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A Review on Herbal Medicines Role in the Management of Various Chronic Diseases

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ABSTRACT

Natural products, especially those derived from plants, have been used to help mankind sustain human health since the dawn of medicine. Traditional medicine has been in existence since time immemorial and has been well accepted and utilized by the people throughout history. Since ancient times, plants have been an exemplary source of medicines. Plant-derived medicinal products have attracted the attention of scientists around the world for many years due to their minimum side effects and positive effects on human health. In the pharmaceutical landscape, plants with a long history of use in ethnomedicine can be a rich source of substances for the treatment of various ailments and infectious diseases. Medicinal plants are considered a repository of numerous types of bioactive compounds possessing varied therapeutic properties. The vast array of therapeutic effects associated with medicinal plants includes anti-inflammatory, antiviral, antitumor, antimalarial, and analgesic properties. According to the World Health Organization a variety of drugs are obtained from different medicinal plants and about 80% of the world's developing population depends on traditional medicines for their primary health care needs. A high frequency of scientifically unsupported uses of some herbal products that claimed to treat chronic conditions was found. A substantial proportion of patients did not inform their pharmacists about herbal products use, therefore to avoid any possible negative outcomes, better counseling and communication between patients and health care professionals is recommended.

Keywords: Natural products, Traditional medicine, world Health Organization, ethnomedicine, herbal products and therapeutic properties.

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1. Introduction

Traditional medicine is “the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, used in the maintenance of health and in the prevention, diagnosis, improvement or treatment of physical and mental illness”. There are many different systems of traditional medicine, and the philosophy and practices of each are influenced by the prevailing conditions, environment, and geographic area within which it first evolved, however, a common philosophy is a holistic

approach to life, equilibrium of the mind, body, and the environment, and an emphasis on health rather than on disease. Generally, the focus is on the overall condition of the individual, rather than on the particular ailment or disease from which the patient is suffering, and the use of herbs is a core part of all systems of traditional medicine. Traditional Chinese medicine is an important example of how ancient and accumulated knowledge is applied in a

holistic approach in present day health care. TCM has a history of more than 3000 years¹⁻³.

Diagnosis and treatment are based on a holistic view of the patient and the patient's symptoms, expressed in terms of the balance of yin and yang. Yin represents the earth, cold, and femininity, whereas yang represents the sky, heat, and masculinity. The actions of yin and yang influence the interactions of the five elements composing the universe: metal, wood, water, fire, and earth. TCM practitioners seek to control the yin and yang levels through 12 meridians, which bring and channel energy through the body. TCM is a growing practice around the world and is used for promoting health as well as for preventing and curing diseases. Over the past 100 years, the development and mass production of chemically synthesized drugs have revolutionized health care in most parts of the world. However, large sections of the population in developing countries still rely on traditional practitioners and herbal medicines for their primary care. In Africa up to 90% and in India 70% of the population depend on traditional medicine to help meet their health care needs. In China, traditional medicine accounts for around 40% of all health care delivered and more than 90% of general hospitals in China have units for traditional medicine. However, use of traditional medicine is not limited to developing countries, and during the past two decades public interest in natural therapies has increased greatly in industrialized countries, with expanding use of ethnobotanicals. The most common reasons for using traditional medicine are that it is more affordable, more closely corresponds to the patient's ideology, allays concerns about the adverse effects of chemical (synthetic) medicines, satisfies a desire for more personalized health care, and allows greater public access to health information.

The major use of herbal medicines is for health promotion and therapy for chronic, as opposed to life-threatening, conditions. However, usage of traditional remedies increases when conventional medicine is ineffective in the treatment of disease, such as in advanced cancer and in the face of new infectious diseases. Furthermore, traditional medicines are widely perceived as natural and safe, that is, not toxic.

Currently, herbs are applied to the treatment of chronic and acute conditions and various ailments and problems such as cardiovascular disease, prostate problems, depression, inflammation, and to boost the immune system, to name but a few. In China, in 2003, traditional herbal medicines played a prominent role in the strategy to contain and treat severe acute respiratory syndrome (SARS), and in Africa, a traditional herbal medicine, the Africa flower, has been used for decades to treat wasting symptoms associated with HIV.

Herbs and plants can be processed and can be taken in different ways and forms, and they include the whole herb, teas, syrup, essential oils, ointments, salves, rubs, capsules, and tablets that contain a ground or powdered form of a raw herb or its dried extract. Plants and herbs extract vary in the

solvent used for extraction, temperature, and extraction time, and include alcoholic extracts (tinctures), vinegars (acetic acid extracts), hot water extract (tisanes), long-term boiled extract, usually roots or bark (decoctions), and cold infusion of plants (macerates). There is no standardization, and components of an herbal extract or a product are likely to vary significantly between batches and producers. Average life expectancy at birth has increased from around 41 years in the early 1950s to approaching 80 years in many developed countries. Consequently, the percentage of elderly people (65 years and above) in our populations is increasing. The graying of our populations brings an increasing burden of chronic age-related disease and dependency. Aging is associated with a progressive decline in physiological function and an increased risk of pathological changes leading to cancer, cardiovascular disease, dementia, diabetes, osteoporosis, and so on⁴⁻⁹.

2. Chronic Diseases

One important element of effective communication is having a shared language or at least a shared understanding of the meaning of the central words used in a conversation. One term that is often used in discussions between patients and medical providers, in the academic literature, and policy discussions, is "chronic disease"¹⁴. There is a various definition for chronic disease with variation in the time a disease must be present for something to be referred to as chronic, therefore making it difficult to reach a consensus.

Natural products have been reported since ancient's history to be used by human kind and are still used world wild for health promotion and treatment of diseases¹. Despite all the recent developments in drug industry, herbs remain to be used often in treatments of common ailments rather than conventional drugs². More commonly, they are used as adjunct therapy to conventional pharmaceuticals, as a safer and more affordable system of health care. Regardless of the reasons, patients using herbal medicines in combination with conventional medications, especially those used for chronic conditions, should be assured that the treatments they are using are safe and effective as what they are supposed to be. Pharmacists are found in an ideal position to discuss with their patients the use of herbal supplements when pharmacological treatments are prescribed. Lack of dialog between the pharmacists and their patients about the use of herbal supplements is alarming and has been previously highlighted⁶. Patients with chronic conditions were found unaware of the risks due to the herb-drug interactions, leading to unsafe and inefficient treatments⁷. Studies shed light on the importance of pharmacists asking the patients about their use of any herbal products along with their conventional medications⁸. In addition, patients should be provided with science-based information on dosage, contraindications and efficacy for their herbal treatments by their community pharmacists¹⁰⁻¹⁵.

Despite significant progress made in implementing the WHO traditional medicine strategy 2014–2023 around the world, there are numerous challenges related to herbal products safety and quality, research and development,

education and training of practitioners, in addition to information provision and communication between pharmacists and their patients. To resolve these challenges, provision of education for the pharmacist is essential¹⁰. More clinical based study is needed to guide towards the appropriate use of herbal medicines in our health systems. Use of herbal products by chronically ill patients has been acknowledged by previous studies conducted in Jordan and in the Middle Eastern countries. The herbal products used by the patients in this study were found to be relatively safe plants that are commonly used on daily basis as food or beverage. However, according to the literature, many of these products failed to show evidences for their claimed uses. The study sheds light on the inefficient use of herbal products mainly by male patients.

Many of the interviewed patients reported that they experienced some side-effects, which could be a consequence for the reported improper use of the medicinal herbs coincidentally with conventional chronic medications. In a recent similar study conducted in Palestine, Al-Ramah *et al.* reported that about 60% of the chronically ill patients used at least one medicinal herb, with about 22% experiencing at least one inefficient herbal product use. Males and older patients were also more likely to experience inefficient use of herbal products.

This study unveiled interesting facts about causes leading to the inefficient use of herbal products among chronically ill patients. Patients rarely inform their pharmacists about their use of herbal products. Only 11% of the patients ask their pharmacists to make a recommendation for herbal treatments that can be used to improve their health conditions. Female patients were less interested than males in the role of the pharmacist as an adviser for herbal product's use. Other cause reported in this study leading to the inefficient use of herbal products was the source of patient's knowledge about herbal products use. Most patients depend on the internet to obtain knowledge in this study. The community pharmacist came 2nd in this domain. Nevertheless, only 8% of pharmacists reported to have very good knowledge in this study. Such results are not surprising considering that only about one third of the pharmacists reported receiving education about the safe and efficient use of herbal products through their educational courses at their universities. Majority of the pharmacists depended on other less science-based evidences and trusted sources such as the internet. Consequently, only 11% of the pharmacists said they always ask their chronically ill patients about their use of herbal products. Hence, chronically ill patients need to be educated about the role of the pharmacist regarding the efficient and safe use of the herbal products. Also, pharmacy students need to receive full education in this area at their pharmacy schools and to have their skills to update and upgrade their knowledge continuously following graduation to become independent long-term self-learners.

International Diversity and National Policies

The diversity among countries with the long history and holistic approach of herbal medicines makes evaluating and regulating them very challenging. In addition, there are a

great number of different herbs used. Legislative criteria to establish traditionally used herbal medicines as part of approved health care therapies faces several difficulties. In a survey conducted across 129 countries, WHO reported the following issues regarding herbal medicines: lack of research data, appropriate mechanisms for control of herbal medicines, education and training, expertise within the national health authorities and control agency, information sharing, safety monitoring, and methods to evaluate their safety and efficacy. The support needed from different countries includes information sharing on regulatory issues, workshops on herbal medicines safety monitoring, general guidelines on research and evaluation of herbal medicines, provision of databases, herbal medicine regulation workshops, and international meetings¹⁶⁻²².

National policies are the basis for defining the role of traditional medicines in national health care programs, ensuring that the necessary regulatory and legal mechanisms are established for promoting and maintaining good practice, assuring the authenticity, safety, and efficacy of traditional medicines and therapies, and providing equitable access to health care resources and their resource information. Another fundamental requirement is harmonization of the market for herbal medicines for industry, health professionals, and consumers.

Herbal medicines are generally sold as food supplements, but a common regulatory framework does not exist in different countries. As a result, information on clinical indications for their use, efficacy, and safety are influenced by the traditional experience available in each place. A brief outline of the legislation in United States, Canada, and Europe is given in this section, and could be used to guide the legal aspects of the herbal medicine industry in other countries. In the United States, under the Dietary Supplement Health and Education Act (DSHEA) of 1994, any herb, botanical and natural concentrate, metabolite and constituent of extract, is classified as a dietary supplement. Dietary supplements do not need approval from the Food and Drug Administration (FDA) before they are marketed. Under DSHEA, herbal medicines, which are classified as dietary supplements, are presumed safe, and the FDA does not have the authority to require them to be approved for safety and efficacy before they enter the market, which is the case for drugs. This means that the manufacturer of the herbal medicine is responsible for determining that the dietary supplements manufactured or distributed are indeed safe and that any representations or claims made about them are sustained by adequate evidence to show that they are not false or misleading. However, a dietary supplement manufacturer or distributor of a supplement with a "new dietary ingredient," that is, an ingredient that was not marketed in the United States before October 1994, may be required to go through premarket review for safety data and other information. Also, all domestic and foreign companies that manufacture package labels or hold dietary supplements must follow the FDA's current good manufacturing practice (GMP) regulations, which outline procedures for ensuring the quality of supplements intended for sale. Regarding contamination, the FDA has not issued

any regulations addressing safe or unsafe levels of contaminants in dietary supplements but has set certain advisory levels in other foods.

A product being sold as an herbal supplement (dietary supplement) in the United States cannot suggest on its label or in any of its packaging that it can diagnose, treat, prevent, or cure a specific disease or condition without specific approval from the FDA. A claim also cannot suggest an effect on an abnormal condition associated with a natural state or process, such as aging. In Canada, herbal remedies must comply with the Natural Health Products Regulations. According to these regulations, all natural products require a product license before they can be sold in Canada. In order to be granted a license, detailed information on the medicinal ingredients, source, potency, nonmedicinal ingredients, and recommended use needs to be furnished. Once a product has been granted a license, it will bear the license number and follow standard labeling requirements to ensure that consumers can make informed choices. A site license is also needed for those who manufacture, pack, label, and import herbal medicines. In addition, GMPs must be employed to ensure product safety and quality. This requires that appropriate standards and practices regarding the manufacture, storage, handling, and distribution of natural health products be met. The GMPs are designed to be outcome based, ensuring safe and high-quality products, while giving the flexibility to implement quality control systems appropriate to the product line and business. Product license holders are required to monitor all adverse reactions associated with their product and report serious adverse reactions to the Canadian Department of Health²³⁻²⁹.

In Europe, the European Directive 2004/24/EC released in 2004 by the European Parliament and by the Council of Europe provides the guidelines for the use of herbal medicines. The directive establishes that herbal medicines released on the market need authorization by the national regulatory authorities of each European country and that these products must have a recognized level of safety and efficacy. The registration of herbal medicinal products needs sufficient evidence for the medicinal use of the product throughout a period of at least 30 years in the European Union (EU), at least 15 years within the EU, and 15 years elsewhere for products from outside the EU. With regard to the manufacturing of these products and their quality, products must fulfill the same requirements as applications for a marketing authorization. Information is based on the availability of modern science-based public monographs in the *European Pharmacopeia* and their equivalents developed by the pharmaceutical industry. The standards put forward allow not only to define the quality of products but also to eliminate harmful compounds, adulteration, and contamination. Within the EU, a number of committees were set up to attempt and standardize the information and guidelines related to herbal medicines.

A variety of materials has been produced, such as monographs on herbs and preparations, guidelines on good agricultural and collection practice for starting materials of herbal origin, and guidelines on the standardization of

applications and setting up pragmatic approaches for identification and quantitative determination of herbal preparations and their complex compositions.

Quality, Safety, and Scientific Evidence

Herbal medicine has been commonly used over the years for treatment and prevention of diseases and health promotion as well as for enhancement of the span and quality of life. However, there is a lack of a systematic approach to assess their safety and effectiveness. The holistic approach to health care makes herbal medicine very attractive to many people, but it also makes scientific evaluation very challenging because so many factors must be taken into account. Herbal medicines are in widespread use and although many believe herbal medicines are safe, they are often used in combination and are drawn from plant sources with their own variability in species, growing conditions, and biologically active constituents. Herbal extracts may be contaminated, adulterated, and may contain toxic compounds. The quality control of herbal medicines has a direct impact on their safety and efficacy. Another problem is that despite the popularity of botanical dietary and herbal supplements, some herbal products on the market are likely to be of low quality and suspect efficacy, even if the herb has been shown to have an effect in controlled studies using high-quality product. There is a belief that herbs, as natural products, are inherently safe without side effects and that efficacy can be obtained over a wide range of doses. Although herbs may well have undesirable side effects, there are no set “doses,” and herb–drug or herb–herb interactions are possible. A major hypothetical advantage of botanicals over conventional single-component drugs is the presence of multiple active compounds that together can provide a potentiating effect that may not be achievable by any single compound. This advantage presents a unique challenge for the separation and identification of active constituents. Compounds that are identified by activity-guided fractionation must be tested in appropriate animal models to confirm in vivo activity. Ideally, the composition of the total botanical extract must be standardized and free of any potential hazards, and plants should be grown specifically for the production of botanical extracts under controlled conditions and originate from a characterized and uniform genetic source with a taxonomic record of the genus, species, and cultivar or other additional identifiers.

Records should be maintained for the source of the seed, locations and conditions of cultivation, and exposure to possible chemical treatments such as pesticides. Because the environment can significantly affect phytochemical profiles and the efficacy of the botanical end product, botanical extracts can vary from year to year and may be significantly affected by temperature, drought, or flood as well as by geographic location. Therefore, biochemical profiling must be used to ensure that a consistent material is used to produce a botanical. The importance of plants in traditional medicine and as raw materials in pharmaceutical industries cannot therefore be overemphasized. The use of herbs to treat diseases is almost universal among non-industrialized societies. A number of traditions came to dominate the practice of herbal medicine at the end of the

twentieth century. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including opium, aspirin, digitals and quinine. The use of medicinal plants is increasing worldwide, in view of the tremendous expansion of traditional medicine and a growing interest in herbal treatments. Plants are used in medicine to maintain and augment health-physically, mentally and spiritually as well as to treat specific conditions and ailments.¹ It has been found that countries in Africa, Asia and Latin America use traditional medicine to help meet some of their primary health care needs. In Africa, for example, up to 80 percent of the population uses traditional medicine for primary health care. In industrialized countries, adaptation of traditional medicines is termed “complimentary?” or “alternative” medicine. Traditional medicine has maintained its popularity in all regions or the developing world and its use is rapidly spreading in industrialized countries. The global market for herbal medicines currently stands at over US \$80 billion annually and is growing steadily.¹ In Nigeria, Ghana, Mali and Zambia for example, the first line of treatment for 60% of children with high fever resulting from malaria is the use of herbal medicines at home. The plant kingdom contributes immensely to human health when no synthetic medicines were available and when no concepts of surgery existed. There is therefore need to conserve these plants associated with indigenous knowledge for human development and good health. Synthetic drugs gained popularity against green remedies because their fast-acting effects, however, people have begun to realize the benefits associated with natural remedies³⁰⁻³⁵.

Chemically prepared drugs may act quickly, but they have side effects which affect human body negatively in the long run, whereas, medicinal plants work in an integrated or probiotic with little or no adverse effects on the body. A number of plant species are being used in various human health around the world. Plant species contain active ingredients such as alkaloids, phenols, tannins, cryogenics, glycosides, terpenoids. These ingredients have been used and found effective as sweeteners, anti-infections and anti-bacterials. For instance, the bark of *Alstonia boonei* contains alkaloids and achistamine, which are useful in the treatment of fever, dizziness and high blood pressure. Ginger (*Allium sativum*) and Garlic (*Zingiber officinale*) are spicy additions to food that has long been used to maintain human health. It is not an exaggeration to say that medicinal plants have a great role to play in sustainable human health.

3. Role of medicinal plants

Medicinal plants have been used as a source of drugs by mankind for several thousand years. In fact, ancient man was totally dependent on plants for his needs of treatment, prevention and other form of medicaments, thus, utilizing plants as drugs for millennia. Throughout the development of human culture, the use of medicinal plants has had magical-religious significance and different points of view regarding the concepts of health and disease which existed within each culture. For the past 3000 years, a large number of plants are used in health care practices, such as in

Traditional Medicine in China, India and Africa, most of which contains therapeutic values which has been ascertained as such by Western standards. Furthermore, several other plants have been employed for centuries by several cultures which are less likely to be proven by western standards.

The role of medicinal plants in human health is clearly enormous. Out of the 252 drugs considered as basic and essential by the World Health Organisation (WHO), 11% are exclusively of plant origin and a significant number are synthetic drugs obtained from natural precursors. Some of these drugs obtained from plants include digoxin from *Digitalis* spp., quinine, quinidine from *Cinchona* spp., vincristine and vinblastine from *Catharanthus roseus*, atropine from *Atropa belladonna* and morphine and codeine from *Papaver omniferum*. It is estimated that 60% of anti-tumour and anti-infectious drugs already on the market or under clinical trial are of natural origin.² These plants offer compounds for new drugs, biomimetic synthesis development and the discovery of new therapeutic properties not yet attributed to known compounds. In most cases, the crude extract of medicinal plants may be used as medicaments.

It has been estimated that more than 400 traditional plants or plant derived products have been used for the management of type 2 diabetes across the world. Galegine, a substance produced by the herb *Galega officinalis*, provides an excellent example of such a discovery. Experimental and clinical evaluations of galegine provided the pharmacological and chemical basis for the discovery of metformin which is the foundation therapy for type 2 diabetes. Plant derived agents are also being used for the treatment of cancer. Several anticancer agents including vincristine, taxol, vinblastine, derivatives, irinotecan and topotecan and etoposide derived from epipodophyllotoxin are in clinical use worldwide. More so, it was used as condiments or seasoning in food, which in turn provides some health value to humans.³ In sustainable human health management, medicinal plant has played a vital role which has led to the growing interest in alternative therapies and therapeutic use of plants.

The use of these plants for health practices is on the increase. This is because, it is very cheap in comparison to the conventional synthetic form of medication, in essence, and it is very affordable. Meanwhile, it can be consumed without the aid of any kind of prescription, making it easily accessible. Also, medicinal plants are known to be more productive in comparison to other forms of medication in curing certain conditions, they are known to be all natural. With the use of these plants, supposed side effects caused by conventional medicine are avoided thereby making it less harmful. When synthetic drug is being abused or incorrectly used, it results in other problems which would have being avoided using plants. In the developing countries, majority of the population does not have access to conventional pharmacological treatment, hence, the use of plants and folk medicine. More so, ecological awareness suggests that “natural” products are harmless; users are

faced with minimal health risk resulting from its usage. Plants, herbs, and ethnobotanicals have been used since the early days of humankind and are still used throughout the world for health promotion and treatment of disease. Plants and natural sources form the basis of today's modern medicine and contribute largely to the commercial drug preparations manufactured today. About 25% of drugs prescribed worldwide are derived from plants. Still, herbs, rather than drugs, are often used in health care. For some, herbal medicine is their preferred method of treatment. For others, herbs are used as adjunct therapy to conventional pharmaceuticals. However, in many developing societies, traditional medicine of which herbal medicine is a core part is the only system of health care available or affordable. Regardless of the reason, those using herbal medicines should be assured that the products they are buying are safe and contain what they are supposed to, whether this is a particular herb or a particular amount of a specific herbal component. Consumers should also be given science-based information on dosage, contraindications, and efficacy. To achieve this, global harmonization of legislation is needed to guide the responsible production and marketing of herbal medicines. If sufficient scientific evidence of benefit is available for an herb, then such legislation should allow for this to be used appropriately to promote the use of that herb so that these benefits can be realized for the promotion of public health and the treatment of disease.

4. Conclusion

The use of herbal products is a common practice among Jordanian chronically ill patients. Pharmacists should be aware of the common herbal products uses, especially for treating common conditions and to be able to evaluate and discuss its efficiency and safety with their patients using science-based evidences. A high frequency of scientifically unsupported uses of some herbal products that claimed to treat chronic conditions was found³⁶⁻³⁸. A substantial proportion of patients did not inform their pharmacists about herbal products use, therefore to avoid any possible negative outcomes, better counseling and communication between patients and pharmacists are recommended. There is a demand for a wide variety of wild plant species is increasing with growth in human needs, numbers and commercial trade. Plants have provided humans with many of their essential needs, including life-saving pharmaceutical agents. However, medicinal plants are threatened as a result of human impact and uncontrolled wild collection, it is therefore recommended that deliberate efforts towards domestication and cultivation are essential for continuous supply of these plant species.

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