

Prehospital Use of Herbal Medicine in the Southwestern Ethiopia: Prevalence, Associated Factors and Safety Concern

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Abstract

Background

In Ethiopia, despite the frequent reports that demonstrate the use of herbal medicine for treatment of many ailments, there is no finding that describes the prevalence and associated factors with prehospital use of herbal medicine. Therefore, the present study was aimed to assess the prevalence of the prehospital use of herbal medicine and associated factors as well as safety concern in the South western Ethiopia.

Methodology:

A Hospital based cross-sectional study design was employed among patients admitted to Medical wards in Jimma Medical Center (JMC) (n=217) from June to September, 2021. The pre-tested questionnaire was used for data collection. Moreover, literatures were reviewed to identity the potential toxicity and/or drug interactions (if any,) associated with the herbal medicine used before admission by patients. The Statistical Package for Social Science (SPSS) version 21.0 (Chicago, SPSS Inc.) was used for data analysis. The results were summarized using descriptive statistics. The bivariate logistic regression was used to check the association between the outcomes and independent variables. Then, multivariate logistic regression was employed for independent variables possessing p -value of less than 0.05 to identify the strength of association between variables at 5% level of significance.

Results

The current study revealed that about 34% of respondents revealed the prehospital use of herbal medicine. The majority respondents (78.7%) did not discuss with their health care providers about prehospital use of herbal medicine. The factors like age (AOR: 0.281, 95% CI: 0.115, 0.683), educational level (AOR: 2.672, 95% CI: 1.101, 6.485) and insurance coverage (AOR: 2.082, 95% CI: 1.083, 4.004) were significantly associated with prehospital use of herbal medicine. Moreover, 'Dammakese' (*Ocimum gratissimum* L), 'Tenadam' (*Ruta chalepensis* L), 'Makkanisa' (*Croton macrostachyus*), 'Jinjibli' (*Zingiber officinale*), 'Barzaafi Adi' (*Eucalyptus globulus* Labill), 'Qabarichoo' (*Echinops kebericho*, Mesfin) and 'Papaya' (*Carica papaya* L) were the most commonly used herbs before admission to hospital. From published literatures review we revealed that the *Zingiber officinale*, *Carica papaya* L, *Eucalyptus globulus* Labill and *Ruta chalepensis* L possess the potential interaction with many conventional medicines as well as toxic effects.

Conclusions

The present study revealed that the prehospital use of herbal medicine was relatively high in which majority of patients did not disclose to the health care providers. Its use was significantly associated with age, educational level and insurance coverage. In addition, some of herbs used are associated with safety issues. Therefore, health care providers should thoroughly discuss with their patients regarding the prehospital use of herbal medicine.

Introduction

Herbal medicine is defined as herbs, herbal materials, herbal preparations, and finished herbal products, that contain active ingredient in parts of the plants, or plant materials, or combinations thereof to treat, diagnose, prevent illness and maintain well-being (1). It is a mixture of various organic chemicals derived from raw or processed sections of plants, including leaves, flowers, stems, seeds, and roots (2). Globally, the herbal medicines have been used as a source of medicine, and 80–85% of populations rely on these medicinal plants using the extracts or their active components as a traditional medicine to meet their primary health care needs (3–5).

Over last few decades, the use of herbal medicine has been increased especially in developing countries including Ethiopia (6–9). This resurgence of public interest in herbal medicine has been linked to a number of factors particularly, the various claims on the efficacy or effectiveness of plant medicines, the consumer choice for natural remedies and greater interest for alternative medicine, the misconception that herbal products are superior to synthetic products, the belief that herbal remedies may be effective in treating certain ailments that have proved to be ineffective or inadequate with conventional drugs, the high cost and side effects of most modern drugs, the patients' beliefs that their health care professionals do not accurately identify the problem; so they feel that herbal remedies are an alternative, and a move to self-medication (10–13). These claims and perceptions have amplified the continued use of herbal medicines among consumers, even concomitantly with modern medicines despite the potential harmful drug interactions with collective undesirable effects of increased toxicity and decreased efficacy (14–19). Moreover, in recent years, the evidence of pre-admission use of herbal medicine among patients have been reported in previous literatures, and revealed that the prehospital use of herbal medicine was associated with high risk developing a hospital-acquired suspected adverse drug reaction, delay of hospitalization, the occurrence of toxicity (20–23). Simultaneously, the patients often do not disclose prehospital use of herbal medicine to their physicians (24–31) that could affect patients treatment outcomes. However, in Ethiopia, despite frequent reports that demonstrate the use of herbal medicine for treatment of many ailments (24, 32–34), there is no finding that describes the prehospital use of herbal medicine and associated factors. Moreover, the very recent finding has evidenced the need of comprehensive study on prehospital use of herbal medicine among consumers (35). Therefore, it was hypothesized that there would be a prehospital use herbal medicine in Ethiopia, particularly in the early stages to alleviate symptoms of fever, common cold, chilling, headache and malaria related symptoms as the southwestern region is very malarias (36). Therefore, the present study was aimed to assess the prevalence of the prehospital use of herbal medicine and associated factors as well as safety concern in the South western Ethiopia.

Methodology

Study design, period and location

A Hospital based cross-sectional study design was employed among patients admitted to Medical wards in Jimma Medical Center (JMC) (n=217) from June to September, 2021. Jimma Medical Center is located in Jimma Town, and 350 km away from Addis Ababa, the capital of Ethiopia. It provides the major services encompassing nine medical, clinical, and diagnostic departments. Approximately, 15,000 inpatients and 160,000 out patients, 11,000 emergency cases, and 4,500 deliveries came to the center in year from catchment population of about 15 million (37).

Sample population, size, and sampling technique

The minimum sample size was calculated using Raosoft sample size calculator (38). As such, a sample size contained of 234 patients was calculated by considering a 5% margin of error, 95% confidence interval, and 50% distribution response for an approximate population of 600 (the total patients expected to be admitted to Medical wards of JMC during period of one month) (39). Including the 5% dropouts, 245 participants were included in the study. All adult patients aged 18 years or older admitted to medical wards and who provided a written informed consent were allowed to participate in the study while unconscious patients and those who refused to give the consent were excluded from the study.

Data collection tool and procedure

The data collection tool was developed based extensive review of previous literature articles (4,12,16,40). It was firstly prepared in English, and was translated to local languages (Afaan Oromo and Amharic) and reversed back to English for the purpose of consistency by languages experts. Moreover, four experts have examined the face validity and as well as readability of the questionnaire, paying attentions on easy comprehension of the questionnaire to gear to general populations. Before commencement of the actual study, the pre-test was conducted on 5% of populations to check acceptability and consistency of data collection tool. The questionnaire has two sections; the first section was designed to assess the sociodemographic characteristic of the patients while the second section was used to dig information regarding the pre-hospital use of herbal medicine among patients. Moreover, literatures were reviewed to identity the potential toxicity and/or drug interactions (if any,) associated with the herbal medicine used before admission by patients.

Statistical analysis

All the filled questionnaires were checked to ensure their completeness before they were manually entered into the Statistical Package for Social Science (SPSS) version 21.0 (Chicago, SPSS Inc.) after appropriate coding for analysis. The results were summarized using descriptive statistics. The bivariate logistic regression was used to check the association between the outcomes (status of pre-hospital use of herbal medicine) and independent variables (Gender, age, marital, educational, occupation, residence, monthly income, insurance coverage). Then, multivariate logistic regression was employed for independent

variables possessing p -value of less than 0.05 to identify the strength of association between variables at 5% level of significance.

Results

Sociodemographic characteristics of study participants

Two hundred seventeen (217) study participants responded in this study from 245 sample size, yielding 88.5% response rate. Among study participants, the majority of respondents (n=115, 53%) were males and age grouped greater than 50 years old (n=61, 28.1%). About 80.2 % of study participants were married, and the majority (n=64, 29.5%) of them categorised under secondary school stage of educational status. With regard to occupation, the majority of respondents (n=79, 36.4%) were farmers, and more than half of respondents (n=121, 55.8%) were readmitted. Moreover, around 57% of study participants were from a rural area, and about 28.2% of respondents had a monthly income was below 1500 Ethiopian Birr (Table 1).

Table 1: Socio demographic characteristics of the respondents

Variables	Frequency (n=217)	Percentage (%)
Gender		
Male	115	53.0
Female	102	47.0
Age		
18–29	58	26.7
30–39	54	24.9
40–49	44	20.3
≥50	61	28.1
Marital Status		
Single	31	14.3
Married	174	80.2
Divorced	12	5.5
Educational status		
No formal education	47	21.7
Primary school	54	24.9
Secondary school	64	29.5
College/Diploma	35	16.1
Degree and above	17	7.8
Occupation		
Government Employee	46	21.2
Private Employee	52	24.0
Farmer	79	36.4
Daily Labor	30	13.8
Others	10	4.6
Residence		
Urban	92	42.4
Rural	125	57.6
Monthly income		

<1500 ETB	83	38.2
1500-2500 ETB	65	30.0
>2500 ETB	69	31.8
Insurance coverage		
Yes	107	49.3
No	110	50.7
Admission history of the patient		
New admission	96	44.2
Readmission	121	55.8

Abbreviation: ETB, Ethiopian Birr

Prevalence and characteristics of prehospital use of herbal medicine

About 34% of respondents reported their prehospital use herbal medicine (Figure 1). Among users of herbal medicine before admission, about 17.3% of respondents experienced side effects after having of herbal medicine thus about 8% of them dissatisfied with their use while 13.3% became neutral. The majority of respondents (n=62, 85.2%) and (n=59, 78.7%) did not discuss with their health care providers about prehospital use of herbal medicine, and did not know drug-herb interaction respectively. Moreover, the majority of respondents (n=34, 45.3%) did get herbal medicine from their home/back yard garden, and about 96% of them were volunteer to specify types of herbs used (Table 2). The most commonly used herbal medicine reported by respondents were depicted in table 4 with their Local, Scientific, Family name, reason for use and the potential toxicity and/or drug-herb interactions (Table 4).

Factor affecting prehospital use of herbal medicine

The multivariable logistic regression revealed that age, educational level and insurance coverage were significantly associated with prehospital use of herbal medicine. Accordingly, the patients who aged between 30-39 years old were 71.9 times less likely use herbal medicine than those aged between 18-29 years old (AOR: 0.281, 95% CI: 0.115, 0.683). Besides, the patients who had educational level of secondary school were 2.672 times more likely use herbal medicine than those who had no formal education (AOR: 2.672, 95% CI: 1.101, 6.485). Moreover, the patients who had no insurance coverage were 2.082 times more likely use than those who had insurance coverage (AOR: 2.082, 95% CI: 1.083, 4.004) (Table 3).

Table 2: Characteristics of prehospital use of herbal medicine

Items	Frequency(n=75)	Percentage (%)
How did you satisfy with herbal medicine use before admission?		
Satisfied	24	32
Average	35	46.7
Neutral	10	13.3
Dissatisfied	6	8.0
Experienced any side effect after having herbal medicine		
Yes	13	17.3
No	62	82.6
Discussed with their HCPs about prehospital use of herbal medicine		
Yes	11	14.6
No	64	85.4
Do you think there may be drug-herb interaction?		
Yes	16	21.3
No	59	78.7
Volunteer to specify types of herbs used		
Yes	72	96.0
No	3	4.0
Source where did you get the herbal medicine		
At home/back yard garden	34	45.3
Traditional healers/Herbalist	27	36.0
Relative/friends	6	8.0
Others	8	10.7

Table 3: Factors associated with prehospital use of herbal medicine

Study variables	Prehospital Use of HM (%)				
	Used	Not used	COR (95% CI)	AOR (95% CI)	P-value
Age category					
18–29	13 (22.4%)	45 (77.6%)	I	I	0.029
30–39	25 (46.3%)	29 (53.7%)	0.333 (0.148, 0.758)*	0.281 (0.115, 0.683)*	
40–49	12 (27.3%)	32 (72.7%)	0.770 (0.311, 1.906)	0.719 (0.296, 1.922)	
≥50	25 (41.0%)	36 (59.0%)	0.416 (0.187, 0.957)*	0.448 (0.186, 1.079)	
Educational status					
No formal education	19 (40.4%)	28(59.6%)	I	I	0.023
Primary school	14 (25.9%)	40 (74.1%)	1.612 (0.699, 3.716)	1.957 (0.779, 4.921)	
Secondary school	14 (21.9%)	50 (78.1%)	1.964 (0.847, 4.533)	2.672 (1.101, 6.485)*	
Certificate/Diploma	21 (60.0%)	14 (40.0%)	0.452 (0.191, 1.087)	0.553 (0.197, 1.546)	
Degree and above	7 (41.2%)	10 (58.8%)	0.965 (0.338, 2.751)	1.164 (0.315, 4.299)	
Residence					
Urban	40 (43.5%)	52(56.5%)	I	I	0.058
Rural	35 (28.0%)	90 (72.0%)	1.978 (1.121, 3.490)	1.882 (0.980, 3.615)	
Monthly income					
<1500 ETB	21 (25.3%)	62 (74.7%)	I	I	0.496
1500-2500 ETB	22 (38.8%)	43 (66.2%)	0.667 (0.324, 1.351)	0.642 (0.294, 1.402)	
>2500 ETB	32 (46.4%)	37 (53.6%)	0.392 (0.197, 0.777)*	0.689 (0.300, 1.584)	
Insurance coverage					

Yes	44(41.1%)	63(58.9%)	I	I	0.028
No	31(28.2%)	79(71.8%)	1.819 (1.032, 3.205)*	2.082(1.083, 4.004)*	

Note: *Statistically significant at 95% CI, Abbreviations: ETB: Ethiopian Birr; CI, Confidence Interval; COR, Crude Odd Ratio; AOR, Adjusted Odd Ratio.

Table 4: Types of herbal medicines used by participants before admission

Scientific Name	Family	Local name	Frequency	Reason for use	Potential toxicity and/or drug-herb interaction
Zingiber officinale	Zingiberaceae	Zinjibli	6 (8.3%)	GIT discomfort, nausea, vomiting	Interaction between Ginger-crizotinib, anticancer (41), <i>Z. officinale</i> -losartan, antihypertensive have been indicated (42)
Croton macrostachyus	Euphorbiaceae	Makannisa	12 (16.6%)	Malaria, common cold	-
<i>Eucalyptus globulus</i> Labill	Myrtaceae	Barzaafi adii	5 (6.9%)	Asthma, headache, common cold	Interaction between Eucalyptus globulus Labill and diazepam has been evidenced in mice (43)
Ocimum gratissimum L.	Lamiaceae	Damakesse	22 (30.5%)	Malaria, Gastritis	-
<i>Ruta chalepensis</i> L.	Rutaceae	Tenadam	19 (26.3%)	Ameobiasis, stomachache, fever	Based on dose the Ruta chalepensis L could produce neurotoxic effects (44).
Carica papaya L.	Caricaceae	Papaya	4 (5.5%)	Gastritis, Giardiasis	Interactions between C. papaya leaf with oral hypoglycemic agents (metformin and glimepiride), antimalarial (artemisinin), antibiotic (ciprofloxacin), and cardiovascular drug (digoxin) have been evidenced (45)
Echinops kebericho, Mesfin	Asteraceae	Qabarichoo	4 (5.5%)	Malaria, headache, Gastritis	Evidenced as well tolerated for toxicity profile in rat(46)

Discussion

This study reported the first study of its kind in Ethiopia regarding the prehospital use of herbal medicine and associated factors among patients admitted to health facilities. Accordingly, about 34% of respondents revealed the prehospital use of herbal medicine. This result is higher when compared with study conducted in German (30%) (29), Canada (27%) (47), China (13%) (48), even though it was lower than study conducted in Uganda (79%) (20), this might be related with employment of different study approach and variations in sample size of study population. The higher prevalence of prehospital use of herbal medicine in our study could be due to the fact that Ethiopia is endowed with rich and diverse flora that comprised a foundation for primary health care (4,34). In addition, the Southwestern region of Ethiopia, Jimma zone, is very malarial (36) thus patients could use herbal medicine before admission to hospital in the early stages of sickness to alleviate symptoms like fever, common cold, chilling, headache and malaria related symptoms.

In the present study, majority of respondents did not discuss with their health care providers as they have used herbal medicine before admission. This finding is consistent with other studies (24–31), thus it very crucial to elucidate the use of herbal medicine during clinical history taking process (20). In the current study, factors like age, educational level and insurance coverage were significantly associated with prehospital use of herbal medicine. Similar findings have been reported in previous literatures (49).

Moreover, 'Dammakese' (*Ocimum gratissimum* L), 'Tenadam' (*Ruta chalepensis* L), 'Makkanisa' (*Croton macrostachyus*), 'Jinjibli' (*Zingiber officinale*), 'Barzaafi Adii' (*Eucalyptus globulus* Labill), 'Qabarichoo' (*Echinops kebericho*, Mesfin) and 'Papaya' (*Carica papaya* L) were the most commonly used herbs before admission to hospital. However, despite their benefits, some of these herbs are associated with the potential toxicity and/or drug-herb interactions. For instance, the interactions between Ginger-grizotinib (41), Z. officinale-losartan (42), and interactions between C. papaya leaf with oral hypoglycemic agents (metformin and glimepiride), antimalarial (artemisinin), antibiotic (ciprofloxacin), and cardiovascular drug (digoxin) (45) have been reported in literatures. Moreover, the interaction between *Eucalyptus globulus* Labill and diazepam has been evidenced in mice (43) while the *Ruta chalepensis* L could produce neurotoxic effects particularly at high doses (44). Even in our study, among users of herbal medicine before admission, about 17.3% of respondents experienced side effects and more than three-fourth of patients did not know drug-herb interactions. Therefore, the prehospital use of herbal medicine without appropriate discussion between patients and health care providers could result in severe health consequences.

Conclusion

The present study revealed that the prehospital use of herbal medicine was relatively high in which majority of patients did not disclose to the health care providers. Its use was significantly associated with age, educational level and insurance coverage. In addition, some of herbs used are associated with safety

issues. Therefore, health care providers should thoroughly discuss with their patients regarding the prehospital use of herbal medicine.

Declarations

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Authors' Contributions

AM and GH designed, extracted, analysed and interpreted the data. GH and SS conceived the study; guided the design and supervised the whole research. GH also prepared the manuscript. All authors read and approved the final manuscript.

Competing interests

We declare there are no competing interests.

Availability of data and materials

The documents supporting this study will be available upon request from corresponding author.

Consent for publication

Not applicable.

Ethical approval and consent to participate

The ethical principle outlined in the Helsinki Declaration was followed for this study. Institutional Review Board of Jimma University, School of Pharmacy approved the study (Reference, IoH/SoP/723/2021). A letter of permission was received from the office of Chief Executive Officer of Jimma University Medical Center. The written informed consent of the study participants was taken prior to interviews for collection of data. The withdrawal right of study participants from involvements of study at any time was assured.

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Figures

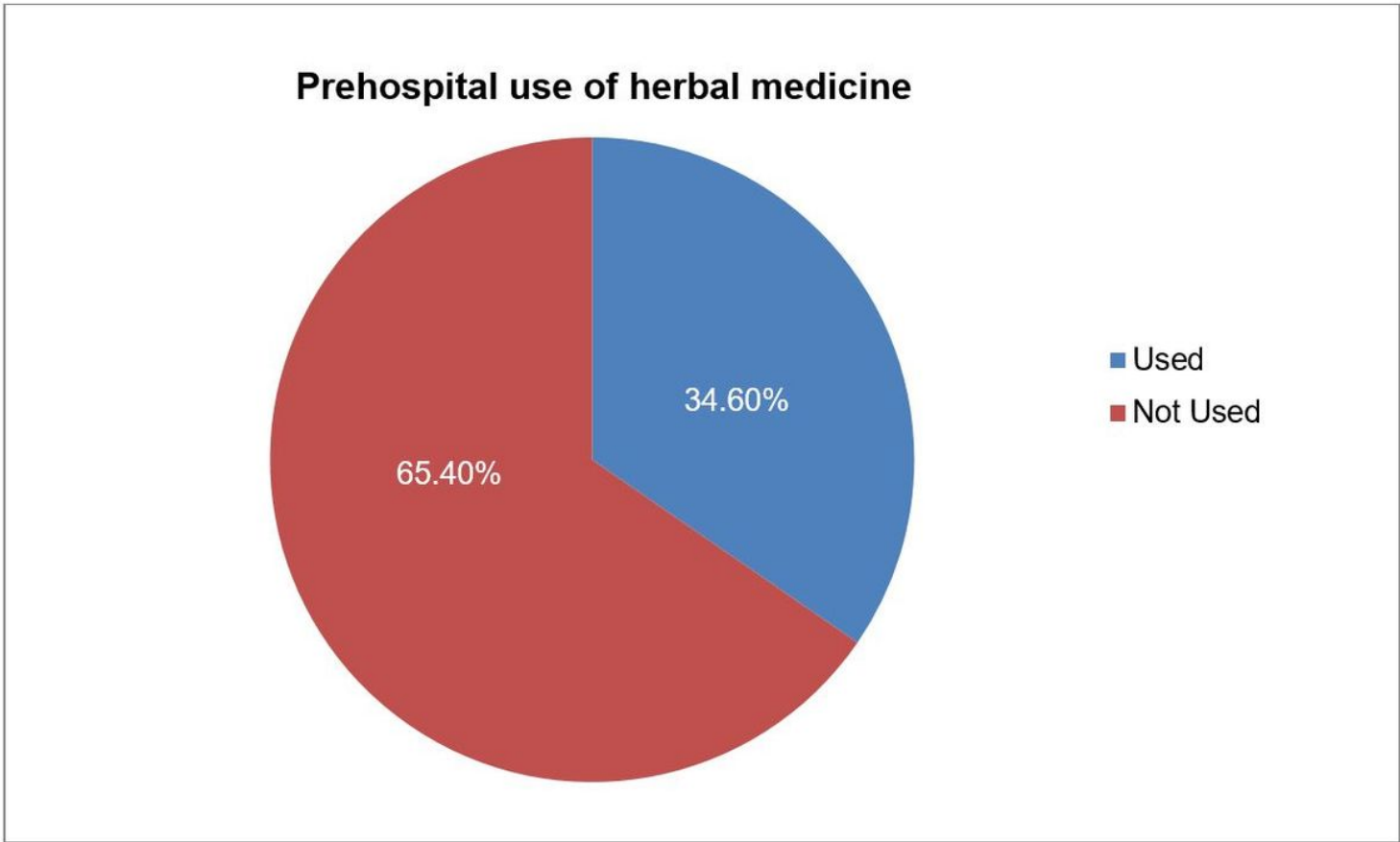


Figure 1

The prevalence of prehospital use of herbal medicine