HERBAL MEDICINES IN THE UNITED KINGDOM

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Summary

In the UK, herbal medicines are used widely, but have given rise to diverse controversies. They are often used without the knowledge of biomedical health care providers like doctors, nurses or pharmacists. Instead, Medical Herbalists, who often have university training, and other generally unlicensed health care practitioners offer treatment and also dispense herbal medicines. Today, the national regulatory framework is broadly similar to the one in other European Union member states, but herbal medicines are mostly seen as an element of *Complementary and Alternative Medicines* (**CAM)**, a simplistic and unjustified juxtaposition. Historically, a wide range of products were available and, famously, the Chelsea Physic Garden in London served as a hub for such products and as a teaching facility for apothecaries. (Nicholas) *Culpeper's herbal*, as well as John Gerard's *General historie of plantes*, are the best known examples of written treaties summarising the medical use of plants (Rhys 1901).

Today, contrary to other EU-countries, a diverse range of non-European traditions, but especially traditional Chinese medicine and to a lesser degree, Ayurveda, is also practised widely. This review summarises the history and current role of herbal medicines in the United Kingdom with a particular emphasis on the changing regulatory framework. We also give some examples of medicinal plants which are important in the United Kingdom. Several of these have a long tradition of use, while others have been incorporated into use in the UK in the last decades.

1. Introduction

Contrary to other countries in Europe, in the UK, herbal medicine and therapies associated with it have generally *all* been included under *Complementary and Alternative Medicines* (**CAM)**, a highly diverse group of approaches to health care (Micozzi 2002). However, this categorisation will certainly change over the next years (Edwards et al. 2012a,b) and it is now more widely recognised that they constitute a third category between mainstream medicine (or biomedicine) and CAM. Approaches in the CAM-fields are based on philosophies towards health and illness sometimes fundamentally different from the approach of conventional, scientific medicine (biomedicine) and pharmacy. In other European countries, herbal medicines, especially products for which empirical evidence exists (valerian, St. John's wort, ginkgo, echinacea and others), are often very much embedded in mainstream medicine. On the other hand the use of such remedies is extensive, increasing and complex. Out of all the EU countries, the United Kingdom has probably been the most un-regulated market for herbal medicine, and the UK's share of sales of herbal medicinal products (HMPs) within the European Union is relatively small. The freedom to dispense herbs to the

general public has been regarded as a national right by British herbalists for many years. The variety of herbal medicines available over the last 30 years has grown exponentially, and is probably greater in the UK than any other EU member state.

In several surveys, one fifth to half of the UK's population claimed to regularly use CAM alone or in addition to orthodox or conventional medicine and treatments. This usage is particularly frequent amongst those who are over-the-counter medicines-users. There is not, on the whole, a wide understanding of what herbal medicines are (or are not) (IPSOS-MORI 2008, Thomas et al 2001). Health care professionals and students also commonly use such products. Forty-three percent of students at a university school of pharmacy reported using at least one type of CAM during the last 12 months (Freymann et al 2006). The use of herbal medicine in the UK is not restricted to certain groups or professions or to specific ethnic groups.

Today, practitioners can be found from many of the major traditional medicinal practices, including Anthroposophy, Western Medical Herbalism, Traditional Chinese Medicine, Kampo, Ayurveda, Unani-tibb and Tibetan Medicine. Many practitioners have arrived here from abroad to set up their clinics; this is particularly true of Chinese Doctors, whose establishments can be found in most major towns and cities in the UK. Also, in recent years, data on the use of such products in immigrant communities has mounted (Ceuterick et al 2008, Sandhu & Heinrich 2005, Yöney et al 2010).

2. Some Historical Considerations

The UK has a documented history of medicinal plant use since Anglo-Saxon times. Three surviving texts report medicinal formulations in England during the tenth century: the Old English Herbarium, Bald's Leechbook and 'Lacnunga'. The Old English Herbarium lists 185 plants of which 140 had an Anglo-Saxon Name. For example, *Achillea millefolium* L. commonly known as yarrow has the Anglo-Saxon name of 'gearwe' and was indicated for cramps, digestive problems, fever, headache, snakebite and urinary complaints. Modern research has demonstrated that yarrow contains several compounds that possess an anti-inflammatory action, partly substantiating this traditional use (Watkins 2011). A similar manuscript in Welsh, written shortly after 1382 exists - Llyfr Coch Hergest (The Red Book of Hergest) is a large vellum manuscript. Importantly, it preserves a collection of Welsh prose and poetry, notably the tales of the Mabinogion. A key part of this is a description of herbal remedies compiled in Myddfai, Wales by a medical dynasty that lasted over 500 years.

With Europe being, on a global perspective, both comparatively small but also very diverse and with strong (and not always friendly) links, there can be no doubt that exchanges between the various traditions in Europe have had a long history and have always been relatively intense. This has impacted on the medical traditions all over Europe (e.g. Leonti 2010). For over 1500 years the classical and most influential book in Europe had been Dioscorides' *De materia medica*. Until the Europeans' (re-)invention of printing in the mid-15th century (by Gutenberg), texts were hand-written codices, which were used almost exclusively by the clergy and scholars in monasteries. A wider distribution of the information on medicinal plants in Europe began with the early herbals, which rapidly became very popular and which made the information

about medicinal plants available in the languages of lay people. These were still strongly influenced by Graeco-Roman concepts, but influences from many other sources came in during the 16th century (see Table 1).

Herbals were rapidly becoming available in various European languages, and, in fact, many later authors copied, translated and re-interpreted the earlier books. This was especially so for the woodcuts used for illustration. These were often used in several editions or were copied. The herbals changed the role of European pharmacy and medicine and influenced contemporary orally transmitted popular medicine. Previously, there had been two lines of practice: the herbal traditions of the monasteries and the popular tradition, which, in botanico-historical terms, remains practically unknown. Books in European languages made scholastic information much more widely available and it seems that the literate population was eager to learn about these medicopharmaceutical practices. These new books became the driving force of European 'phytotherapy', which developed rapidly over the next centuries.

The trade in botanical drugs increased during this period. From the East Indies came nutmeg (*Myristica fragrans*, Myristicaceae), already used by the Greeks as an aromatic and for treating gastrointestinal problems. Rhubarb (*Rheum palmatum* and *Rh. officinale*, Polygonaceae) arrived in Europe from India in the 10th century and was employed as a strong purgative. Another important change at this time was the discovery of healing plants with new properties, during the exploration and conquest of the 'New Worlds' – the Americas, as well as some regions of Asia and Africa. For example, 'guayacán' (*Guaiacum sanctum*, Zygophyllaceae), from Meso-America, was used against syphilis, despite its lack of any relevant pharmacological effects.

The first pharmacopoeias were issued by autonomous cities, and became legally binding documents on the composition, preparation and storage of pharmaceuticals, and again the developments in London were part of a wider shift in Europe:

- *Ricettario Fiorentino* (Florence, Italy), 1498.
- *Pharmacopoeia of Nuremberg* (Frankonia, Germany) or *Pharmacorum omnium*, 1546.
- *Pharmacopoeia Londiniensis* (UK), 1618, one of the most influential early pharmaceutical treatises.

These pharmacopoeias were mainly intended to bring some order into the many forms of preparations available at the time, the varying composition of medicines and to reduce the problems arising out of their variability.

One of the most well-known English apothecaries (and astrologers) of the 17th century is Nicholas Culpeper (1616–1654), best known for his 'English physician' – more commonly called 'Culpeper's herbal'. This is the only herbal that rivals in popularity John Gerard's *General historie of plantes*, but his arrogant dismissal of orthodox practitioners made him very unpopular with many physicians. Culpeper describes plants that grow in Britain which can be used to cure a person or to 'preserve one's body in health'. He is also known for his translation *A physicall directory* (from Latin into English) of the London Pharmacopoeia of 1618 published in 1649 (Arber 1938).

Year	Title	Author	Language
1478	De materia medica	Dioscorides	Latin
1481	The Latin Herbarius	Anon	Latin
1525	Herball [*Rycharde Banckes' Herball*]	Anon	English
1530	*Herbarium vivae eicones ad naturae imitationem*	Otto Brunfels	Latin
1541	*Historia plantarum et vires ex Dioscorides*	Conradus Gesnerus	Latin
1542	*De historia stirpium commentarii insignes*	Conradus Gesnerus	Latin
1548	*Libellus de re herbaria novus, in quo herbarium*	William Turner	Latin
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Table 1. Some examples of printed herbals written in Latin or English in the 15th and 16th century. This is part of a wider tradition with similar developments in practically all other European language groups (e.g. Flemish, French, German, Polish, Spanish) (adapted from Heinrich et al 2012).

Another development was the establishment of independent guilds specialising in the sale of medicinal plants, even though apothecaries had practiced this for centuries. In 1617, the Worshipful Society of Apothecaries was founded in London, and, in 1673, it formed its own garden of medicinal plants, known today as the Chelsea Physic Garden (Minter 2000). It was founded with the purpose of serving as a hub for herbal ('physic' or healing) products and as a teaching facility for apothecaries. Famously, barges transported medicinal plants down the river from the garden to the city centre and the hall of the Worshipful Society of Apothecaries. Importantly, the garden also offered state of the art opportunities for scientific work by supplying the Royal Society of Great Britain with 50 good herbarium samples per year, up to a total of 2,000 plants. This was part of an agreement Dr Hans Sloane arranged when a new site for the garden was purchased in 1713 and then leased in 1722 to the Society of Apothecaries for £5 a year in perpetuity. In the following decades, numerous discoveries were associated the

gardens staff including notably Philip Miller (1722–1770) and later curators. (Minter 2000) Other gardens like the Royal Botanic Gardens at Kew and Edinburgh have made crucial contributions too, but are of course, not focused mostly on medicinal plants.

The Worshipful Society of Apothecaries of London, mentioned above, is one of the Livery Companies of the City of London. Originally apothecaries were members of other guilds mostly focused on trading goods; the Grocers' Company (founded 1345) and before this, they were members of the Guild of Pepperers (founded 1180). With the separation from the Grocers in 1617, a stronger focus and diagnostic aspect were developed, and the 17th century saw considerable competition between this guild and the College of Physicians.

In 1815, through the Apothecaries Act, the Society was granted the power to license and regulate practitioners of medicine ('apothecaries') throughout England and Wales, a power it retained until 1999.

Another body of importance in this context is the Royal Colleges of Physicians, and especially, the Royal Colleges of Physicians of London. In 1518 it was founded as the College of Physicians and in 1674 it became a Royal College. As such it is the first medical institution in England with a Royal Charter. Similar Royal Colleges are based in Scotland (Edinburgh,) and Ireland (Coláiste Ríoga Lianna na hÉireann) both founded in the 17th century. In general, herbal medicines were of less importance to physician as compared to apothecaries.

With the founding of the (Royal) Pharmaceutical Society of Great Britain in 1841, a new body responsible for making and dispensing medicines was established. This body became the regulatory body for pharmacists and was also responsible for their training (until 2010) and took over many of the responsibilities originally held by apothecaries.

All these organisations, as well as the pharmaceutical industry, which started to develop in the 19th century, regularly used plant derived medicines in their practices. Over the century, the industry moved from using ill defined extract to 'distillate' the active ingredients from plants.

In scientific and medical terms, the observation of the effects of plants has always been a key element of a local and traditional medical system. Little is known about local popular traditions in medieval and early modern Europe, and our knowledge starts with the availability of written (printed) records on medicinal plant use by common people (see above). A typical example of such a remedy is foxglove (*Digitalis purpurea*), reportedly used by an English housewife to treat dropsy, and then more systematically by the physician William Withering (1741–1799) from Shropshire who worked in a Birmingham hospital. Withering transformed the orally transmitted knowledge of British herbalism into a form of medicine that could be used by medical doctors. Prior to that, herbalism was more of a clinical practice interested in the patient's welfare, and less of a systematic study of the virtues and chemical properties of medicinal plants. This example is the most famous of many and exemplifies the importance of such local herbal medicines in health care but also their early systematic development into medicines.

In the early 19th century, the concept of 'pharmacognosy' was developed, a field which now covers a wide range of aspects of research on medicinal plants. In 1811 the term was coined posthumously by the Austrian physician Johann Adam Schmidt (1759–1809) based on knowledge (gnosis) of medicines (pharmakon) and this field of research developed fast in all European countries and North America.

In subsequent decades, when it became clear that the pharmaceutical properties of plants are due to specific molecules that can be isolated and characterised, this led to the development of a field of research now called **natural product chemistry** or, specifically for plants, **phytochemistry**. Pure chemical entities were isolated and their structures elucidated. Some were then developed into medicines or chemically modified for medicinal use. Examples of such early pure drugs include:

- **Morphine** from opium poppy (*Papaver somniferum*, Papaveraceae), which was first identified by FW Sertürner of Germany in 1804 and chemically characterised in 1817 as an alkaloid. The full structure was established in 1923, by JM Gulland and R Robinson, in Manchester.
- **Quinine** from cinchona bark (*Cinchona succirubra* and others), was first isolated by Pierre Joseph Pelletier and Joseph Bienaime Caventou of France in 1820; the structure was elucidated in the 1880s by various laboratories. Pelletier and Caventou were also instrumental in isolating many of the other alkaloids.
- **Salicin**, from willow bark (*Salix* spp., Salicaceae), was first isolated by Johannes Buchner in Germany. It was derivatized first (in 1838) by Rafaele Pirea (France) to yield salicylic acid, and later (1899) by the Bayer company, to yield acetylsalicylic acid, or **aspirin** – a compound that was previously known but which had not been exploited pharmaceutically.

Again, these were not developments restricted to one country, but often went on in cooperation and in competition between the developing European powers of the 19th century and, most importantly, they foreshadowed the move from using complex and generally ill-defined mixtures to pure chemical entities to be used as medicines.

One of the most important events that influenced the use of medicinal plants in the Western World in the 20th century was the serendipitous discovery of the antibacterial properties of fungal metabolites such as benzylpenicillin, by Florey and Fleming in 1928 at St Mary's Hospital (London). These natural products changed forever the perception and use of plant-derived metabolites as medicines by both scientists and the lay public. Another important development came with the advent of synthetic chemistry in the field of pharmacy. Many of these studies involved compounds that were synthesised because of their potential as coloring material (Sneader 1996). The first successful use of a synthetic compound as a chemotherapeutic agent was achieved by Paul Ehrlich in Germany (1854–1915); he successfully used methylene blue in the treatment of mild forms of malaria in 1891.

Another key event which impacted on the development of herbal medicines in the UK, but which is often overlooked, is the founding of the UK's National Health Service (today, technically, one in each of the four countries – England, Northern Ireland, Scotland and Wales) in 1948. It started, after a long debate, in an austere society recovering from the destruction caused by the Second World War. A key element of the

NHS's strategy was the supply of evidence-based and cheap medicines. At the same time, this was an era of high levels of innovations in medicines and medical care, with new medicines being brought to the market at a high rate, including antibiotics, better anaesthetic drugs, cortisone, drugs for the treatment of mental illness such as schizophrenia and depression, diuretics for heart failure and antihistamines (http://www.nhshistory.com/shorthistory.htm). Initially, herbal medicines were used by the NHS, but HMPs were more and more considered to be inadequate (see below).

The British National Formulary (BNF) is a key handbook in British medicine and pharmacy which briefly describes all medicines which can be prescribed by a doctor. It is published jointly by the Pharmaceutical Press (London) and the British Medical Journal Group (BNF 2011, and previous editions). Overall, it contains 1036 pages, listing over nine hundred drugs. In essence, it summarises all products which are considered to be a medicine and, as such, is a positive list of prescription medicines in the UK. In the 2011 edition,, only medicines from seven plant medicines are included – anise, orange, eucalyptus, pine, psyllium husk, sterculia and senna (BNF, March 2011; 61st edition). In the context of this historical discussion, understanding its role is essential, since it more and more excluded plant medicines and, marginalised this type of product. In contrast, the 1949 National Formulary contained 128 pages and listed 23 plants including wild cherry, opium, digitalis, anise, catechu, cardamom, gentian, gelsemium, hyoscyamus, peppermint, lobelia, rhubarb, nux vomica, quillaia, podophyllum, ipecacuanha, tragacanth, liquorice, ginger, cascara, belladonna, colchicum and tolu. Due to a wider availability of other medicines by the time the 1974 – 76 edition of the BNF was published, this number had been reduced to around 18 plants, cascara, senna, rhubarb, ipecacuanha, gentian, podophyllum, nux vomica, peppermint, ginger, raspberry, lemon, opium, orange, tragacanth, catechu, cardamom, liquorice and belladonna. By the 40th edition, published in 2000, the number had increased slightly to 20 plants. The increase in listings was mainly due to the addition of tiger balm preparations. The plants listed in this edition were podophyllum, ipecacuanha, orange, anise, lemon, blackcurrant, liquorice, squill, opium, tolu, psyllium, sterculia, senna, clove, cajuput (cajeput), cinnamom, capsicum, peppermint, eucalyptus and thyme.

Another element of regulation is the UK's Medicine Act, which, in 1968, and as a response to the thalidomide (Contergan®) disaster, established governance covering the manufacture and supply of medicines in the UK. It provides some important exemptions in the context of herbal medicines. In essence, however, the act limited what can be used as a medicine to those drugs for which sufficient evidence is available and which are cost-effective. Overall, the developments in the last 200 years or so, but even more so in the last sixty years, resulted in a successive exclusion of herbal medicines from mainstream medicines, and thus, these products found other niches in the market. Key to this was the founding of the NHS and the subsequent definition of a positive list of drugs that can be prescribed.

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