Journal of Pharmaceutical Research International

Volume 35, Issue 35, Page 41-53, 2023; Article no.JPRI.111969
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Saudi People's Knowledge and Attitudes about Herbals' Side Effects and their Interactions with Medications

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/JPRI/2023/v35i357486

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/111969

Original Research Article

Received: 02/12/2023
Accepted: 29/12/2023
Published: 30/12/2023

ABSTRACT

Introduction: The safety of herbal medicines is of particular importance because the majority of these products is self-prescribed and is used to treat minor and often chronic conditions. If not used with caution, some herbals may cause side effects and interactions with drugs.
Objective: To determine awareness, attitudes of Saudi people about side effects of herbs and herbal products, their interaction with medicines and to determine the common source of information about herbals.
Methodology: A cross-sectional study in the period from January to November 2023. on a random sample comprised of 530 Saudi persons living in different regions of Saudi Arabia using questionnaire in Arabic language. All data were analysed by descriptive statistics.
Results: Among the study participants, there were 147 (28%) have medium interest in herbals and 36 (7%) have large interest, 150 (28%) believes that herbals have no side effects, 121 (23%) believes that herbals can be taken instead of medications, 82 (16%) believes that herbals have the same efficacy as medications, 103 (19%) take herbals with medications, 172 (32**%)** think that taking

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herbals with prescription medications may give better effect than taking each one separately**,** 78 (15%) don't know that taking medication with herbals can cause side effects, 87 (16%) don't know that herbals can interact with medications, only 73 (14%) reported that they told the doctor or pharmacist about taking herbals with medications. Laxative/constipation and carminative effect (19%), relieving pain (14%), cough and cold (13%), menstrual disturbances (8%) were the most conditions to be treated by herbal remedies among study participants. Only 12 (2%) had adverse effects from taking herbals. Anise (39%), Peppermint (37%), Ginger (21%), cinnamon (20%), cumin (19%), are among the commonly used herbs reported by participants. The source of information about herbals reported among participants were family and relatives (62%), media (12%).

Conclusion: Although herbals are widely used, *knowledge* of *their* potential *adverse effects* and interactions with drugs is limited. There's a need to increase public awareness of the community about risks of medical herbs.

Keywords: Herbals' side effects; interactions; medications; knowledge.

1. INTRODUCTION

"An herb is defined as a plant or plant part used for its aromatic, savoury, medicinal or cosmetic properties" [1]. "Generally, the whole plant or plant parts are used singly or in combination with more than one plant for the purpose of treatment. However, the herbal industry now produces herbal products containing isolated chemicals or extracts of single plants in modern pharmaceutical dosage forms. This practice is against that of traditional herbal practitioners who support the use of the whole plant or plant parts, as they believe that there is synergism or antagonism among the many constituents and that the pharmacological activity depends on their combined effects" [1].

"It has been estimated that 80% of the world population use some form of herbal medicine. There is little doubt that the use of herbal medicines is growing. Worldwide, the usage increases at a rate of 10-20% annually" [1,2].

"It is undeniable that plants have an important role in the development of modern medicines. More than 60–70 % of modern medicines in the world market are directly or indirectly derived from plant products" [2]. "In the last few years, research has uncovered interesting and beneficial chemicals in herbs. However, herbs are not non-toxic just because they are natural. Medicinal herbs contain powerful, pharmacologically active compounds. While some herbs in common use appear to be fairly safe, all medicines, herbal or otherwise, should be used with caution. The number of reports of adverse effects of herbal medicines is now increasing due to increased use and also probably due to increased awareness among the consumers and clinical practitioners" [3].

"The increasing use of the herbal medicine requires concern about interactions between herbs and conventional drugs and also the regulation of the herbal medicines. In 1991, WHO drafted guidelines for the assessing of the herbal medicines and defined some basic criteria for evaluation of their quality, safety and efficacy" [4].

"A general rule of such assessment is that traditional experience of their use and the medical, historical and ethnological background of herbal medicines shall be taken into account, through detailed descriptions in the medical or pharmaceutical literature or documented accounts of their applications. Nowadays a certain number of developed and even some developing countries have set policies for regulation of the traditional herbal medicines" [5].

The factors affecting the safety of traditional medicines include intrinsic toxicity of the plants, adulteration, substitution, contamination, and misidentification, lack of standardization, incorrect preparation and or inappropriate dosage labeling and herbs drugs interactions.

Rationale of the Study: The safety of herbal medicines is of particular importance because the majority of these products is self-prescribed and is used to treat minor and often chronic conditions. However, most patients consuming herbal preparations are not aware of the potential adverse effects and interactions of these preparations with drugs. This study is conducted on the presumption that little research has been conducted to explore people's knowledge about herbals' safety.

Objective of the Study: To determine awareness and attitudes of Saudi people about

side effects of herbs and herbal products and their interaction with medicines.

To determine the common source of information about herbals.

2. REVIEW OF LITERATURE

Traditional medicine in Saudi Arabia is based on herbal remedies and spiritual healing. There is hardly a city or village in Saudi Arabia where traditional medicines are not used or sold. They are also widely used in home remedies for certain ailments.

"Probably the popularity of herbs is due to the concept of being 8 natural drugs and having no side effects. Satisfaction, cultural and religious belief are among the other factors influencing the use of herbal drugs" [6]. "Alternative medicine is now being used by well-educated adults of well-disciplined communities without bringing into the knowledge of physicians" [7,8]. "There are greater chances of drug-drug interaction between the allopathic and herbal components if taken up by the same patient. This fact invites to collect evidence-based data about usage, awareness and attitude about the herbal medicines. A good proportion of the Middle east population is reported to experience harmful effects from such herbal remedies" [9].

The number of reports of adverse reactions attribufig. to traditional medicine has increased from 11 in 1997 to 23 in 1999. Adverse effects or poisoning pertaining to herbals reported to the National Poison Centre (NPC) from 1995 to June 2000 are as follows: 8 cases (1995), 3 cases (1996), 5 cases (1997), 11 cases (1998), 7 cases (1999) and 9 cases (until June 2000). The list of herbals involved include *Datura fastuosa* ('kecubong'), Datura metel ('kecubong'), *Datura stramonium* ('terong pengar') *Pithecallobium jiringa* ('jering'), *Ganoderma mycelium* ('kulat kayu'), lemon grass ('serai'), margosa ('daun mambu'), nutmeg (*Myristica fragrans*), eucalyptus (*Eucalyptus globulus*), yohimbine, cassava ('ubi kayu'), camphor, stephamine, 'Air Abu Kansui', 'Minyak Rohini', 'Yu Yee' oil, 'Pil Kuda', 'Minyak Angin', 'Slimming gel' (Pusat Racun Negara – personal communication). The most common adverse effects reported are hepatic and renal problems [10]. "However, it is difficult to identify the causative agent associated with the adverse reactions encountered because traditional herbal preparations often contain multiple ingredients. The above number of reported cases most probably does not reflect the actual frequency of adverse reactions caused by traditional herbal preparations, as most cases go unreported" [10].

"Drug interactions are defined as pharmacodynamic, pharmacokinetics or clinical responses that result from the administration of two or several drugs, which differ from the known effect of each of these drugs taken separately" [10]. "The clinical effects of these interactions can be antagonistic, synergistic and additive or idiosyncratic that can lead either to treatment failure, increasing of the expected pharmacological effect or to toxic effects. The interaction between herbs and conventional drugs may often occur because of the fact that some herbs are substituted. The addition of pharmaceutical drugs in herb products is a particular problem with Chinese patent medicines" [10].

"Out of 2609 samples of traditional Chinese medicines collected from eight hospitals in Taiwan, 23.7% contained pharmaceutical adulterants, most commonly caffeine, paracetamol, indomethacin, hydrochlorothiazide and prednisolone" [11].

According to Brinker [12], the interactions between herbs and conventional drugs may be categorized of the following types:
- Decrease of the bioavailability of the drug: "this may occur by reduction of the absorption of the drug. This is the case with for example *Amorphophallus konjac,* tea (*Camella sinensis*), guar gum (*Cyamopsis tetragonolobus*), Plantago spp; or by enhancement of metabolism that is the case with mustard (Brassica spp); or by enhancement of elimination for example by coffee" [12].

- Increase of the bioavailability of the drug: "the bioavailability can be enhanced by the increase of the absorption of the drug as with cayenne pepper (Capsicum spp) or black pepper (*Piper nigrum*) or by reduction in the metabolism, as with citrus and licorice. The oral drug absorption can be increased by *Zingiber officinale*. The absorption of phenytoin and propranolol is increased and the elimination of both drugs slowed when they are taken together with piperine (alkaloid from Piper spp)" [12].

- Protection from adverse effects: "several herbs may provide protection against the adverse effects of drugs, including cayenne pepper, licorice, milk thistle (Silybum 15 marianum), and *Zingiber officinale*. The vomiting effect induced

by cyclophosphamide can be prevented by prior administration of ginger acetone extract" [12].

- Enhancement of drug effect: "The effects of drugs may be enhanced by a mechanism dissimilar from that of the drug, for example, by bromelian (*Ananas comosus*). For example the hypokalemia resulting from a long term use of stimulant laxative herb potentiate the effect of cardiotonic and anti-arrhythmic drugs like quinidine" [13].

- Additive effect: "This effect may occur when the herb and the drug have similar activities, as it can occur with Aloe, betel nut (*Areca catechu*), gingko, licorice, gurmar (*Gymnema sylvestre*, leaves), bitter melon (*Momordica charantia* fruit and juices), and kava (*Piper methysticum*). The hypoglycemic effect of oral antidiabetic drug is increased when associated with gurmar in human clinical trial. The gurmar is used as antidiabetic remedy in Chinese traditional medicine" [14 The low absorption of dietary carbohydrates can lead to the reduction of insulin dose in insulin-dependent patients.

- Antagonistic to or incompatible with drug effect: Antagonism or incompatibility may occur with betel nut (*Areca catechu* seed), mustard, and papaya (*Carica papaya*). In human case report (per os) the antiparkinsonian effect of phenothiazines such as flupenthixol and fluphenazine and anticholinergic effect of procyclidine are reduced when administrated with arecoline and that could be due to the cholinergic effect of the later. De Smet and d'Arcy have used a different categorization to classify herb-conventional drug interactions [15]. Brinker [16] in his review has described the well-known and possible interactions between herbs and conventional drugs. It is well documented that the laxative-containing herbs decrease the absorption of orally taken drugs [17].

When it comes to the herb-herb interactions there are few data. Many traditional medicines consist of admixtures of herbal ingredients in complex formulas; there may be synergism or antagonism between components. In addition, new chemical complexes are probably produced from the interactions of these ingredients.

"The alkaloid berberine can combine with glycyrrhizin found in licorice form a new chemical with potentially different pharmacological property" [15]. "A Chinese herbal medicine Scutellaria constituent, baicalin, a flavonoid glucuronide, can complex with berberine" [17].

The most common components reported in the literature to be responsible of herb-drug interactions are fibers, tannins, anthraquinoids, heterosides, alkaloids, coumarins, polysaccharides, mineral elements etc. These substances are biologically active and responsible for the therapeutic effect of the medicinal plants (herbs)

3. METHODOLOGY

3.1 Study Design, Settings and Duration

A cross-sectional study on people living in Saudi Arabia in the period from January to November 2023.

3.2 Study Population and Sampling

- The survey conducted on random sample of 530 Saudi people.

3.3 The inclusion Criteria for the Study

- Adult male and female Saudi people of different age ranges and education
- Saudi nationality
- Older than 16 years
- Living in Saudi Arabia
- Agree to fill the questionnaire

3.4 The Exclusion Criteria

- Incompletely filled questionnaires
- Non-Saudi

3.5 Data Collection and Data Collection Tool

Data collection was carried out using a questionnaire especially designed for this study, developed in Arabic language.

The questionnaire addressed the following issues:

- Demographic data of participants.
- Estimation of herbal usage and causes for their use.
- Estimation of herbal usage with drugs
- Determine attitudes, awareness of herbal usage, herbal usage with drugs
- Estimation of herbals side effects, reporting these side effects to the physician

- Determine source of information about herbals.
- Determine the commonly used herbals

3.6 Statistical Analysis

All data were analyzed using MS EXCEL Statistical program by means of Descriptive statistics with representation by pie chart or bar graph.

4. RESULTS

4.1 Demographic Characteristics of Participants

Totally 530 participants agreed to fill the questionnaire, among them there were 61 (11%) males and 469 (89%) females. The largest proportion of participants 222 (42%) aged from 16 to 25 years, 161 (30%) participants aged from 25 to 35 years. The education of 120 participants (23%) is secondary education, 292 (55%) with bachelor's degree. More than half of participants 270 (51%) were married. Mostly the participants were from eastern region of Saudi Arabia 239 (45%) followed by Northern region 158 (30%) (Fig. 1).

4.2 Chronic Diseases and Medications Taken by Participants

223 (42%) of study participants take medications; of them 173 (33%) take vitamins, 35 (7%) take analgesics/anti-inflammatory/antipyretics, 30 (6%) take medications for hypertension, 23 (4%) take medications for diabetes. (Table 1).

4.3 Participant's Attitude and Interest in Herbals

Regarding the Interest in herbals, there were 147 (28%) have medium interest in herbals, 207 (39%) have little interest, 140 (26%) have no interest, 36 (7%) have large interest.

150 (28%) believes that herbals have no side effects, 123 (23%) believes that herbals have more benefits, 105 (20%) take herbals upon advice from their doctors or pharmacists or friends, 51 (10%) take herbals because they are cheap and available. (Fig. 2).

4.4. Participant's Knowledge about Herbals

121 (23%) believes that herbals can be taken instead of medications, 255 (48%) believes that herbals may be taken instead of medications. 82 (16%) believes that herbals have the same efficacy as medications, 270 (51%) believes that herbals may have the same efficacy as medications. (Fig. 3).

4.5 Participant's Opinions and Attitudes about Concomitant use of Herbals with Medications

103 (19%) take herbals with medications, 172 (32**%)** think that taking herbals with prescription medications may give better effect than taking each one separately but 322 (61%) think that taking herbals with prescription medications not give better effect than taking each one separately (Fig. 4).

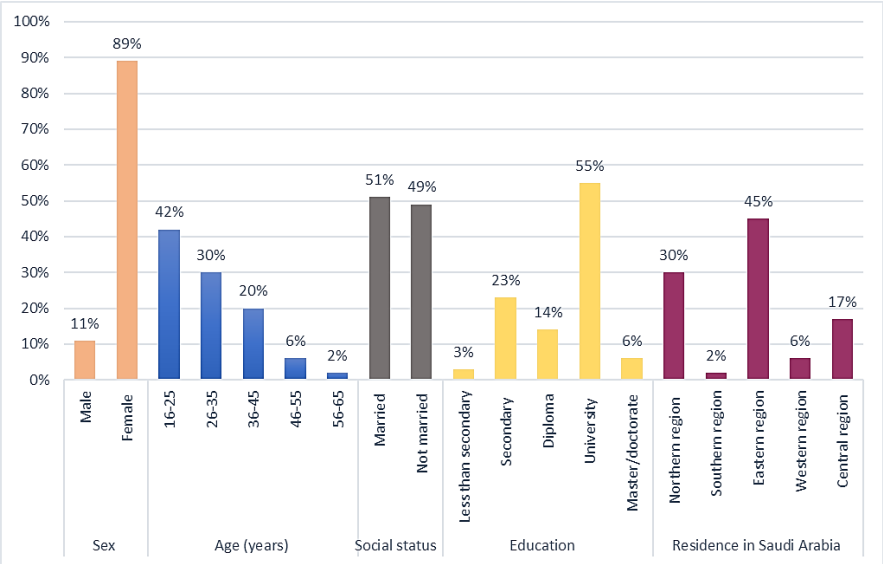

Fig. 1. Demographic characteristics of participants

Table 1. Chronic diseases and medications taken by participants (n=530)

Questionnaire items	Categories	Frequency	Percentage
Do you take medications?	Yes	223	42%
	No	307	58%
Type of medications	Antihypertensives	30	6%
	Antidiabetics	23	4%
	Medications for heart diseases	2	1%
	Medications for thyroid disturbance	21	4%
	Medications for gastrointestinal diseases	5	2%
	Vitamins	173	33%
	Antibiotics	16	3%
	Analgesics/anti-inflammatory/antipyretics	35	7%

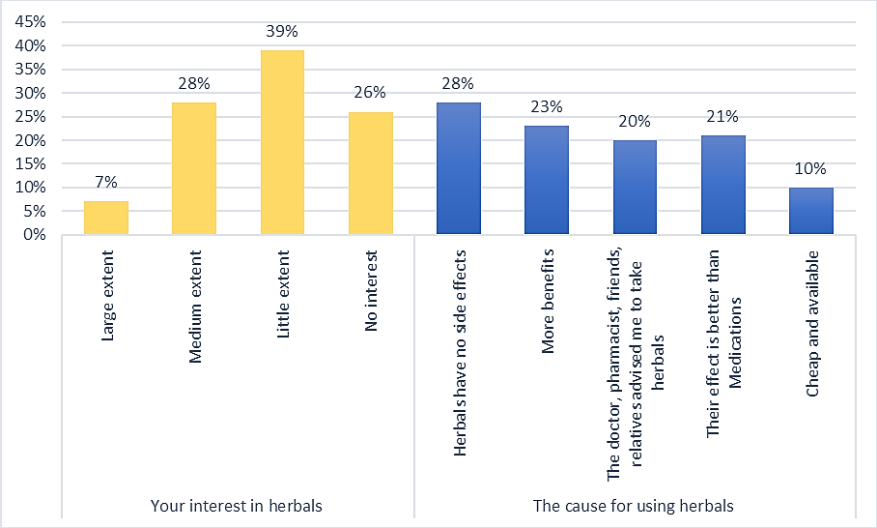

Fig. 2. Participant's attitude and interest in herbals

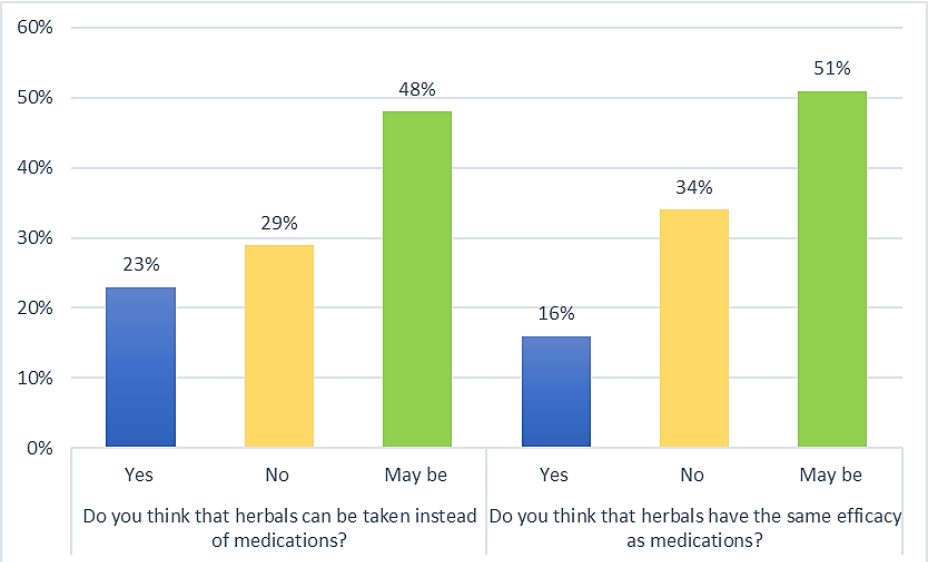

Fig. 3. Participant's Knowledge about herbals

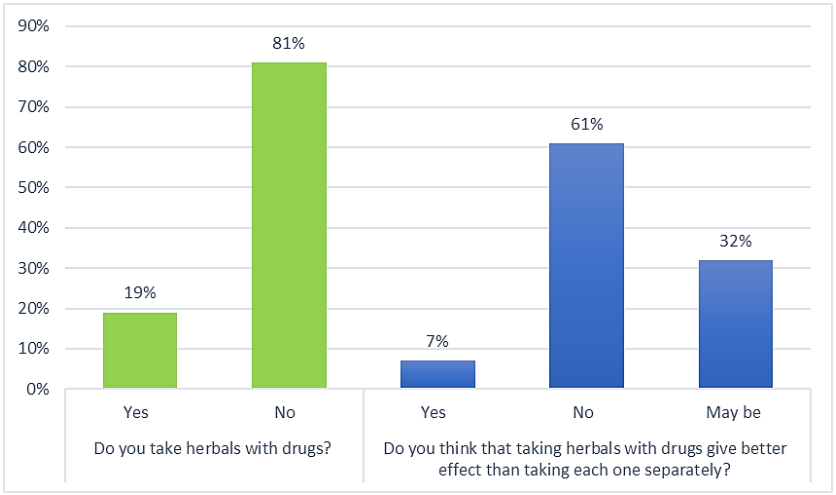

Fig. 4. Participant's opinions and attitudes about concomitant use of herbals with medications

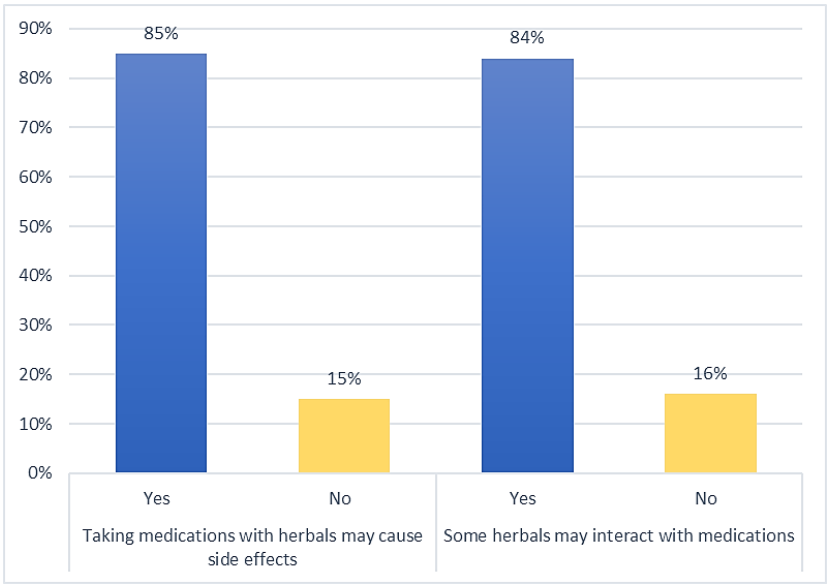

Fig. 5. Participant's knowledge about consequences of concomitant use of herbals with medications

4.6 Participant's Knowledge about Consequences of Concomitant use of Herbals with Medications

78 (15%) don't know that taking medication with herbals can cause side effects, 443 (84%) know that herbals can interact with medications but 87 (16%) don't know. (Fig. 5).

4.7 Practices, Experiences of Participants Regarding Herbals Use

Only 73 (14%) reported that they told the doctor or pharmacist about taking herbals with medications. Small proportion 30 (6%) reported that they had side effects due to taking herbals with medications, 19 (4%) reported side effects which occurred to them due to taking herbals with medications to pharmacists or physicians, 197 (37%) don't read the medication leaflet before taking herbals with it, 282 (53%) reported benefits from taking herbals. Laxative/constipation and carminative effect (19%), relieving pain (14%), cough and cold (13%), menstrual disturbances (8%), faster recovery of bone diseases (6%), decreasing blood pressure (6%), relaxing effect (5%), decreasing blood glucose (1%) were the most conditions to be treated by herbal remedies among study participants. Only 12 (2%) had

adverse effects from taking herbals; adverse effects reported by participants from herbals use was headache (0.7%), hormonal disturbance (0.6%), gastrointestinal disturbances (0.4%) and rash, itching (0.6%). (Fig. 6).

4.8 Commonly Used Herbals among Participants

Anise (39%), Ginger (21%), cinnamon (20%), cumin (19%), Peppermint (37%), salvia (7%), Fenugreek (9%), black seed (9%), Hibiscus, and Myrrh (5%) are among the commonly used herbs reported by participants (Fig. 7).

4.9 Source of Information about Herbals

The source of information about herbals reported among participants were family and relatives (62%), media (12%), physician (12%) and pharmacists (10%) (Fig. 8).

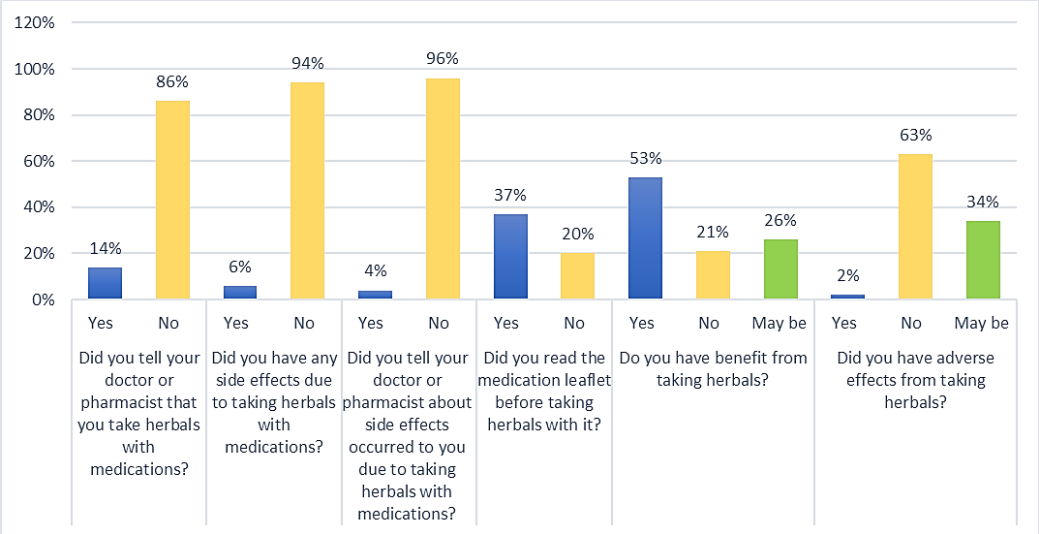

Fig. 6 (a). Practices, experiences of participants regarding herbals use

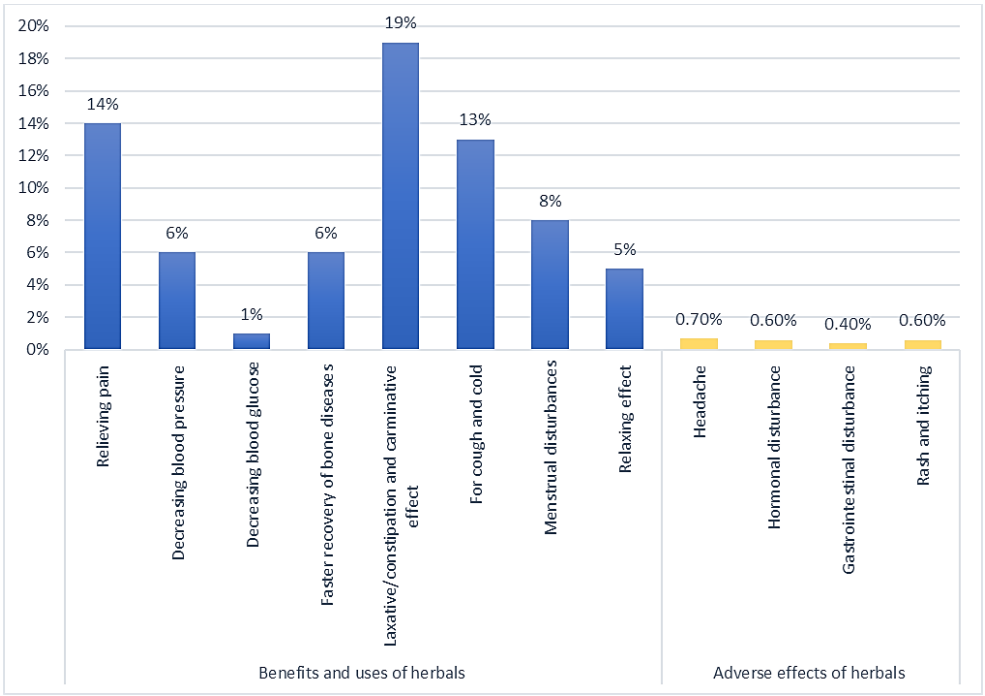

Fig. 6 (b). benefits, uses and side effects of herbals among participants

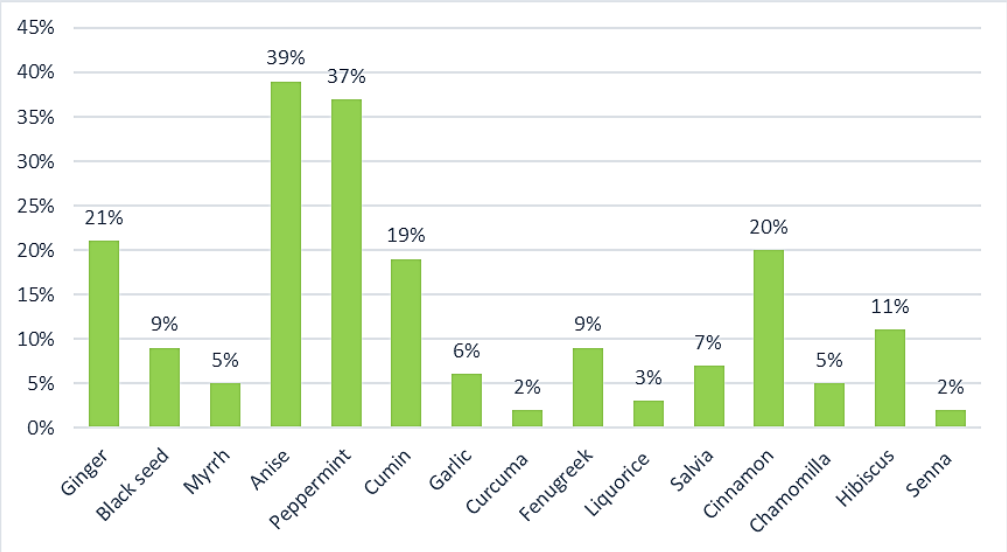

Fig. 7. Commonly used herbals among participants

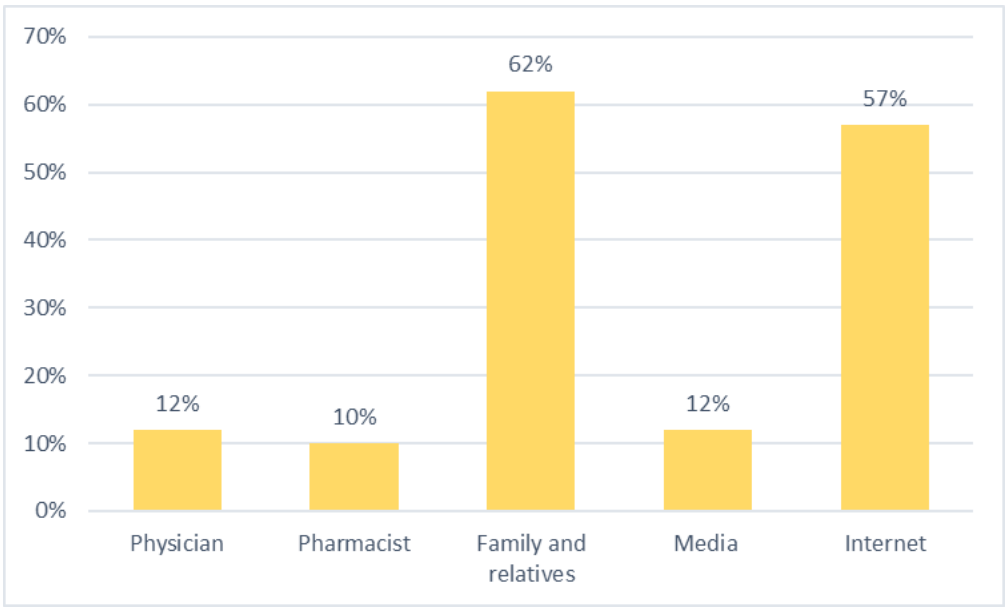

Fig. 8. Source of information about herbals

5. DISCUSSION

The present findings indicated that females are more likely to use herbals which is in accordance with other studies [18-21]. It has been reported that females have more positive attitudes with regard to herbs.

Anise, Ginger, Peppermint, cinnamon, cumin, salvia, Fenugreek, black seed, Hibiscus, and Myrrh are among the commonly used herbs. Decreasing blood pressure, blood glucose, cough and cold, constipation/diarrhea and carminative effect, menstrual disturbances were the most conditions to be treated by herbal remedies in this Arab region of the globe as suggested by many authors [22,23].

Use of herbal and dietary supplements is extremely common. In one US survey of adults who regularly take prescription medication, 18.4% reported the concurrent use of at least one herbal product or high-dose vitamin and 61.5% of those who used unconventional therapies did not disclose such use to their

physicians [24]. In the present study, 19% of participants reported concurrent use of herbals with medication and only 14% reported using herbal products with medications to their practitioner.

A survey of 515 users of herbal remedies in the UK found that 26% would consult their general practitioner for a serious adverse drug reaction associated with a conventional over the counter medicine, but not for a similar reaction to herbal remedy [25] Only 73 (14%) of participants tell the doctor or pharmacist about taking herbals with medications, 30 participants reported having adverse effects due to concurrent use of medications with herbals; only 19 of them reported that they told doctor or pharmacist about these side effects. Our results (59%) show some similarity to previous work carried out in Riyadh, KSA which reported that 50% of patients do not inform the health care practitioners about the herbal use [26]. This may result in severe drug interaction and prove the need for fabrication of nanoparticles for better drug delivery and better safety [27].

The current results indicate that the role of healthcare practitioners (medical doctor and pharmacist) is not currently evident. Often physicians miss to ask for herbal use in their history taking session from patients [22]. Our findings also support the observation of that 90% of doctors did not recommend stopping herbal medicine despite knowing. This is probably due to the fact that physicians' knowledge regarding herbal and other forms of alternative medicine is not sufficient so they do not comment on herbal medicine usage by their patients [22].

Faced with the increasing use of herbs by the patients, it is crucial that healthcare providers be prepared to discuss their uses and limitations, as well as possible side effects or adverse reactions [28,29]. Resent studies reported that pharmacists are now receiving more questions from patients regarding the use of herbs and natural health product than ever before, which necessitate that pharmacists become more knowledgeable about these products and their uses, dosing, adverse effects, drug expiration, disposal drug interactions and contraindications [30,31].

Few (2%) of those who use herbs in this survey indicate that they have experienced certain associated side effects (headache, hormonal disturbance, gastrointestinal disturbance and rash) which is consistent with that reported in North America [32,33]. However our results is lower compared with Wassie SM et al in an Ethopian survey who reported the incidence of adverse effects in 22.7% herbal users ranging from worsening of comorbidities to fistula formation, bleeding and psychosis [34]. The increasing use of herbs needs proper rules and regulations under medical act after finalizing the drug developmental steps in animal and human models.

Use of herbals based on family and relatives and other's experiences and stories was 62%. Previous study in Nigeria similarly showed that around 80% of herbals consumers depend on the advice of friends and relatives regarding the use [35]. More than half of participants (57%) used Internet as a source of information regarding herbals. In previous study, they found that 91.1% used herbal medicine following their own independent research or following the advice from friends with no medical background [36].

6. CONCLUSION AND RECOMMENDATION

When used wisely, herbal medicines have a place in the control of certain ailments and diseases. Herbs are widely used by Saudi people and they find it very useful.

Use of natural herbs and herbal medicines may not be without risk. Although herbals are widely used, *knowledge* of *their* potential *adverse effects* and interactions with drugs is limited. There’s a need to increase public awareness of the community about risks of medical herbs.

More research on adverse reactions on locally available herbal preparations should be encouraged and public education on the good and bad effects of herbals need to be emphasized.

Health care professionals should remain vigilant for potential interactions between herbals and prescription medications.

Education through TV programs, electronic websites and different types of media should

participate in public awareness of the community particularly in how to use medical herbs properly with take care of symptomatic side effects and possible complications that could occur as a result of using these herbs especially when taken concurrently with medications.

Furthermore, there should be certified centers of alternative medicine supervised by health care facilities to monitor the sources, quality and safety of herbal medicine.

7. LIMITATIONS OF THE STUDY

This type of study, using a questionnaire, has its limitations. It depends very much upon information given by respondents and open to recall bias or error. The extent of truthful answers or verifying respondents' claims is not possible in this type of study, which were taken by online questionnaire. A further limitation of the study is the cross-sectional nature of the data that represented one point in time and, therefore, do not reflect any changes in respondents' beliefs, attitudes over time.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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