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The prevalence and predictors of using herbal medicines among Iranian cancer patients

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ABSTRACT

Background: and Purpose: Using of herbal medicines is common for cancer treatment. The aim of this study was to determine the prevalence, reasons, and predicting factors for the use of herbal medicines by Iranian cancer patients.

Materials and methods: We conducted this cross-sectional study on 315 cancer patients through face-to-face interview in Kerman, Southeast of Iran, 2017.

Results: In total, 267 (84.1%) patients used at least one herbal medicine during chemotherapy courses, while only 42 (16.1%) patients discussed the use of herbal medicines with physicians. Living in urban regions (OR, 2.56; 95% CI, 1.30–5.05; $P < 0.0001$) and the experience of constipation and diarrhea (OR, 2.11; 95% CI, 1.09–4.05; $P = 0.02$) were determined as some predicting factors for the use of herbal medicines.

Conclusion: Our findings indicate that as herbal medicines are common among cancer patients and their use is often overlooked, physicians should pay particular attention to herbal medicines during chemotherapy.

1. Introduction

Herbal medicines, as part of Complementary and Alternative Medicines (CAM), are defined as "plant-derived materials or products with therapeutic or other human health benefits, which contain either raw or processed ingredients from one or more plants". According to this definition, herbal medicines include raw plant materials, processed plant materials, and herbal medicinal products [1]. Today, the use of herbal medicines in the treatment of diseases, such as cancer, is highly prevalent [2].

Consumption of herbal medicines varies in different countries. A study in developing countries revealed that more than half of cancer patients used herbal medicines along with the prescribed medications [3]. In some countries including Palestine, consumption of herbal medicines has been estimated at 90% among cancer patients [4]. On the other hand, the use of these medicines among cancer patients is lower in developed countries. According to previous studies, more than one-third of cancer patients in the United States and Europe consumed herbal medicines [5,6].

Patients believe that natural products are safer and more effective than modern medicines in the treatment of diseases. Self-medication, dissatisfaction with the standard treatment, and longer survival are among other reasons for the use of herbal medicines [7,8]. Since patients generally assume that herbal medicines are safe and risk-free, they do not discuss it with their physicians or other healthcare professionals. Some studies showed that nearly a quarter of patients discuss this issue with their physicians [9,10]. The poor communication between physicians and patients, besides self-medication, can lead to adverse effects for patients, and in some cases, herb-drug interactions may occur as a result of the simultaneous use of herbal medicines and pharmaceutical drugs [11].

The study conducted in Israel showed that one-third of cancer patients used herbal medicines during chemotherapy [12]. Patients often use herbal medicines during chemotherapy to reduce its side effects [13].

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Chemotherapy, despite its benefits, has some common side effects, which may become unbearable for patients. Gastrointestinal disorders, such as nausea and vomiting, diarrhea, and constipation, along with neuropathic and skin disorders, are the most common side effects of chemotherapy. For reducing the extent and severity of these side effects, medicinal plants or botanical dosage forms may be used by cancer patients [14,15]. However, the mechanism of action of herbal medicines during chemotherapy are not clear, and consumption of these medicines during chemotherapy may reduce the effects of chemotherapy medications; therefore, these medicines should be used with caution [16].

Availability and species of herbal medicines vary in different geographical areas; accordingly, the prevalence of herbal medicines consumption are different in these regions [17]. In traditional Iranian medicine, more than 200 medicinal plants have been described for cancer treatment [18]. To the best of our knowledge the prevalence and reasons of using herbal medicines among Iranian cancer patients have remained unclear. Taking into account the importance of this issue, we performed this cross-sectional study to specify the prevalence and reasons of using herbal medicines among cancer patients. In addition, we aimed to determine the most common herbal medicines and to identify the predicting factors for using herbal medicines among Iranian cancer patients.

2. Materials and Methods

2.1. Study design and population

In this cross-sectional study, 315 patients with different types of cancer were recruited from February to August 2017 in Kerman, Southeast of Iran. Patients were recruited from two public health sectors and one private health sector (cancer clinics), using convenience sampling. Sampling was not restricted by gender, cancer site, or cancer stage, and all patients were included. The inclusion criteria were as follows: 1) age above 18 years; 2) completion of at least one chemotherapy course; and 3) administration of chemotherapy drugs by infusion, injection or orally. Also, 4) patients who had completed the chemotherapy course one month before the survey were eligible for the study.

2.2. Data collection

Data were collected through face-to-face interviews by the first author in the waiting room of cancer clinics. The interview time usually was before or after injection or infusion of chemotherapeutic agents. For patients who had consumed chemotherapy drugs orally, a checklist was completed upon their monthly checkup.

2.2.1. Instrument

A checklist was used to collect the data and was completed for all patients who voluntarily participated in the study. We developed this checklist based on the literature review. Before the study, both a traditional Iranian medicine specialist and an expert herbalist examined the checklist. Then, we interviewed 15 patients in a pilot study to evaluate the checklist. Pilot data were analyzed separately and results showed that the native names of two herbal medicines (Khatmi in Persian for *Malva sylvestris* and Poodeneh in Persian for *Mentha longifolia*) should be added in the checklist.

The checklist consisted of four major parts. The first part included demographic information, such as age, gender, marital status, educational level, place of residence, and comorbidities. In the second part of the checklist, items related to the history of herbal medicine consumption during chemotherapy and reasons for using or not using herbal medicines were investigated. If a patient gave a positive response to the question: “Have you ever used herbal medicines during chemotherapy?”, the third and fourth parts of the checklist had to be completed.

In the third part, the name of herbal medicines, access to herbal medicines, and sources of information about herbal medicines were asked. The final section of the checklist included the patient's intention to use herbal medicines as an alternative treatment, satisfaction with herbal medicines to reduce chemotherapy complications, and physician's awareness of this practice. To reduce information bias, all the interviews were conducted in the waiting room of cancer clinics. A sample of herbal medicines were showed before we started the interviews, patients observed the samples and said their names. In many cases, the patients had forgotten the name of herbal medicines, but when they observed the samples, they could realize which herbal medicines they were used. For collecting the patients' clinical information, medical charts of patients recruited in the interview were reviewed. In this section, cancer site, clinical stage, metastasis, and recurrence status were extracted from the clinics registry.

2.3. Data analysis

Data were described using descriptive statistics, such as mean, Standard Deviation (SD) and Confidence Interval (CI). To analyze the data, a univariate logistic regression model was used to compare demographic and clinical characteristics between users and non-users of herbal medicines. A multivariable logistic regression model was also used to determine the predicting factors for using herbal medicines. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 23. *P*-value (P) less than 0.05 was considered statistically significant.

2.4. Ethical considerations

All procedures performed concerning human participants were in accordance with the ethical standards of the Ethics Committee of Kerman University of Medical Sciences (ethics number, IR.KMU.REC.1396.1278) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in this study. If a patient refused to cooperate, he/she was excluded from the study.

3. Results

3.1. Demographic and clinical characteristics of cancer patients

In total, 315 participants contributed to this study. The mean (SD) of patients’ age was 51.16 (14.01) years (range, 18–92 years). The majority of patients were females (n = 221; 70.2%) and married (n = 297; 94.3%). In more than half of the patients, educational level was under high-school diploma (n = 190; 60.3%), and the majority lived in urban areas (n = 235; 74.6%). Patients with breast cancer constituted more than one-fourth of patients (n = 119; 37.8%). Less than half of patients experienced comorbid diseases, such as hypertension (n = 57; 18.1%), diabetes mellitus (n = 32; 10.2%), and heart diseases, including heart attack and dysrhythmias (n = 32; 10.2%). During chemotherapy, nausea and vomiting were the most common complications among patients (n = 225; 71.4%), followed by constipation and diarrhea (n = 192; 60.9%) (Table 1).

3.2. Prevalence and reasons of using and not using herbal medicines

In total, 267 (84.1%; 95% CI, 80.6–88.9) patients reported the use of at least one herbal medicine during the chemotherapy courses. However, only 42 (16.1%; 95% CI, 11.9–20.1) patients reported the use of herbal medicines to their oncologists. More than three-quarters of patients who used herbal medicines during chemotherapy were satisfied with the effects of herbal medicines on reducing chemotherapy side effects (75.8%; 95% CI, 70.2–80.6). Based on the findings, more than half of user patients were interested in using herbal medicines

Table 1
The prevalence of using herbal medicines based on demographic and clinical characteristics of cancer patients referred to Kerman cancer clinics, February to August 2017.

Variables	levels of variables	Total	Prevalence of using herbal medicines	95% CI[a]
Age groups	< 50	140	117(83.5)	76.9–89.5
	≥50	175	150(85.7)	80.1–90.5
Sex	Male	94	76(80.9)	72.8–88.5
	Female	221	191(86.4)	81.8–90.5
Marital status	Single	18	14(77.8)	57.1–94.1
	Married	297	253(85.2)	81.3–88.8
Educational levels	Under diploma	190	155(81.6)	76.1–87.3
	Diploma and higher diploma	125	112(89.6)	83.7–94.6
Area of residence	Urban	235	206(87.7)	83.2–91.7
	Rural	80	61(76.3)	66.2–84.8
Cancer site	Breast	119	101(84.9)	78.1–91.3
	Gastrointestinal	60	51(85.0)	75.4–92.9
	Lymphoma and hematologic tumors	56	46(82.1)	71.4–91.7
	Gynecologic	32	30(93.8)	83.8–100
	Thorax	17	14(82.4)	60.9–100
	Other sites	25	22(88.0)	75.0–100
	Unclear	6	3(50.0)	11.8–88.2
Clinical stage	I	19	18(94.7)	83.3–100
	II	52	43(82.7)	71.7–92.0
	III	55	48(87.3)	77.8–95.3
	IV	41	37(90.2)	79.5–97.8
	Unclear	148	121(81.8)	75.2–87.7
Metastatic status	Positive	141	118(83.7)	77.2–89.3
	Negative	161	141(87.6)	82.5–92.4
	Unclear	13	8(61.5)	35.3–87.5
Recurrence status	Positive	49	45(91.8)	83.7–98.3
	Negative	251	212(84.5)	79.7–88.8
	Unclear	15	10(66.7)	42.9–92.3
Comorbid illness	Hypertension	57	50(87.7)	78.0–95.9
	Diabetes mellitus	32	29(90.6)	78.8–100
	Heart diseases	32	28(87.5)	75.8–97.3
	Dyslipidemia	25	24(96.0)	86.7–100
	Insomnia	15	13(86.7)	66.7–100
	Other diseases	95	88(92.6)	86.8–97.4
	No disease	156	125(80.1)	73.6–86.2
Most complication during chemotherapy	Nausea and vomiting	225	189(84.0)	79.1–88.5
	Constipation and diarrhea	192	170(88.5)	84.0–93.2
	Pain	190	161(84.7)	79.2–89.4
	Oral lesions	151	130(86.1)	80.0–91.2
	Skin lesions	151	134(88.7)	83.9–94.0
	Other complications	235	197(83.8)	78.8–88.7

[a] Confidence Intervals.

rather than pharmaceutical drugs (68.7%; 95% CI, 62.3–74.2).

The main reason for using herbal medicines was the successful experience of herbal medicine consumption (n = 169; 64%). In addition, progress in treatment and enhanced quality of life were other contributing factors regarding the use of herbal medicines (n = 106; 40.2%). On the other hand, fear of drug-herb interactions (n = 15; 30%) and lack of awareness (n = 12; 25.5%) were among common reasons for non-users (Table 2).

The primary sources of herbal medicine information included family members and previous knowledge of herbal medicines (87%; 95% CI, 82.4–91.2), followed by friends and relatives (67.6%; 95% CI, 62.2–73.3), other patients with the same disease (43.9%; 95% CI, 38.2–50.0), and media such as TV and radio (40.8%; 95% CI, 35.1–46.9). On the other hand, other sources including herbalists (29.4%; 95% CI, 24–35.1), Internet (19.5%; 95% CI, 14.1–24.4), and other health workers except physicians (17.9%; 95% CI, 13–22.5) were not very popular among herbal medicine users.

We identified 80 different herbal medicines consumed by patients. Among herbal medicines, *Matricaria chamomilla* L. (n = 192; 71.9%) and *Mentha aquatica* (n = 192; 71.9%) were the most popular ones (Fig. 1). Apothecaries (persons who prepare and sell herbal medicines and drugs) (n = 228; 87%), family members and relatives (n = 78; 29.8%), and traditional pharmacists (n = 27; 10.3%) were identified as the main sources to get herbal medicine for patients. Also, more than 40% of patients (n = 107) used herbal medicines that grow naturally and patients collected them by their own hands (Handpicking).

Table 2
The reasons for using and not using herbal medicines among cancer patients referred to Kerman cancer clinics, February to August 2017.

Variables		Frequency (%)
Reasons for using	Successful experience in previous uses	169(64.0)
	Curing the disease and improving the quality of life	106(40.2)
	Suggesting by family and friends	103(39.0)
	Reducing the side effect of medications	71(26.9)
	Dissatisfaction with physician and chemotherapy treatment	8(3.0)
	Other	77(29.2)
Reasons for not-using	Fearing of drug interaction	15(30.0)
	Lack of awareness	12(25.5)
	Forbidden by physician	6(12.0)
	Other	15(30.0)

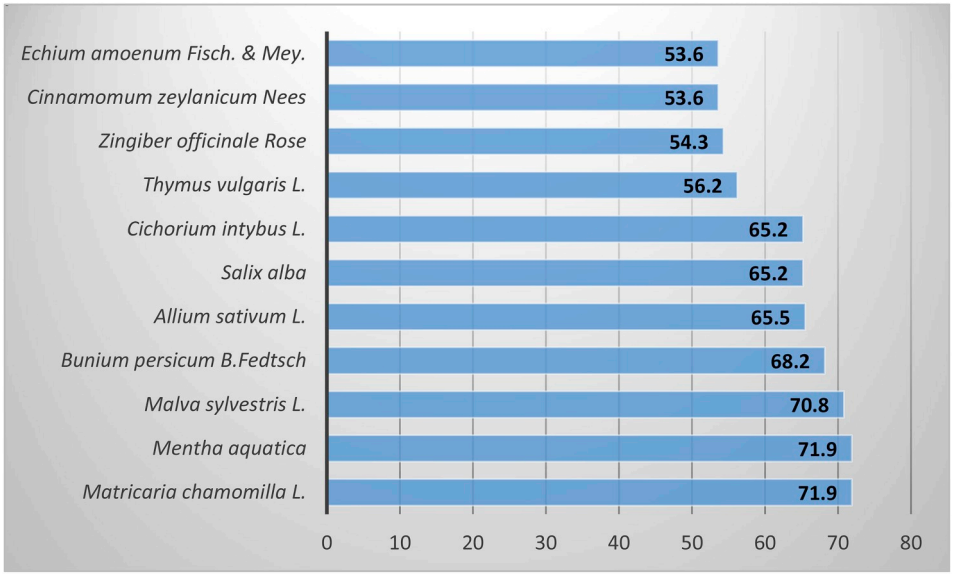

Fig. 1. The persentage frequency of most popular herbal medicines which were consumed by cancer patients referred to Kerman cancer clinics, February to August 2017 (The prevalence of using herbal medicines: 84.1% (n = 267)).

3.3. Predictors of using herbal medicines

History of using herbal medicines was related to some factors such as educational level, place of residence, experience of comorbid diseases, and chemotherapy side effects. In the bivariate logistic regression model, some patients had higher odds of using herbal medicines: patients with high-school diploma or more (Odds Ratio (OR), 2.01; 95% CI, 1.02–3.97; $P = 0.04$) versus those with lower education; patients living in urban areas (OR, 2.26; 95% CI, 1.25–4.48; $P < 0.0001$) versus those residing in rural areas; patients with experience of comorbid diseases (OR, 1.94; 95% CI, 1.03–3.64; $P = 0.03$) versus those without any comorbidities; and patients with chemotherapy complications e.g., constipation and diarrhea (OR, 2.17; 95% CI, 1.17–4.02; $P = 0.01$) and skin lesions (OR, 2.09; 95% CI, 1.10–3.98; $P = 0.02$). In contrast, patients with unclear metastatic status (OR, 0.24; 95% CI, 0.07–0.80; $P = 0.02$) had a lower odds of consuming herbal medicines (Table 3).

According to the results of multivariate logistic regression model, residence in urban areas (OR, 2.56; 95% CI, 1.30–5.05; $P < 0.0001$), unclear metastatic status (OR, 0.19; 95% CI, 0.05–0.71; $P = 0.01$), and constipation and diarrhea (OR, 2.11; 95% CI, 1.09–4.05; $P = 0.02$) were identified as the predicting factors for the use of herbal medicines during or between chemotherapy courses (Table 3).

4. Discussion

Based on the results, the prevalence of using herbal medicines among cancer patients are higher than the rates reported in other studies, which described herbal medicines and remedies as popular CAM strategies [19–22]. Geographic and socioeconomic factors also play a role in the high prevalence of using herbal medicines in Iran. Generally, the variety of weather conditions makes Iran a suitable habitat for medicinal plants. Kerman Province, located in Southeast of Iran, is known as one of the major sources of medicinal plants [23]. Iran has a long history of production and consumption of herbal medicines and almost all Iranians believe that herbal medicines are safe and effective and can be used daily [24,25]. Some studies showed that the prevalence of using herbal medicines was high in the general population of Iran [26,27]. Considering the high prevalence of using herbal medicine in the general population, the high prevalence of these medicines in patients is not unexpected.

In our study, consistent with previous researches, use of herbal medicines, similar to other CAM therapies, was unknown to physicians, and they were often unaware of the consumption of herbal medicines by patients; nonetheless, the rate of physician awareness in our study was lower than that of similar researches [4,9,28]. It seems that patients think their use of herbal medicines is irrelevant to their conventional cancer treatments. There are many reasons why patients do not consult their physicians or why physicians do not ask about the use of herbal medicines. Patient-doctor communication is one of the most important factors for patient's disclosure. Doctors being non-inquirers, their disapproval, and lack of interest were identified as contributing factors for patient's nondisclosure. Also, the short length of periodic visits time is considered [29–31].

Apothecaries were the most common source of access to herbal medicines in the current study, and patients often relied on the seller's suggestions rather than traditional pharmacists or traditional medicine specialists. A few sellers (apothecary) receive proper education, and less than a quarter of them obtain their medicinal information through reading [32–34]; nevertheless, more than half of Iranian people purchased herbal medicines from apothecaries [35]. All individuals, especially physicians and patients, should know that the safety, toxicity, drug-herb interactions, side effects, and mechanisms of herbal medicines are very important issues, which may not be known to apothecary.

The main reasons for using herbal medicines among cancer patients were dissatisfaction with physician and treatment and improvement of quality of life. In this regard, the results of a systematic review showed that these reasons were common among cancer patients as discussed in many studies [36]. The findings indicate that CAM, especially herbal medicines, has high acceptance among patients. Therefore, considering their vulnerable physical and emotional status, cancer patients select these approaches as therapeutic tools. Side effects such as pain, gastrointestinal disorders, fatigue, and skin lesions, besides fear of cancer recurrence (an emotional discomfort), often become unbearable, and patients use herbal remedies for relieving these symptoms [37–39].

Although illiterate and rural people were expected to use herbal medicines more frequently than others, our findings revealed that highly educated patients, as well as those living in urban areas, had a greater tendency to use herbal medicines in comparison with other patients; these findings are in line with previous researches [40–42]. Since the level of education and place of residence are established socioeconomic indicators, this finding confirms their important role in

Table 3
Bivariate and multivariable analysis of predictive factors for using herbal medicines among cancer patients referred to Kerman cancer clinics, February to August 2017.

Variables		Crude OR[b] (95% CI[c])	P-Value	Adjusted OR[a] (95% CI)	P-Value
Age groups	< 50	1	0.48	-	-
	≥50	1.24 (0.67–2.28)		-	-
Sex	Male	1	0.25	-	-
	Female	1.45 (0.76–2.75)		-	
Marital status	Single	1	0.42	-	-
	Married	1.60 (0.50–5.08)		-	-
Educational levels	Under diploma	1	0.04	-	-
	Diploma and higher diploma	2.01 (1.02–3.97)		-	
Area of residence	Rural	1	< 0.0001	1	< 0.0001
	Urban	2.26 (1.25–4.48)		2.56 (1.30–5.05)	
Cancer site	Breast	1	0.86	-	-
	Gastrointestinal	1.07 (0.45–2.45)		-	-
	Lymphoma and hematologic	0.87 (0.37–2.02)	0.75	-	-
	Gynecologic	2.85 (0.62–12.94)	0.17	-	-
	Thorax	0.88 (0.23–3.38)	0.86	-	-
	Other sites	1.29 (0.37–5.12)	0.61	-	-
	Unclear	0.19 (0.03–1.01)	0.05	-	-
Clinical stage	I	1	0.18	-	-
	II	0.23 (0.02–1.96)		-	-
	III	0.38 (0.04–3.31)	0.38	-	-
	IV	0.51 (0.05–4.93)	0.56	-	-
	Unclear	0.24 (0.03–1.94)	0.18	-	-
Metastatic status	Negative	1	0.42	1	-
	Positive	0.77 (0.40–1.46)		0.57 (0.28–1.13)	0.10
	Unclear	0.24 (0.07–0.80)	0.02	0.19 (0.05–0.71)	0.01
Recurrence status	Negative	1	0.16	1	-
	Positive	2.13 (0.72–6.26)		-	-
	Unclear	0.37 (0.12–1.16)	0.09	-	-
Comorbidity status	Negative	1	0.03	1	0.06
	Positive	1.94 (1.03–3.64)		1.88 (0.96–3.66)	
Nausea and vomiting	Negative	1	0.49	-	-
	Positive	0.78 (0.38–1.75)		-	
Constipation and diarrhea	Negative	1	0.01	1	0.02
	Positive	2.17 (1.17–4.02)		2.11 (1.09–4.05)	
Pain	Negative	1	0.86	-	-
	Positive	1.05 (0.56–1.96)		-	
Oral lesions	Negative	1	0.64	-	-
	Positive	1.15 (0.62–2.13)		-	
Skin lesions	Negative	1	0.02	1	0.05
	Positive	2.09 (1.10–3.98)		1.96 (0.99–3.88)	

[a] Backward (Wald) model was run in multivariable logistic regression model and the goodness of fit test was 0.38.
[b] Odds Ratio.
[c] Confidence Intervals.

using herbal medicines. Also, adherence to treatment may be another reason for this unexpected finding. It seems that younger patients with a high educational level do not adhere to treatment protocols and may check other remedies, such as herbal medicines [43].

According to similar studies, comorbid diseases are known to be associated with the use of all types of CAM in cancer patients [40,44]. Most of these diseases are often chronic, such as hypertension, diabetic mellitus, and insomnia, and patients may use herbal medicines for treatment before cancer develops. In this regard, a study showed that patients with chronic diseases tend to use all types of CAM more frequently than healthy people [45]. In many cases, use of herbal medicines may become a part of the patient's lifestyle, and consumption may continue even during cancer treatment.

Although this research is one of the first studies in Iran to provide some information about the consumption of herbal medicines among cancer patients, it has several limitations. First, all the information about using herbal medicines was based on the patient's self-report; therefore, recall bias can be a limitation, and some herbal medicines may be underreported. Second, in many cases, patients did not remember or know the species of medicinal plants used as herbal medicines and only mentioned their common names. For solving this problem, we selected famous medicinal plant species, as consumed herbal medicines, and showed them to patients during interviews. Finally, another limitation was related to medical charts; in some cases, clinical stage and ultimate diagnosis of cancer type were not clear.

5. Conclusion

Based on the findings, the prevalence of using herbal medicines was high among cancer patients, while a few patients consulted their physicians about these herbal remedies. Medicinal plants used for the preparation of herbal medicines are easily available, and family members and other relatives play an important role for using herbal medicines. Previous successful experience in using herbal medicines was a main reason for their consumption during or between chemotherapy courses. As the mechanism of effects of herbal medicines in the treatment of cancer is not exactly known and they may interact with chemotherapy agents if they are used together, physicians should be cautious and ask patients or their families about the consumption of herbal medicines before initiating (or during) chemotherapy courses.

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Declaration of interest

Authors have no conflict of interest.

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