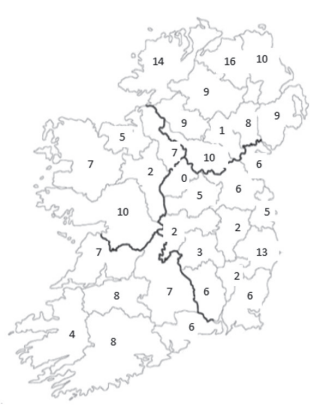
No.	County	No.	County
0	Derry	2	Longford
0	Tyrone	2	Kilkenny
0	Fermanagh	2	Meath
0	Monaghan	2	Donegal
0	Sligo	3	Offaly
0	Laois	3	Westmeath
0	Kerry	3	Kildare
1	Mayo	3	Wexford
1	Roscommon	4	Carlow
1	Leitrim	4	Clare
1	Tipperary	5	Wicklow
1	Louth	5	Cork
1	Armagh	6	Dublin
1	Antrim	6	Galway
1	Down	8	Cavan
2	Waterford	9	Limerick

	Number of species cited
Total (Ireland)	75
Leinster	34
Ulster	13
Munster	21
Connacht	9

Figure 9 - Number of recorded CNS uses as per county in Ireland . The table shows the distribution per provinces in the country.

Fig. 10 shows the narrow range in folk medicine of disorders associated with the central nervous system treated with medicinal plants. The most commonly reported citings were for conditions such as headache, toothache and neuralgia. A decoction of mistletoe *Viscum album* was used for soothing the nerves, in Leitrim a wash of *Laminaria digitata* was thought to be beneficial in cases of paralysis, whereas *Primula veris* was used in Cavan Dublin, Clare, and Limerick to treat insomnia.

The species that were not used for any of the above systems were grouped together as "other". This included medicinal plants used for the skeletal system. In this particular category are *Allium ampeloprasum* which was employed in Donegal for



No.	County	No.	County
0	Longford	7	Clare
1	Monaghan	7	Mayo
2	Roscommon	7	Leitrim
2	Carlow	7	Tipperary
2	Offaly	8	Limerick
2	Kildare	8	Armagh
3	Laois	8	Cork
4	Kerry	9	Fermanagh
5	Westmeath	9	Tyrone
5	Sligo	9	Down
5	Dublin	10	Cavan
6	Waterford	10	Antrim
6	Kilkenny	10	Galway
6	Meath	13	Wicklow
6	Louth	14	Donegal
6	Wexford	16	Derry

	Number of species cited
Total (Ireland)	213
Leinster	56
Ulster	86
Munster	40
Connacht	31

Figure 10 - Number of other uses (including skeletal) recorded as per county in Ireland. The table shows the distribution per provinces in the country.

the treatment of cattle disease, *Glechoma hederacea* used in various counties across Ulster to stimulate menstruation in cases of chlorosis, *Umbilicus rupestris* used in Mayo as an abortifacient, *Salix repens* used in Galway as an ointment for baldness, and *Conium maculatum* which was thought to cure giddiness but the specific origin of use is unknown. However, when we looked towards skeletal diseases, rheumatism was the main application treated in folk medicine throughout the majority of counties of Ireland. *Rorippa nasturtium* was used as a poultice in Cavan and Roscommon for the treatment of this specific ailment. A noteworthy recording was the use of *Rubus idaeus* in Antrim during childbirth, and *Fragaria vesca* which was used as a tea for excessive odour, also in Antrim.

Discussion

The information gathered confirms that original groups in Ireland had practiced and transmitted the knowledge of herbal medicine. However, one cannot deny the disappearance of ample ethnopharmacological information due to the lack of communication throughout the generations. In view of the rapid loss of such vital knowledge, documentation of any information available has become an essential task for the mutual benefit of the current and future generations. The preservation of traditional knowledge is not the only benefit reaped from ethnobotanical studies; these may allow plant identification that may be of medicinal or commercial interest that can generate incomes for local communities.

Allen and Hatfield in their book *Medicinal Plants in Folk Tradition: An Ethnobotany of Britain & Ireland*, attempt to reclaim our diminished tradition. Among the 78 different botanical families reported, Asteraceae, Scrophulariaceae and Lamiaceae were the most widely cited in Ireland. They are briefly discussed below.

Asteraceae

Taraxacum officinale, commonly known as dandelion belongs to the Asteraceae family. It is commonly used throughout a wide number of countries and is of great relevance for phytotherapy in traditional and folk medicine. Native to Europe and Asia, and having been introduced to North America and Australia, the dandelion is renowned for its diuretic properties, for promoting urine flow and assisting with renal problems. Included in the European Pharmacopoeia as a herbal medicine, it was also approved by the The German Commission E for a variety of different indications, including conventional remedies for dyspeptic complaints, infections of the urinary tract, liver and gallbladder complaints and loss of appetite (Biagioli, 2000). This can be attributed to the considerable amount of sesquiterpene lactones which not only stimulate digestion by salivation, production of stomach acids and enzymes, among others, but are also suggested to exert anti-inflammatory and anticancer effects (Goos et al., 2007). As reviewed by Schütz et al. (2006), the dandelion, due to its antioxidant activity, may be used for its possible beneficial effects against t obesity, cancer and numerous cardiovascular risks (González-Castejon et al., 2012).

Although the dandelion is a well-known species, other lesser-known species of the Asteraceae family are of use. *Antennaria dioica* has been used as an astringent and a styptic, it also has been chewed and mixed with cobwebs to staunch bleeding; and *Artemisia vulgaris* has been used to treat epilepsy (Allen and Hatfield, 2004). Boiling leaves with salty water from *Tanacetum vulgare* or tansy plant has been cited throughout Ulster as an emmenagogue, for indigestion or pains in the joints. An infusion was used for the treatment of gout and other parts of the plants were used to treat jaundice and fevers, or as a vermicidal purge (Allen and Hatfield, 2004). *Bellis perennis* or daisy was widely employed in folk medicine throughout the country for a wide range of applications; coughs and colds, headaches, ringworm, whitlows, chilblains, blasts, erysipelas, stomach or liver complaints.A solution of the plant was drunk or the plant was used to make ointments to heal burns. Boiling pieces of the plant with sugar and soap in a tin until the mixture turned black was employed in the treatment of boils (Allen and Hatfield, 2004).

Senecio aquaticus or *S. jacobaea*, commonly known as ragwort is a perennial growing herb belonging to the Asteraceae family. Despite its' carcinogenic effects, traditional folk medicinal used for the treatment of painful menstruation, urinary tract inflammation, chronic cough, rheumatism, anaemia and anaemic headaches. The frequent use of ragwort for chronic cough can be linked back to its former use which was for colds, coughs and sore throats recorded in Cavan, Sligo, Meath, Clare and Limerick (Allen and Hatfield, 2004). All of the recordings by Allen and Hatfield related its use as topical in the form of a wash for burns and scalds, a gargle in the case of respiratory ailments or as a poultice for boils, abscesses, rheumatic complaints, sprains and swollen joints (Allen and Hatfield, 2004). Little to no studies have demonstrated the medicinal use of *Senecio Jacobaea* in conventional therapy and the chemical constituents plant are assessed it is evident the threat to both human and animal health. The pyrrolizidine alkaloids present

in this particular plant are extremely toxic for cattle and other livestock causing severe liver toxicity if ingested by humans.

The herbal remedy *Chamaemelum nobile* or chamomile, also belonging to the Asteraceae family has been used in traditional medicine for thousands of years and is best known for its ability as an infusion to ease stomach ailments and as a mild sedative. Allen and Hatfield recorded the plants' further use in swellings and inflammation, where hot fomentations were used, a poultice of the plant applied to boils and an ointment derived from the plant which was used to cure boils and colds (Allen and Hatfield, 2004).

Scropulariaceae

Scropulariaceae, the second most cited botanical family in Irish folk medicine includes the well-known *Digitalis purpurea* or foxglove. An extremely popular herb in folk medicine, Allen and Hatfield recorded its application for heart trouble, tuberculosis, coughs, skin complaints, wounds, lumps and swellings, sprains, burns, old ulcers, festering of stone-bruises, and as a repellent (Allen and Hatfield, 2004). This plant is no longer used due to its toxic nature; however, the closely related *Digitalis lanata* contains digoxin which is commonly prescribed nowadays for congestive heart failure or for the treatment of cardiac arrhythmias. (Newman et al., 2008) *Scrophularia nodosa*, common figwort had numerous applications in folk medicine: a tonic was used to clear the blood of impurities, for rashes, boils, bronchial ailments, sore throats and coughs; an ointment was used for sore throats and goitre; a poultice was used on sprains, swellings, burns, wounds and erysipelas; and a cocktail of the plant was drunk for liver, kidney and stomach problems. Reports of its application in sudden stroke were also recorded, however geographic origin and utilisation is unclear (Allen and Hatfield, 2004). Its' applications for anti-inflammatory and skin disorders were further documented by M. Ahmad who also identified its predominant active components: saponins, cardioactive glycosides and flavonoids (Ahmad et al., 2012). Other species belonging to this family, the fermander speedwell (*Veronica chamaedrys*) was ground and boiled in milk to treat epilepsy, and for the treatment of jaundice the leaves and stems were boiled and the liquid drunk (Allen and Hatfield, 2004).

Lamiaceae

Lamiaceae, a very significant botanical family was registered in 24 of the 32 counties in the book *Medicinal Plants in Folk Tradition*. This family includes the plant species *Prunella vulgaris,* also commonly known as self-heal which is an "Irish herb par excellence" with three principle but distinct functions for folk medicine: to staunch bleeding, to ease respiratory complaints and to treat heart trouble (Allen and Hatfield, 2004). There is an increasing commercial demand for the plant due to its potential anti-inflammatory, antiviral and antibacterial properties. It also has a reputation as a heart remedy with recordings scattered throughout Ireland for weak blood. One of the main components is rosemarinic acid, a phenolic component with antioxidant effects that inhibits lipid peroxidation at membranes which eliminates the oxidative stress in cardiomyocytes (Chen et al., 2012). A study carried out by Neves et al. in Northern Portugal revealed a variety of uses for the flower and aerial parts of the plant. Among them were mouth and throat infection, as a hypotensive agent and as an antidysenteric (Neves et al., 2009).

Thymus vulgaris or thyme as an infusion was used to aid in respiratory problems and act as a sedative; it could also be mixed with honeysuckle and wild sage to cure tuberculosis. There are also reports accounting for the sniffing of the plant to banish headaches (Allen and Hatfield, 2004). Thyme is still use in contemporary medicine where it has been approved by the Commission E for cough and bronchitis. The herb is used internally for catarrh of the upper respiratory tract, dyspeptic complaints, asthma, laryngitis, chronic gastritis and whooping cough. Externally, it is used as a mouthwash and gargle for inflammations of the mouth and throat, pruritus, and dermatoses, tonsillitis and poorly healing wounds. The triterpenes present within the plant increases isoprenaline-induced relaxation of the smooth bronchial muscle and increased secretion of surfactant factors contributing to the spasmolytic activity (Danloy et al. 1994).

Although many applications reported by Allen and Hatfield are no longer used, some uses have clearly been passed on through effective communication between generations and have essentially stood the test of time. Through the binding of particular active constituents to receptors, a pharmacological response can be identified, thus proving their benefit as herbal medicines. Despite the absence of evidence confirming the applications of the plants in some cases, the majority of the above mentioned medicinal plants are currently used. The herbal therapies available in pharmacies and health stores nationwide are vast. *Allium sativum* or garlic is used as an herbal medicine, particularly useful in cardiovascular ailments. It has been approved by the Commission E for arteriosclerosis, hypertension and for the treatment of raised levels of cholesterol (Biagioli, 2000). Its main bioactive constituent, S-allyl cysteine sulphoxide, is an organosulphur-containing amino acid. It is thought to possess antioxidative, anticancer, antihepatotxic effects and reduces the risk of stroke via reduction in LDL cholesterol levels (Asdaq and Inandar, 2010). Although its main application focuses on cardiovascular diseases, it can be employed for respiratory ailments. In folk medicine, garlic was utilised internally for inflammatory respiratory conditions, whooping cough and bronchitis and is currently available as a tincture in pharmacies. The leaf of a related species, *Allium ursinum* is chewed to release the active compound allicin, and is popular for the treatment of chest and lung infections, coughs, colds and asthma (Allen and Hatfield, 2004). The high concentration of antioxidants in the leaves make this an attractive agent for various inflammatory ailments particularly rheumatism (Stajner et al., 2008).

Furthermore, the herbal remedy *Zingiber officinale* is still very popular throughout Ireland for the treatment of nausea and vomiting during pregnancy despite the increasing concern over its safety. The plant is believed to possess carminative, diaphoretic, and antispasmodic properties and thus an infusion or decoction of the plant is commonly used to cure dyspeptic complaints and to prevent travel sickness. Its pharmacological action is attributed to an increase in gastric tone and peristalsis via anticholinergic and antiserotonergic pathways (Ding et al., 2013).

Eucalyptus oil presentations, which are available in pharmacies nationwide are common herbal remedies used as a decongestants and expectorants for upper respiratory tract disorders such as pharyngitis, bronchitis and sinusitis (Elaissi et al., 2012) as well as for various musculoskeletal conditions. The leaf contains eucalyptol which accounts for 70-90% of the essential oil composition, and is thought to supress edema formation and reduces pain and inflammation (Jun et al., 2013) and so the oil is used to treat coughs and bronchitis. An oil extract is found in numerous over-the-counter cough and cold preparations as well as in inhalation vapours or topical ointments. Eucalyptol can also be found in Listerine mouth rinse which is commonly used for the reduction of dental plaque and gingivitis.

Some of these medicinal plants are currently used, however, sever others are not employed anymore due to their high toxicity. Many of these herbal preparations have stood the test of time and refuse to be replaced by modern medicinal preparations.

Phytochemicals have shown to have a significant influence on various medicinal products determining their pharmacological effect which inevitably predicts the particular usage and presentation type. For instance, tannins present in *Rumex acetosa* account for the plant's use for inflammatory ailments of the nasal passageways and respiratory tract; as the mucolytic, spasmolytic, bronchodilatory and antibacterial effects of *Hedera helix* can be explained by the presence of triterpene saponins (Song et al., 2014).

Dissecting this book allowed the documentation of cultural heritage along with the ethnopharmacological information and preservation of this indigenous knowledge from being lost irretrievably. Folk medicine has significantly evolved over the years with older remedies being replaced by newer, perhaps more effective remedies in some cases. While some remedies have survived the passing of time with similar applications been employed nowadays, the majority have been lost from contemporary medicine.

Conclusion

Despite the development of more advanced methods for human treatment, a large portion of the world population, especially in developing countries, depend on traditional medicine for the treatment of diseases and injuries. Hundreds of plant genera playing a significant role in indigenous medicine have been recorded within the folk medicine in Ireland, and this review attempts to preserve this information before it gets lost irretrievably. The research conducted revealed a large amount of folk medicinal plants and modes and purposes of employment.

It is clear from the findings that many of the plants studied may be potential sources for new therapies, turning unexplored plant species a promising subject for further pharmaceutical research. Knowledge of indigenous herbal medicines amongst the Irish population is limited and predominantly unevenly distributed, so efforts to elucidate this should be intensified.

Analysing the information gathered by Allen and Hatfield, we can deduce that the main forms of use of these herbs were for topical diseases, being the inadequate hygiene in past times an important factor in this regard. The broad variety of indications and the reported frequencies underpin the crucial role medicinal plants play in traditional Irish medicine. Medicinal plants can also be considered crucial nowadays having a significant role in the evolving technology associated with human health care with the majority of therapies available involving the use of plant extracts and their active constituents. The recorded data was compared with recent ethnobotanical studies with the primary objective of explaining the role played by cultural/ethnic components for shaping the use patterns of wild medicinal plants. Noticeable differences were established between the counties of Ireland regarding plant use, with counties closer to Dublin having higher numbers of species cited, possibly due to population differences or simply a lack communication spreading outwards.

It is impossible to deny that many cultures are still relying on medicinal plants for primary health care, and many others opting to use alternative medicines like herbs and plants, however more research is needed. Only a minority of the Irish population know much about the use of medicinal plants due to the loss of information to younger generations. Despite the numerous studies undertaken to fully understand the area of herbal medicine, ample areas have yet to be explored. Hence, ethnopharmacological information of medicinal plants in Ireland is vital for the preservation of any indigenous knowledge remaining as Allen and Hatfield attempted to do in their book *Medicinal Plants in Folk Tradition: An Ethnobotany of Britain & Ireland*. The study of ethnopharmacology provides the rationale for selection and pursuit of scientific research medicinal plants in Ireland, which,have and continue to be used effectively by significant groups of people.

Authors contributions

YC wrote the manuscript; FB designed the study, and contributed to critical reading of the manuscript. All the authors have read the final manuscript and approved the submission.

Conflicts of interest

The authors declare no conflicts of interest.

REFERENCES

Ahmad, M., Muhammad, N., Mehjabeen,, Jahan, N., Ahmad, M., Obaidullah, Qureshi, M., Jan, S.U., 2012. Spasmolytic effects of *Scrophularia nodosa* extract on isolated rabbit intestine. Pak. J. Pharm. Sci. 25, 267-275.

Allen, D.E., Hatfield, G., 2004. *Medicinal Plants in Folk Tradition- An Ethnobotany of Britain & Ireland*. Cambridge: Timber Press; 431 p.

Alzweiri, M., Sarhan, A.A., Mansi, K., Hudaib, M., Aburjai, T., 2011. Ethnopharmacological survey of medicinal herbs in Jordan, the Northern Badia region. J. Ethnopharmacol. 137, 27-35.

Asdaq, S.M. Inandar, M.N., 2010. Potential of garlic and its active constituent, S-allyl cysteine, as antihypertensive and cardioprotective in presence of captopril. Phytomedicine 17, 1016-1026.

Biagioli, L.F., 2000. *PDR for Herabl Medicines* 2nd ed. Joerg Gruenwald, T.B., Christof Joenicke, (eds). Montvale, New Jersery: Medical Economics Company, Inc.

Chen, Y., Zhu, Z., Guo, Q., Zhang, L., Zhang, X., 2012. Variation in concentrations of major bioactive compounds in *Prunella vulgaris* L. related to plant parts and phenological stages. Biol. Res. 45, 171-175.

Danloy, S., Quetin-Leclercq, J., Coucke, P., De Pauw-Gillet, M.C., Elias, R., Balansard, G., Angenot, L., Bassleer, R., 1994. Effects of alpha-hederin, a saponin extracted from *Hedera helix*, on cells cultured *in vitro*. Planta Med. 60, 45-49.

Ding, M., Leach, M., Bradley, H., 2013. The effectiveness and safety of ginger for pregnancy-induced nausea and vomiting: A systematic review. Women Birth 26, e26-e30.

Elaissi, A., Rouis, Z., Salem, N.A., Mabrouk, S., ben Salem, Y., Salah, K.B., Aouni, M., Farhat, F., Chemli, R., Harzallah-Skhiri, F., Khouja, M.L., 2012. Chemical composition of 8 eucalyptus species' essential oils and the evaluation of their antibacterial, antifungal and antiviral activities. BMC Complement. Altern. Med. 12:81. DOI: 10.1186/1472-6882-12-81.

González-Castejón, M., Visioli, F., Rodriguez-Casado, A., 2012. Diverse biological activities of dandelion. Nutr. Rev. 70, 534-547.

Goos, K.H., Albrecht, U., Schneider, B.. 2007. [On-going investigations on efficacy and safety profile of a herbal drug containing nasturtium herb and horseradish root in acute sinusitis, acute bronchitis and acute urinary tract infection in children in comparison with other antibiotic treatments]. Arzneimittelforschung. 57, 238-246. PubMed PMID: 17515295.

Jun, Y.S., Kang, P., Min, S.S., Lee, J.M., Kim, H.K., Seol, G.H., 2013. Effect of eucalyptus oil inhalation on pain and inflammatory responses after total knee replacement: a randomized clinical trial. Evid-Based Compl. Alt. Article ID 502727, DOI: 10.1155/2013/502727.

Neves, J.M., Matos, C., Moutinho, C., Queiroz, Gr., Gomes, Lg.R., 2009. Ethnopharmacological notes about ancient uses of medicinal plants in Trás-os-Montes (northern of Portugal). J. Ethnopharmacol. 124, 270-283.

Newman, R.A., Yang, P., Pawlus, A.D., Block, K.I., 2008. Cardiac glycosides as novel cancer therapeutic agents. Mol. Interv. 8, 36-49.

Schutz, K., Carle, R., Schieber, A., 2006. *Taraxacum* - a review on its phytochemical and pharmacological profile. J. Ethnopharmacol. 107, 313-323.

Song, J., Yeo, S.G., Hong, E.H., Lee, B.R., Kim, J.W., Kim, J., Jeong, H., Kwon, Y., Kim, K., Lee, S., L. Park, J., Ko, H., 2014. Antiviral activity of hederasaponin B from *Hedera helix* against enterovirus 71 subgenotypes C3 and C4a. Biomol. Ther.. 22, 41-46.

Stajner, D, Popović, B.M., Canadanović-Brunet, J., Stajner, M., 2008. Antioxidant and scavenger activities of *Allium ursinum*. Fitoterapia 79, 303-305.

Weatherall, D., Greenwood, B., Chee, H.L., Wasi, P., 2006. Science and Technology for Disease Control: Past, Present, and Future. In: Jamison, D.T., Breman, J.G., Measham A.R. (eds) *Disease Control Priorities in Developing Countries*. 2nd ed. Washington (DC).

Weldegerima, B., 2009. Review of the importance of documenting ehtnopharmacological information on medicinal plants. Afr. J. Pharm. Pharmacol. 3, 400-403.