

**Healthcare Professionals' Personal and Professional Views of Herbal Medicines in
the UK**

Short title: Healthcare Professionals' Views of Herbal Medicines

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Abstract

Healthcare professionals (HCPs) have a pivotal role in optimising patient care and should be familiar with Complementary and Alternative Medicines (CAM). The aim of the study was to explore UK based HCPs personal and professional opinions and experiences of herbal medicines (HMs). An online questionnaire was distributed via social media to recruit (n=112) a range of HCPs from across the UK. HCPs from primary and secondary care, the private sector and academia took part. A large proportion of participants (62%) said they did not personally use any HMs, while 38% did use HMs. HCPs who had personally used HMs had a positive impression of HMs and were more likely to recommend HMs to patients than those who had not used HMs themselves. Participants were given the opportunity to share their perceptions on the safety and efficacy of HMs and their experiences with patients reporting adverse drug reactions to HMs and herb-drug interactions. HCPs identified their lack of knowledge on HMs and insufficient training which made them unable to advise patients on the safe use of HMs. More education on HMs would help improve HCPs knowledge of HMs and help them make better informed decisions when considering patients pharmaceutical care plans.

Key words:

ethnopharmacology; herbal medicines; traditional medicine; complementary and alternative medicines; polypharmacy; healthcare professionals

Introduction

Complementary and Alternative Medicines (CAM) is a broad term which covers over 700 types of therapies including: diet and exercise, reflexology, massage, relaxation techniques, and herbal medicines (HMs) (Kayne, 2002). As CAM is becoming more popular in the UK, and more people are experimenting with holistic treatments these are becoming more commercial and professionalized (Clarke *et al.*, 2004). In some developing countries more than 80% of the population depend on HMs for primary health care (WHO, 2008). Interest in HMs has been growing in developed countries over the past few decades (Pharmaceutical Press, 2013). In Europe, Germany and France are leading in over-the-counter (OTC) sales of HMs, which are readily available even in conventional pharmacies (Wachtel-Galor and Benzie, 2011). The HMs market value is steadily growing; the annual expenditure on CAM in Australia, Canada and the UK, was estimated to be worth US\$ 80 million, US\$ 2400 million, and US\$ 2300 million respectively (WHO, 2002).

A House of Lords report (2000) highlighted that healthcare professionals (HCPs) should be familiar with CAM therapies, including their potential uses and risks in order to optimise patient care. Some CAM therapies are already accepted and incorporated as part of conventional Western medical systems, such as acupuncture, chiropractic and osteopathy; these are now included in the NHS and NICE guidelines (Clarke *et al.*, 2004; Cant *et al.*, 2012). Other forms of CAM such as HMs are becoming a focus for regulation and more research into their clinical efficacy and safety is being commissioned, a research area where significantly more work needs to be done. A steering group was established by the Government in 2006, to look at how best to

regulate acupuncture, herbal medicines and traditional Chinese medicines. In 2008 a report to the Department of Health, made specific recommendations about how these practitioners should be regulated; however little progress has been made (Pittilo, 2008).

Regulatory bodies such as the General Medical Council (GMC) for doctors, General Dental Council (GDC) for dentists and the General Pharmaceutical Council (GPhC) for pharmacists, all have a role in setting standards for education of undergraduate students (i.e. the future HCPs). The GMC (2009) updated its guidelines for undergraduate medical education in *Tomorrow's Doctors* for application from 2011-2012, these are the current guidelines in place. One of the objectives under '*prescribe drugs safely, effectively and economically*' states courses must, "*Demonstrate awareness that many patients use complementary and alternative therapies, and awareness of the existence and range of these therapies, why patients use them, and how this might affect other types of treatment that patients are receiving.*" The GPhC standards for the initial education and training of pharmacists called '*Future Pharmacists*' updated in May 2011, has a single statement '*complementary therapies*' in the indicative syllabus under section A1.1 '*How Medicines Work*'. The GMC and GPhC have set very broad statements which teaching institutes must include in their syllabi (GMC, 2009; GPhC, 2011); unlike the GDC which does not have any requirements for undergraduate dentistry students to learn about complementary therapies (GDC, 2015). Although some regulatory bodies do state HCPs should have an awareness of CAM including HMs the extent to which this knowledge is taught to undergraduate HCPs remains to be discovered. Many researchers across the globe have tried to explore the extent of CAM education. In the US the majority of medical schools offer courses on alternative medicine (Eisenberg *et al.*, 1998). In Europe CAM education is part of the regular

curriculum in 40% of medical schools and 72% of health science departments (Barberis *et al.*, 2001; Vagra *et al.*, 2006). A study by Smith (2011) investigated the views and practices of UK medical schools inclusion or exclusion of CAM in undergraduate medical courses; Smith (2011) found that all of the respondents to the survey (18 out of 31 medical schools in the UK) said CAM was included in their syllabus in some way. The extent of teaching ranged from a single lecture to student centred learning (coursework). The decision to include CAM in the academic syllabus may be influenced by several factors including: lack of interest by staff and students, lack of research in the area, resources and funding (Wetzel *et al.*, 1998; Smith, 2011). It has been difficult to assess how and what undergraduate medical and pharmacy students across the UK are taught about HMs. Furthermore, there has not been any investigation into UK based HCPs views of this matter or to explore their opinions on HMs.

Non-disclosure of use of herbal medicines to healthcare professionals is well documented. The Ipsos MORI report (2008), on public perceptions of HMs, found that 56% (n=1,138) of participants felt it was important to tell their doctor about their use of HMs; interestingly they found that Asian and Black minority ethnic groups were less likely to disclose information about their use of HMs to their doctors (Ipsos MORI, 2008). This is echoed by Bhamra *et al.* (2017) who explored the use of HMs by South Asian (SA) communities in the UK and whether or not people who took conventional Western medicines (CWM) alongside HMs shared this information with their pharmacists and general practitioners (GPs). The study revealed the vast majority of participants did not tell their HCPs about HMs they consumed alongside CWM; 69% (n=73) of participants did not tell their doctor, while 82% (n=87) did not tell their pharmacist. Various reasons for not telling their HCPs about the concurrent use of HMs

and CWM were uncovered, such as: a fear of being treated differently, not being treated at all, and being labelled as ‘backward’ or uneducated. The importance of having an awareness of cultural diversity is also part of the GMC (2009) requirements in the *Tomorrow’s Doctors* guide which states that, “*students should have acquired respect for patients and colleagues that encompasses, without prejudice, diversity of background and opportunity, language, culture and way of life.*” This is to ensure future HCPs can deal with a multicultural patient population. More recently, the Astana Declaration identified that traditional knowledge needs be incorporated with scientific knowledge to improve primary health care (PHC) and health outcomes for all people “*respecting their rights, needs, dignity and autonomy*” (WHO, 2018).

The aim of this study was to explore UK based healthcare professionals’ personal and professional opinions and experiences of herbal medicines; in order to get an insight into HCPs knowledge of HMs and their perception of the safety and efficacy of HMs.

Methods

Questionnaire Design & Participants

An online questionnaire was designed using SurveyMonkey® (an online survey software), with a combination of open and closed questions. It was designed to be an online, self-completion questionnaire, giving participants the flexibility to complete the survey in their own time. The questionnaire was piloted and approved by De Montfort University (DMU) and NHS Ethics committees.

The first section of the questionnaire set out to explore participants' personal use of HMs: looking into the traditional use of HMs amongst families and cultural backgrounds, and HCPs knowledge of HMs for specific ailments. The second section focused on their patients' use of HMs, whereby HCPs experience of adverse effects and interactions caused by HMs were investigated. The third section looked at the HCPs' professional opinions of HMs; exploring their perception of safety and efficacy of HMs, and opinions on the level of education on alternative therapies during their professional training. The final section was designed to evaluate the population demographics of the respondents, recording ethnic origins, gender, and occupations.

An introductory statement was created to advise participants on the purpose of the research and inclusion criteria. After considering the definitions of a HCP and receiving feedback from DMU Ethics committee it was concluded that the term healthcare professionals (HCPs) would be used to refer to those who currently have or previously had interactions with patients dealing with any aspect of patient care. This could include: doctors, surgeons, nurses, dentists, pharmacists, optometrists, and physiotherapists, herbal medicine practitioners etc. The fundamental requirement for the inclusion criteria was that participants had to be a HCP from the UK or having some experience of working in the UK; this was so the results could be generalised to UK HCPs. There were no other defined parameters for the research sample (i.e. gender, age, or occupation). As this was an exploratory survey to investigate the general perceptions of HCPs on HMs an opportunity sampling technique was employed.

Data collection

SurveyMonkey® was used to publish the questionnaire online and social media platforms were used to distribute the link to the survey. This was considered to be a better alternative to postal questionnaires; as it avoided the cost of printing and posting the questionnaires and enabled HCPs from across the UK to take part in the survey. The survey was available online for one year from 12th May 2014 -12th May 2015; this gave participants the freedom to complete the survey at their own leisure.

The link to the online survey was emailed to friends and colleagues by the research team, participants were then asked to forward the email to other HCPs they knew via email and other social media platforms such as Facebook and Twitter. The distribution method used led to a snowball sampling technique being adopted as the survey was passed on from person to person. To ensure the same person did not attempt the survey several times, settings on the software which automatically tracked the IP address and prevented multiple attempts were activated.

The use of social media in communicating, networking, and even health promotion is expanding (Thackeray *et al.*, 2012). Mediums such as Facebook and Twitter were considered as an innovative way to raise awareness of this research and to distribute the questionnaire. The use of social media in conducting social research is being recognised as a valuable tool for data collection (Wilson *et al.*, 2012), and was used to get a range of HCPs across the UK involved in this study.

Ethical approval

Ethical approval for the study was granted by the Leicester City Clinical Commissioning Group (CCG) and De Montfort University (DMU) ethics committee.

National Health Service Research and Development (NHS R&D) and Site Specific Information (SSI) forms were completed via the Integrated Research Application System (IRAS).

Data analysis

The Statistical Package for the Social Sciences software version 21 was used to input the data from the questionnaires and analyse the results. Microsoft Excel 2010 was used to create the graphical representations.

Results & Discussion

A total of 112 questionnaires were attempted of which 93 were completed. Of the total number of participants who started the questionnaire, 19 withdrew at different stages. It was contemplated to discard the incomplete surveys; however, this would mean losing some valuable data. For this reason all responses were included in the analysis and the number (n) of respondents for each question has been highlighted.

The use of social media to conduct scientific research has only gained attention in the last few years (Sarker *et al.*, 2015), and proved to be highly valuable while conducting this research. By using social media to distribute the link to this survey it enabled a range of different HCPs from across the UK to be contacted to participate in this research, instead of being limited to a single group of HCPs which would have been the case if postal questionnaires were used. The HCPs that formed this survey population were from a range of professions including pharmacy, medicine, dentistry, optometry, research and academia.

Participants' Personal Use of Herbal Medicines

Participants from various ethnic groups including: White-British/Irish (n=37) Asian/British-Indian/Pakistani/Bangladeshi (n=40), Black/ Black-British African/ Caribbean (n=6), White-Italian (n=1), White-American (n=1), Mixed race (n=3) and Turkish (n=1), completed the survey. Knowing this information made it possible to compare ethnic differences in knowledge and use of HMs. Just under half of the participants (n=50) said the use of HMs was part of their traditional family and cultural background. There was a statistically significant difference χ^2 (53.206, n=93, p<0.001) between ethnicity and the traditional use of HMs by participants' families. Participants from South Asian (SA) ethnic groups (i.e. Indian, Pakistani and Bangladeshi) were more likely to say HMs were part of their family and cultural background (n=35) than any of the other ethnic groups (n=7). White British/ Irish participants (n=38) were more likely to claim that HMs were not part of their traditional heritage in comparison to SA participants (n=6), Black Afro-Caribbean (n=3) and 'other' ethnic groups (n=4).

Over a third of participants (n=42) said they used HMs themselves. These participants reported a large assortment of HMs they knew of or used; in total 83 plant species were documented. Numerous remedies for coughs and colds were listed including: honey and lemon (*Citrus limon* L.), turmeric (*Curcuma longa* L.) in milk, Echinacea (*Echinacea angustifolia* DC.), tulsi (*Ocimum tenuiflorum* L.), ginger (*Zingiber Officinale* Roscoe), and cinnamon (*Cinnamomum verum* J.Presl). Mint (*Mentha arvensis* L.), ginger, cardamom (*Elettaria cadamomum* (L.)Maton), and cumin (*Cuminum cyminum* L.) were frequently mentioned for improving digestion. Various remedies for skin conditions such as aloe vera (*Aloe vera* (L.) Burm.f.), turmeric, and neem (*Azadirachta indica*

A.Juss.) were noted. For stress, anxiety and mild depression products such as St John's wort (*Hypericum perforatum* L.), valerian (*Valeriana officinalis* L.), and passion flower (*Passiflora incarnta* L.) were recorded. The most popular product mentioned was turmeric, cited over 40 times; its use as an anti-inflammatory and antiseptic for skin infections and wound healing, coughs, colds, and immune boosting properties were described. Some products such as Sorrel Bitter herbs, nettle tea (*Urtica dioica* L.), and bush tea (*Aspalathus linearis* (Burm.f.) R.Dahlgren) were identified by just a small number of participants. In this survey products native to Asia (e.g. ajwain (*Trachyspermum ammi* (L.) Sprague) and tulsi) and Western countries (e.g. camomile (*Matricaria chamomilla* L.) and Echinacea) were mentioned. The diversity of products mentioned by HCPs could be because the questionnaire was open to all ethnic groups.

Knowledge and Training on Herbal Medicines

The results from this analysis revealed that HCPs who completed this survey had variable levels of knowledge of HMs; some participants had extensive insight into a broad range of HMs, while others had limited or no knowledge of HMs. A difference in knowledge of HMs between ethnic groups was also identified. HCPs from SA ethnic groups recalled more information on HMs in comparison to White British/Irish HCPs. This knowledge difference could be linked to the traditional heritage of HMs amongst SA cultures which SA participants referred to in both this survey and the study by Bhamra *et al.* (2017). From the comments of several participants it was evident they were keen to learn more about HMs if there was evidence to support the claims associated with the use of HMs. A key observation was that those HCPs who had personally tried or used HMs were more likely to recommend them to their patients than

those who had not tried them (Figure 1). The long standing use of HMs was not enough for some participants to believe HMs were worth taking. Clinical evidence and evidence to prove the safety and efficacy of HMs were factors HCPs mentioned as having an influence on whether or not they would recommend HMs to patients. Some participants identified that some CWM such as senna tablets for constipation and peppermint oil capsules for irritable bowel syndrome were actually HMs which were commonly prescribed and recommended to patients.

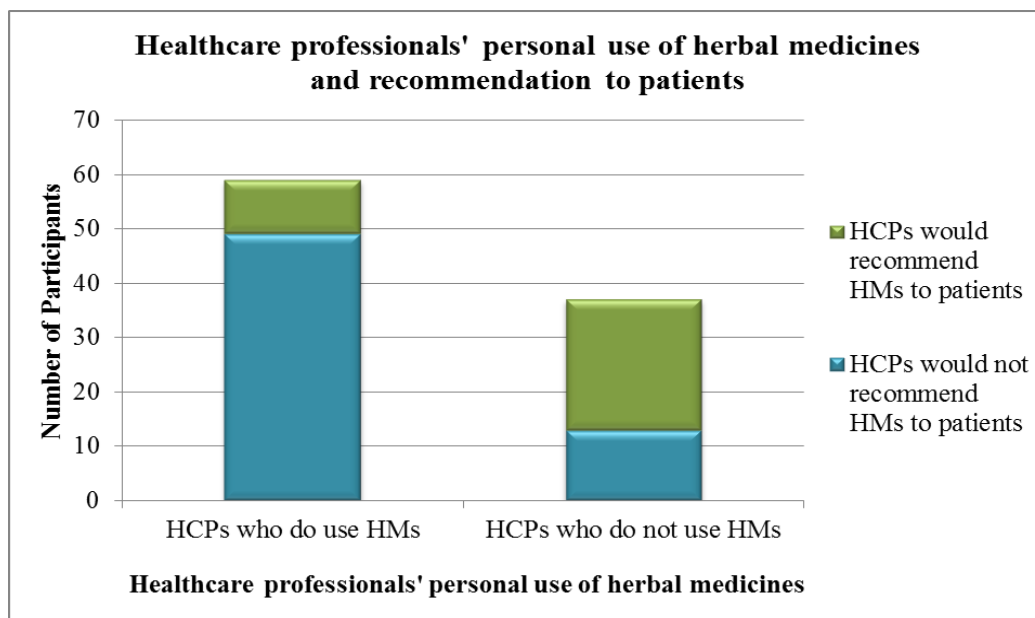


Figure 1 Healthcare professionals personal use of herbal medicines and whether or not they would recommend herbal medicines to their patients

A key discovery of this research was that HCPs said they were not satisfied with the training they received on HMs, and many felt incompetent giving advice to patients about HMs because of this. A large proportion of participants (n=62) claimed they were not given any information on HMs during their professional training; while, even more participants (n=71) believed that not enough training was provided on HMs (Figure 2).

One participant who said they did have training on herbal medicines, participant 85 (a pharmacist) said, “*I know about herbal medicines as I studied pharmacognosy during my bachelor’s degree in India*”; however, this participant did her pharmacy degree in India where training on HMs is commonly included in the curriculum. Smith (2011) contacted UK medical schools to investigate the extent of inclusion of CAM education in undergraduate courses, it was revealed that some medical schools felt there was a lack of interest from staff and students in CAM, there was limited funding and most importantly the programmes were already congested. Although regulatory bodies such as the GMC and GPhC set standards which mean HCPs should be taught about HMs during their undergraduate training the nature and extent of this information remains to be explored. These results demonstrate that HCPs in the UK think the current level of education on HMs provided to them is insufficient and this is an issue which needs to be addressed. Better education and training on HMs will improve HCPs knowledge and awareness of HMs and this will help them make better informed decisions when dealing with patients who take HMs.

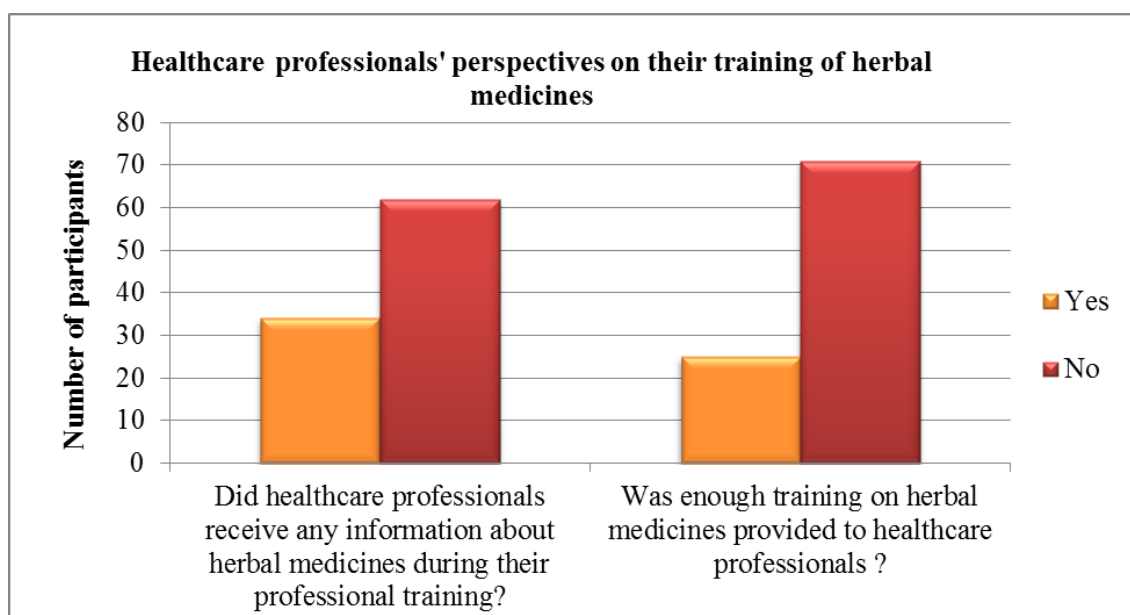


Figure 2 Healthcare professionals' perspectives on their education of herbal medicines during their professional training

Patients' Use of Herbal Medicines

In the study by Bhamra *et al.* (2017) participants, all of SA origin, were asked whether or not they told their doctor or pharmacist about their use of HMs, 69% (n=73) said they did not tell their doctor while 82% (n=87) did not tell their pharmacist. Various factors such as a fear of being treated differently or the HCP not being aware of traditional Asian HMs were identified as reasons for not reporting personal use of HMs to HCPs. This is supported by the findings of several studies which have found patients do not always tell their HCPs about their use of HMs. Giveon *et al.* (2004) found that 44.7% of participants did not tell their doctor about their use of HMs, whilst 11% did but only rarely. In this investigation HCPs were asked whether or not their patients told them about their use of HMs, the majority of HCPs (n=81) claimed they were aware of their patients use of HMs, while just 17 HCPs said they were not aware. The importance of accepting and understanding cultural differences is vital for HCPs to be able to build rapport with their patients; Staines (2011) highlighted, that negative attitudes of HCPs towards alternative therapies could be detrimental to the relationship with their patients. Building trust will help patients feel at ease when disclosing information about their use of HMs to their HCPs; this is vital for providing appropriate care for patients, identifying adverse drug reactions (ADRs) to HMs and potential interactions with CWM.

Safety and Efficacy of Herbal Medicines

HCPs were offered the opportunity to discuss their experience of patients reporting ADRs associated with HMs, interactions with CWM (herb-drug interactions) and their views on the safety and efficacy of HMs. Numerous herbal ADRs were noted (Table 1), some which were considered to be minor effects such as local irritation caused by using topical treatments (e.g. tea tree oil for spots), urticaria, loose stools, nausea and dizziness. While other ADRs were more serious and sometimes life threatening for example, hypoglycaemia caused by karela (*Momordica charantia* L.), impaired coagulation leading to excess blood loss during surgery, severe gastrointestinal bleed and deranged liver functions caused by Kava kava (*Macropiper methysticum* (G.Forst.) Miq.). As people using HMs often ‘self-prescribe’ the risks associated with ADRs may not be known. Barnes *et al.* (1998) found that those who experienced ADRs (minor or serious) from HMs were less likely to see their GP than if it was an ADR caused by CWM. Although efforts to improve herbal pharmacovigilance have been implemented (i.e. the yellow card scheme has been extended to include herbal ADRs), herbal ADRs are still underreported and go unmonitored (Barnes, 2003). This reinforces the importance of HCPs being competent in recognising and reporting incidents associated with HMs.

Table 1: Adverse Effects Encountered From Patients Taking Herbal Medicines

Participant Number:	Adverse Effects From Taking Traditional Herbal Remedies:
2	<i>Loose stools, digestive problems, nausea, dizziness, raised liver enzymes.</i>
15	<i>Impaired coagulation leading to excess blood loss at surgery - patient taking garlic supplements. Excess liquorice consumption has been reported to cause malignant hypertension.</i>
20	<i>Hypoglycaemia with karela.</i>

22	<i>Deranged liver function with Kava kava. Collapse with multi-constituent product. Organ failure in baby from unidentified Asian medicine.</i>
33	<i>When I worked in Oncology there were a number of occasions when ladies being treated with trastuzumab for breast cancer asked about whether there was a problem if they were taking a herbal product. The answer was always possibly and in one case the patient taking Hypericum had her dose delayed until she had stopped taking it.</i>
36	<i>Renal impairment.</i>
44	<i>A number of years ago, I was informed by a colleague of a patient who had been admitted with liver impairment thought to be caused by an Indian herbal remedy.</i>
49	<i>Only Chinese herbal medicines that have potent steroids in.</i>
56	<i>A patient using green vegetable juices for cancer; but, also taking warfarin and ended up with nose bleeds.</i>
57	<i>Digestion issues.</i>
59	<i>Many adverse reactions due to: a) contaminated products due to poor quality controls b) deliberately adulterated products to give an effect c) adverse synergistic effects with existing prescription drugs d) side effects of herbal medicines.</i>
60	<i>Malignant Neuroleptic Syndrome. Serotonergic Syndrome.</i>
61	<i>Liver damage due to use of Traditional Chinese Medicine herbal remedy for eczema.</i>
72	<i>Renal failure after use of an aphrodisiac steroids in skin cream leading to skin thinning.</i>
75	<i>Severe GI bleed resulting in prolonged ICU admission, herbal medicine was for memory (not exactly sure as it has been some time since) but was not ginkgo.</i>
82	<i>Unsure whether traditional remedies were the causative item but dramatic increase in blood pressure for heart failure patient when taking both traditional and Western medicines.</i>
100	<i>Urticaria.</i>
109	<i>A patient taking a Chinese tea remedy which had steroids in it.</i>

Almost two thirds of participants (n=62) in this survey claimed they were aware of herb-drug interactions and documented some of their knowledge (Table 2). Several herb-drug interactions with aloe vera, cranberry juice, garlic (*Allium sativum* L.), ginkgo (*Ginkgo biloba* L.) and ginseng (*Panax ginseng* C.A.Mey.) were noted. The most

common herb-drug interactions reported, by 33 participants, were associated with St John's Wort (SJW). Interactions with antidepressants, anticoagulants, antiretrovirals and the contraceptive pill were mentioned. SJW was the third best-selling herbal remedy in the UK in 2013 (Ministry of Foreign Affairs, 2014). Its traditional use for mild depression and anxiety has become so popular its status as a traditional herbal remedy has been questioned. It is one of the few HMs for which there is extensive research and clinical evidence to support the traditional health claims associated. It could be due to the wealth of literature available for SJW which makes it so well known by HCPs. The most common CWM which participants in this study identified as being affected by HMs was warfarin. Interactions between warfarin and ginseng, ginkgo, garlic, and cranberry juice were documented. These substances can impair platelet aggregation, thus effecting blood coagulation. It has been suggested that garlic can have an anti-platelet effect similar to that of low-dose aspirin; therefore, if taken with other blood thinning drugs there is an increased risk of bleeding (Williamson *et al.*, 2013). Reports that cranberry juice inhibited the metabolism of warfarin, reducing its clearance from the body and increasing its anticoagulant effects were documented by the Committee of Safety of Medicines/ Medicines and Healthcare Regulatory Agency, when several incidents of increased International Normalised Ratio (INR) and bleeding were reported (CSM/MHRA, 2003). Polypharmacy with CWM is common practice in patients with multiple health conditions; combining HMs into the mixture could increase the risk of ADRs and interactions. Due to the unknown risk of herb-drug interactions, some HCPs in this study recognised it was best to avoid taking HMs alongside CWM. From the 37% (n=36) of participants who said they were not aware of any interactions between

HMs and CWM, the importance of educating HCPs about the potential risks associated with consuming HMs alongside CWM was highlighted.

Table 2: Interactions between Herbal and Conventional Western Medicines Identified by Healthcare Professionals

Participant Number:	Interactions between Herbal and Conventional Western Medicines:
2	<i>St John's wort with contraceptives and anti-depressants (SSRI's and MAOI's). Dan shen with anticoagulants.</i>
10	<i>St John's wort interacts with many drugs as it is a cytochrome P450 3AE inducer; for example, oral contraceptives, warfarin, and simvastatin.</i>
12	<i>I'm aware of a lot of interactions between herbal medicines and P-glycoprotein and cytochrome enzymes, which can in turn affect drugs that are dependent on them. St John's wort is an example of a herbal medicine that can produce such interactions.</i>
15	<i>Too many to list- St. John's wort & SSRIs can cause serotonin syndrome. Garlic, ginkgo & ginseng in combination with fish oil can cause impaired coagulation /blood pressure.</i>
16	<i>St. John's wort and warfarin.</i>
17	<i>While working as a medicines information pharmacist in secondary care, I formulated a table of interactions between warfarin and a large variety of herbal/traditional compounds.</i>
18	<i>St. John's Wort and various other medications, including some anti-retrovirals.</i>
20	<i>I refer to Stockley-particularly for St. John's wort.</i>
22	<i>INR changes Enzyme induction Additive side effects.</i>
24	<i>St. John's wort.</i>
25	<i>St John's wort interacts with CYP450 liver metabolised drugs.</i>
26	<i>St. John's wort and warfarin.</i>
30	<i>Ginseng known to interact as well as St. John's wort with antiretrovirals for HIV.</i>

	<i>Aloe vera reduces drug absorption of many drugs. Maca can interact as it's an enzyme inducer.</i>
32	<i>St John's wort and a plethora of Western medicines. Some questions about the use of antioxidants alongside chemotherapy or targeted therapies. Plenty of theoretical interactions e.g. aloe vera juice speeding up the GI tract and possibly causing a reduction in absorbed medications.</i>
34	<i>St. John's wort.</i>
36	<i>Hepatic enzyme inhibition.</i>
40	<i>Cranberry juice and warfarin.</i>
42	<i>St John's wort is widely documented.</i>
48	<i>St. John's wort with levonorgestrel.</i>
53	<i>St John's wort and P450 interactions.</i>
56	<i>Many potential interactions between St John's wort and various medications. Also concern with many herbal remedies for renal patients as most herbal remedies filtered via kidneys e.g. liquorice/nettle etc.</i>
58	<i>SSRI and evening primrose oil.</i>
60	<i>St John's Wort with SSRI, MAO-I and neuroleptics.</i>
61	<i>Enzyme induction e.g. Contraceptive pill failure due to use of St John's wort. Especially CYP450 - warfarin potentiation</i>
63	<i>St John's wort interacts with lots of things e.g. warfarin, tyramine containing foods. Ginkgo biloba with warfarin. Ginseng with aspirin, clopidogrel, and warfarin.</i>
64	<i>I would always check for known or possible interactions and be very careful with things like warfarin.</i>
66	<i>St John's Wort interacts with many medicines. There are too many other interactions to list here. See standard pharmacology and pharmacognosy texts.</i>
67	<i>I have a book on the subject. Herb-Drug interactions in oncology by Cassileth, Yeung and Gubili, Memorial Sloan-Kettering Cancer Centre People's Medical Publishing House, Shelton Connecticut.</i>
68	<i>St John's wort.</i>
69	<i>St John's wort interacts with many drugs, e.g. warfarin.</i>
70	<i>The basics like St John's wort as an enzyme inducer etc.</i>
71	<i>St John's wort interacts with many conventional pharmaceuticals, including statins, beta blockers and antiretroviral drugs.</i>
72	<i>St John's wort and anticoagulants.</i>
74	<i>Garlic and anti-coagulants. St John's wort and many medicines.</i>
75	<i>St. John's wort, Echinacea, ginkgo, garlic, red yeast rice.</i>
77	<i>Mainly the pill.</i>
79	<i>St John's Wort especially.</i>
81	<i>St John's Wort.</i>
82	<i>St John's wort</i>

84	<i>St John's wort and warfarin.</i>
87	<i>St John's wort etc.</i>
88	<i>Ginseng and blood pressure medications. Warfarin and high consumption of green vegetables (iron content).</i>
90	<i>Saint John's wort and various hormonal medications.</i>
92	<i>St. John's wort and warfarin.</i>
93	<i>Some augment the actions of oestrogen in HRT.</i>
100	<i>Need to avoid with some anti-hypertensive medicines.</i>
103	<i>St John's Wort and antidepressants. Ginkgo Biloba with various drugs</i>
104	<i>St John's wort can interfere with Western antidepressants.</i>
110	<i>St John's Wort, Black Cohosh, EPO/GLA, Saw palmetto.</i>
111	<i>St John's Wort interacts with contraceptive pill.</i>

HCPs in this survey had mixed views on the safety and efficacy of HMs; 66% (n=63) of participants thought HMs were effective for treating and preventing various health conditions, and 58%, (n=56) said they were safe. Comments regarding HMs being natural and from plants were documented as statements to justify why participants thought HMs were safe. Participant 42 (a pharmacist) who agreed HMs were safe stated, “*conventional Western medicines are just as harmful as traditional herbal medicines if used improperly and in excess.*” On the other hand, 42% (n=40) of HCPs did not agree that HMs were safe. Some participants stated that HMs may be more dangerous than CWM due to the lack of evidence to support their use. Participant 36 (a consultant physician) said, “*Whilst only a small amount of harms are caused by herbals- I cannot call them safe because in some instances they are not. I think that all in all more regulation is needed and then I would consider the patient's views in taking a cautious approach to use of herbal remedies in some conditions.*” Participant 15 (an anaesthesia registrar) claimed, “*It's more complex than whether they're safe or not - it depends on the dose, what other medication the patient is on & the interaction between*

them (if any). Often, herbal products have inconsistent concentrations between batches & therefore the true dose is never known. There have been instances of additives not listed on packaging also being included in the product - I feel generally these products are an unknown quantity because the contents, concentration & production methods are subject to much lower standards of scrutiny than tablets. They are drugs just as much as tablets are, the 'herbal' label lulls people into thinking there are no possible side effects - this is not true, nor is it safe.” This emphasises that there are numerous factors which determine whether HMs are deemed safe or effective including: the dose, co-morbidities, polypharmacy, time of use (i.e. before surgery could impair blood coagulation and cause complications), adulteration (i.e. the wrong species selected), or contamination (e.g. heavy metals or other active constituents).

Strengths and Limitations

The convenience sampling method employed led to a diverse range of HCPs completing the survey. As the sample size was relatively small and heterogeneous it was difficult to make comparisons between different groups of HCPs. Once the link to the survey was posted on social media it was essentially left to participants to circulate, which may have encouraged those with a specific interest in herbal medicines to complete and share the survey. Nevertheless, as this was an exploratory survey this study has uncovered some interesting concepts such as HCPs personal experience of using HMs, what influences HCPs decisions when recommending HMs and the lack of training HCPs receive on HMs which could ultimately impact on their patients' care. The results of

this study highlight some key issues surrounding HCPs and herbal medicines, which need to be considered in greater depth.

Conclusion

As the popularity of HMs continues to grow, and HMs become more integrated into Western healthcare, the importance of HCPs being aware of the risks and benefits of consuming HMs alone or in conjunction with CWM is becoming more important. In order to ensure patients are receiving the correct pharmacological care it is vital for HCPs to deduce if their patients' use of HMs; a concept which needs to be reinforced to HCPs in the UK. Changes to the regulation of HMs and more clinical research are providing evidence based support for the safety and efficacy of HMs, which is imperative for guiding HCPs clinical judgement. Furthermore, better training and education on HMs for HCPs means they will be equipped with the knowledge to identify potential ADRs, herb-drug interactions, and advise patients on the safe use of HMs. There are very few studies which have explored UK based HCPs views on CAM, and little research actually focuses specifically on HMs. The results from this investigation have enabled an insight into HCPs personal use and professional views of HMs to be uncovered; providing valuable data for future research.

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Conflict of interest

This project received no external funding. The authors declare that there are no conflicts of interest.

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