



Monitoring the Safety of Herbal Medicines in Yemen: A Call for Action

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Short Communication

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ABSTRACT

Consuming modern medicines with traditional herbs to treat and prevent diseases or even maintain health and well-being is common in different countries. Despite the high prevalence of this activity in Yemen, there is neither proper regulation that controls the production, standardization, quality control and use nor an appropriate system for herbal pharmacovigilance in Yemen. Yemenis prefer to use herbs before resorting to allopathic medicines, sometimes in concomitant or alternative to the allopathic medication. Most people believe that herbs are safe, though there are many side effects associated with herbal medicines. For the safe and effective use of traditional herbal medication, there should be a regulation from the official authorities that controls their preparation, selling, quality control, production, and monitoring of the side effects. The World Health Organization (WHO) stated a guideline for monitoring herbal safety within the current

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pharmacovigilance framework. However, monitoring and reporting the adverse effects of allopathic medicines in Yemen are limited, and the situation is more complicated and challenging for herbal medicines. The present article highlighted the challenges and provided recommendations for the application of effective herbal pharmacovigilance.

Keywords: Safety; risk-benefit; pharmacovigilance; low- and middle-income countries; traditional medicines.

1. INTRODUCTION

1.1 Use of Herbs in Yemen

Since ancient times, herbs have been used for the prevention and treatment of several diseases. In recent times the tendency to use herbs as an alternative treatment has increased dramatically worldwide. Herbal medicines (also called as phytomedicines or phytotherapeutic preparations) are "medicinal products containing as active substances exclusively herbal medicines or herbal drug preparations [1]. Traditional herbal medicine utilization is widely spread among countries to treat and prevent diseases or even maintain health and well-being [2]. Using medication from natural origin is a prevalent phenomenon in Yemen, like most South Asian countries [3-5]. However, in contrast to the industrialized countries, there is neither proper regulation that controls the production, standardization, quality control and use nor an appropriate system for herbal pharmacovigilance in Yemen. Yemen has a diverse climate due to variation in the natural topography, which contributes to the diversity of flora. Some of them are used as herbal medicines [6-10]. Herbal medication in Yemen is based on experience passed down through generations with no scientific reference and evidence for most practices. The herbs are sold in the 'Attarah' shops (where spices and herbs are sold) or street vendors without any official authority controlling the process. Hence, poor quality, incorrect, or adulterated herbs that may have fatal toxicity or side effects are accessible. A study stated that about 65-80% of the developing countries' populations use herbs to treat diseases due to poverty and the unavailability of allopathic medicines [11]. Yemen is a low-income country with low socioeconomic and education levels with a high prevalence of various types of acute, chronic, and infectious diseases. Most people are directed toward using herbal medicine due to its lower cost and belief. Yemenis prefer to use herbs before resorting to modern medicines, sometimes alongside or alternative to the allopathic medication. Even though

concomitant use may lead to serious side effects and health problems, most people believe that herbs will not be harmful if used to treat diseases. Thus, this article intends to emphasise the need to include pharmacovigilance program of herbal preparations and medicines in Yemen.

1.2 Adverse Effects of Herbs

Herbs are rich in a chemical mixture of organic and inorganic origin that may have specific adverse effects. As a result of the scarcity of research on medicinal herbs used in Yemen, documented information on side effects and safety is a paucity. Many studies reported the potential interaction between allopathic medicines and herbs [12-16]. The notion in most people's minds about the safety of using herbs is not correct. For instance, some toxic effects were reported [17] for the pyrrolizidine alkaloids (senecionine, C₁₈H₂₅NO₅), which are present in *Senecio* species [18]. Some herbs are not safe in specific patient groups such as children, elderly patients, breastfeeding, pregnant, and patients with chronic diseases.

Moreover, there is a potential interaction between allopathic medicines and herbs. The effect of herbs may be serious if the therapeutic index of allopathic medicines is narrow such as warfarin and phenytoin, or alter the pharmacokinetic and pharmacodynamic properties of allopathic medicines. For instance, hypoglycemia may result from herbs that reduce blood glucose concentrations with hypoglycaemic medications. Concurrent use of several herbs in herbal mixtures is not free from health problems as well. Use of poor-quality herbs that contain other elements than the intended one, contamination with toxic substances (e.g. heavy metals), microorganisms (e.g. *S. aureas*, *E. coli*, *Bacillus subtilis*, *Salmonella* spp.), and pesticide residues resulted in unexpected and sometimes life-threatening side effects [19].

Some of the herbs may result in nephrotoxicity and hepatotoxicity as well. For example, some

herbs like the plants belonging to Aristolochiaceae, like Aristolochia and Asarum species, contain aristolochic acid, which can cause nephropathy and interstitial nephritis. Similarly, hepatotoxicity is also associated with herbal preparations, including aloe species [20,21].

1.3 Herbal Pharmacovigilance

The term pharmacovigilance comes from the Greek word “Pharmaco” which means medicine, and the Latin word “Vigilantia” which means vigilance or watchfulness [22]. Thus, pharmacovigilance can be defined as science and activities relating to detecting, assessing, understanding, and preventing adverse effects or other possible drug-related problems [23]. Like other medicines, herbal medicines have adverse effects that vary from mild to severe [24-27]. Pharmacovigilance aims to improve patient care and safety concerning the use of medicines and assist public health programs by providing consistent, trustworthy information to evaluate the hazard-benefit profile of medicines. Lately, its field has been extended to involve herbals, blood products, traditional and alternative medicines, vaccines, and other health products. For the safe and effective use of traditional herbal medications, there should be a regulation from the official authorities that controls their preparation, selling, quality control, production, and monitoring of the side effects. The World Health Organization (WHO), stated a guideline for monitoring herbal safety within the current pharmacovigilance outline [28]. However, monitoring and reporting the adverse effect of allopathic medicines is limited in most low- and middle-income countries, especially Yemen.

Furthermore, herbal medicines are more complicated and challenging. At the patient's level, the underreporting of herbal medicines may be due to the attribution of side effects to allopathic medicines, not herbal medicines. At the pharmacists' level, unawareness of the importance of monitoring herbal medicine side effects may lead to underreporting.

The practice of using herbs to treat and prevent diseases is increasing globally under alternative medicine. As it is a common practice in developing countries, the health authorities should be aware of the suspected toxicity of some herbs on the liver, kidney, heart, CNS, embryo, side effects, overdose, allergic reaction, tolerance, dependence-addiction, and others.

Pharmacovigilance has principal importance in detecting undesirable reactions. The center of pharmacovigilance was established in Yemen in 2011 by the Supreme Board of Drugs and Medical Appliances (SBDMA). The center initiated some activities; however, most of them have been postponed due to the civil war, and there is no accurate official reporting of adverse effects of medicines [29]. In addition to imposing official regulations for the circulation of medicinal herbs, there must be a center to monitor their side effects. There are many difficulties encountered by the authorities to establish centers to regulate herbal remedies and monitor side effects such as:

1. Lack of funding for herbal related activities.
2. Lack of concern about the standardization and quality control of the herbal products.
3. Lack of attention to fighting street vendors.
4. Lack of funding and interest in researching the traditional use of herbs and documents of their main active components.
5. Availability of herbal medicines from several sources; it is difficult to regulate these medications/preparations and limit their entrance into the local market.
6. The pharmacists have insufficient knowledge to provide information and consultation on herbal medicines.
7. The inability of the physicians to distinguish that the specific side-effect is due to the consumption of herbal medicines.

There are some recommendations to overcome the existing situation for the random use of herbs.

1. The physicians should be concerned about the history of taking herbal medication while prescribing allopathic medicines, and the pharmacists should be aware before dispensing medicines.
2. Health awareness among the local people must be widened via different media types for the proper use of herbal medicine, their side-effect, and possible potential harms for the concomitant use with the other medicines, herbs, or traditional medicines.
3. All health care centers should have a pharmacovigilance system concerned with reporting and monitoring the side effects of the medicines and the herbal medication and possible interactions.
4. Besides continuous education programs for the graduated students and

professionals, the academic curricula of all healthcare professionals should be strengthened to enrich the basic knowledge concerning the traditional uses of herbal medication.

5. The herbal medicine should be subjected to standardization and quality control tests in the Supreme Board of the Drug & Medical Appliances.
6. Supporting the clinical and phytotherapeutics researches concerning the traditional herbal medication.
7. Collaboration between physicians and traditional practitioners is required to explain the risks and benefits of using herbal medicines in treating several diseases.
8. Encouraging pharmacoepidemiological studies to evaluate the safety of herbal medicines.
9. Organizing the sale and circulation of medicinal herbs, herbal medicines should be prescribed by physicians, pharmacists, or certified herbal practitioners.
10. There should be communication between the local health authorities with the national pharmacovigilance centers to develop proper guidelines for the reporting system.
11. Encouraging herbal medicines side-effects reporting from healthcare professionals and consumers.
12. Providing electronic or printed reporting forms similar to conventional medicines and distributing them to the healthcare centers.
13. Incorporating the concept of herbal medication and its side effects into the medical and health science colleges curriculum.
14. Encouraging ongoing education campaigns and training for pharmacists and health professionals to increase awareness about the reporting of side effects of conventional and herbal medicines.

2. CONCLUSION

Given the lack of pharmacological, toxicology, and clinical evidence, herbal medicines' safety monitoring and quality controls are essential. It is imperative to increase the awareness among the public and healthcare professionals about traditional herbal medication because they may have potentially harmful effects on public health. The existing national or institutional-based pharmacovigilance centre should expand the

reporting and monitoring of allopathic and herbal medicines. To prevent the recurrence of the thalidomide tragedy, the local authorities in Yemen must develop an action plan to implement the herbal pharmacovigilance project. There should be close communication with the WHO pharmacovigilance program to include herbal medicines into the national pharmacovigilance program properly. More studies of evidence synthesis should be carried out to establish evidence and gaps in herbal medicines' safety and efficacy issues.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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