

Indigenous Herbal Medicine Use and its Associated Factors among Pregnant Women attending antenatal care at Public Health Facilities in Dire Dawa Administration, Eastern Ethiopia, 2022

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Abstract

Background: Indigenous herbal medicine use during pregnancy is a common phenomenon worldwide, particularly in low resource countries like Ethiopia, mainly due to their cost, perceived efficiency in treatment, and ease of access. But so far, studies across Ethiopia are variable and inconsistent and in the study area. Therefore, this study was aimed at assessing indigenous herbal medicine use and its associated factors among pregnant women.

Methods: A facility-based cross-sectional study was conducted in public health facilities in the Dire Dawa Administration, eastern Ethiopia, from October 10 to November 10, 2022, among pregnant women selected using a simple random sampling technique. Data were collected through face-to-face interviews using a pre-tested structured questionnaire, and data were entered and cleaned by Epi DATA (Version 3.1) and analyzed using SPSS (Version 22). A P-value < 0.25 at bivariate to select variables for multivariate and ≤ 0.05 at multivariate with 95% confidence intervals was considered statistically significant.

Results: A total of 628 participants were included, yielding a response rate of 95.15 %. During their current pregnancy, 47.8% (95% CI: 43.8–51.6%) pregnant women used indigenous herbal medicine(IHMs). The predictors were education level: no formal education (AOR: 5.47, 95%CI: 2.40-12.46), primary level (AOR: 4.74, 95%CI: 2.15-10.44), rural residence (AOR: 2.54, 95%CI: 1.71-3.77), being a housewife (AOR: 4.15, 95%CI: 1.83-9.37), number of antenatal care visits (AOR: 2.58, 95%CI: 1.27-5.25), and knowledge of IHMs (AOR: 4.58, 95% CI: 3.02-6.97).

Conclusion: The use of indigenous herbal medicine during pregnancy was as common and widespread as other research done in different areas. The predictors were residence, education level, occupation, number of antenatal care visits, and knowledge. The most commonly used herbal medicines were *Lepidium sativum*, *Vernonia amygdalina*, *Moringa oleifera*, *Linum usitatissimum*, *Zingiber officinale*, *Eucalyptus globulus*, and *Trigonella foenum-graecum*. The most common indications were related to gastro-intestinal problems: intestinal parasites, nausea and vomiting, constipation, stomach aches, indigestion, and abdominal cramps. It was recommended that, considering their residence and education level, pregnant women during their ANC visits be made aware of the potential benefits and risks of indigenous herbal medicine, and that more research be conducted to confirm their efficacy and safety during pregnancy.

Introduction

According to the World Health Organization (WHO), traditional medicine (TM) is defined as "health practices, approaches, knowledge, and beliefs incorporating plant, animal, and mineral-based medicines, spiritual therapies, manual techniques, and exercises, applied singly or in combination to treat, diagnose, and prevent illnesses and maintain well-being" (1).

Indigenous herbal medicine (IHM), a subset of traditional medicine, is the use of plants found locally to treat disease and improve overall health and well-being (1, 2). These herbal medicines include herbs, herbal materials, herbal preparations, and finished herbal products that contain parts of plants or other plant materials as active ingredients (1, 3, 4).

Pregnancy is characterized by significant physiological changes resulting in various symptoms, such as nausea, vomiting, heartburn, constipation, and so forth (5, 6). Such complaints often force pregnant women to apply remedies like IHMs (7–9). Studies also indicate pregnant women use IHMs for illnesses and diseases during pregnancy, such as fatigue, respiratory and skin issues, and nutritional issues (10, 11).

Additionally, some studies reveal major reasons why pregnant women use herbal medicines; because of their wide availability, possibly because they perceive better effectiveness relative to modern medicine, and because of the relatively low cost of these medicines (12–14). Similarly, in individual perspectives, cultural norms and health beliefs, as

well as illness perceptions, are indicators of herb use (9). A study also indicates a lack of comprehensive, clear, consistent, or evidence-based information on IHMs' safety or benefits to the widespread use of herbs (14, 15). Consequently, the use of herbal medicines has grown considerably worldwide among pregnant women (7, 9, 16, 17).

Globally, the use of IHMs by pregnant women has often evolved through many generations, a process that has led to many effective remedies (1, 7, 18). However, many countries have not investigated the associated side effects and complications on pregnant women and the fetus (1, 7, 10, 11, 18). Besides, the use of IHMs among pregnant women varies significantly, depending on the geographic location, cultural traditions, and socioeconomic levels (19–22).

In Africa, including Ethiopia, IHMs are widely used by the population and pregnant women too (3, 13, 14, 23, 24). This is because, there is a lack of modern health care services and medicine in proportion to people, being available only to a limited number of pregnant women because they are either expensive or few are available for too many people (14).

Herbal medicine use could result in heartburn, increased blood flow, miscarriage, premature labour and allergic reactions (25). Supplementing conventional treatment with HMs may also complicate the care of pregnant women who have pre-existing conditions such as epilepsy or asthma (8). Abortion, preterm birth, intrauterine death and intrauterine growth restriction, uterine rupture, stillbirth, birth defects of the eye, ear, heart, and other risks also have been linked to the use of IHMs by pregnant women (22, 24, 26, 27). However, studies in this area, as well as nationally, are lacking. As a result, the purpose of this study was to determine the prevalence and factors associated with IHM use among pregnant women at public health facilities.

Methods And Materials

Study setting and Design

A facility-based cross-sectional study was conducted in Dire Dawa administration, eastern Ethiopia, **from October 10 to November 10, 2022**. Dire Dawa administration is located 515 kilometers from Addis Ababa, the capital city of Ethiopia. According to 2020 population projections, 506,000 people live in the Dire Dawa Administration (68% of whom are estimated to be urban inhabitants), which has 38 rural and 9 urban kebeles (the smallest administrative units). This administration has six hospitals, including two public and four private ones, 1 defense force hospital, 17 health centers and 34 health posts. There are 35 drug shops, 35 pharmacies, 10 higher special clinics, 9 medium level clinics and 48 primary clinics. Additionally, there are 2 non-governmental clinics (Family guidance and Maristops international clinics) (28).

Study settings: one public referral hospital (Dilchora RH) and six public health centers (3 urban and 3 rural) were selected purposively based on their client flow (information taken from ANC registration book in each health facilities) and sample size was proportionately allocated (Figure 1).

Sample size and Sampling Procedure

The sample size was determined using a single population proportion formula considering the following assumptions: standard normal distribution ($z = 1.96$), 95% level of significance, 4% margin of error, prevalence=48.6% (29), and 10% non-response rate. The final sample size became 660. To obtain all 628 study participants, a simple random sampling technique was used. All confirmed pregnant women of any gestational age were included. However, pregnant women who were severely ill and unable to communicate were excluded.

Data Collection Methods

The data was collected via face-to-face interview using a pre-tested, interviewer-guided, structured questionnaire that was adapted from literature designed for the same study purpose, and then variables were reviewed to suit the local context (13, 23, 30-33). The questionnaire contains four main parts: socio-demographic characteristics; obstetrics; commonly used herbs; knowledge; and perceptions of IHMs. A total of eight health extension workers were recruited for data collection, and four MSc midwives supervised the whole process.

Operational Definitions:

Indigenous herbal medicine (IHM): is the use of locally available plants to treat some abnormalities in pregnant women (13, 33).

Income: the average family's monthly income of the pregnant women in ETB(Ethiopian Birr)(34).

Data Quality Control

The questionnaire was developed in English and translated into the local languages (Afan Oromo, Somali, and Amharic) and then back to English to maintain its consistency. Three days of training were provided to all data collectors and supervisors. We performed a pretest on 5% of the sample size out of the selected health centers at Adisketema health center(urban) and Wihil health center(rural) 2 weeks before the actual data collection. Based on the findings of the pretest, we made minor modifications to the questionnaire. The data collection process was closely supervised, and the completeness of each questionnaire was checked by the investigators and supervisors daily. Data was entered into the EPI DATA software as part of data management. During data cleaning, a logical checking technique was used to identify the errors. Questionnaires are secured in a safe place for confidentiality and as a backup for later, in case a check is necessary. Finally, double data entry was done by two data clerks, and the consistency of the entered data was cross-checked.

Data processing and Analysis

The data were coded and entered into Epi Data (Version 3.1) and exported to SPSS (Version 22) statistical software for analysis. A univariate analysis was used to describe the frequency distribution variables. We coded the outcome variables as "1" for "IHM user" and "0" for "non-user." The association between the outcome and independent variables was analyzed using a logistic regression model. Covariates with a p-value less than 0.25 were retained and entered into the multivariable logistic regression analysis using a forward step-wise approach. A multicollinearity test was performed to determine the linear correlation among the independent variables using the variance inflation factor (>10) and standard error (>2). The goodness-of-fit test was performed using the Hosmer–Lemeshow test ($p > 0.05$). For an outcome variable, an adjusted odds ratio (AOR) with a 95% confidence interval (CI) and a p-value of less than 0.05 was considered statistically significant.

Results

Socio-demographic characteristics: A total of 628 study participants were included, yielding a response rate of 95.15%. The respondents' ages ranged from 18 to 40 years (mean = 27 years, SD = 6.5 years). More than half (59.4%) of the study participants were rural residents and housewives (51.1%) (Table 1).

Obstetric characteristics: 50%, 34.7%, and 15.5% of study participants had 3–4, 1–2, and more than four parities, respectively. Around 18.8%, 53.2%, and 28% were in the first, second, and third trimesters, respectively. Less than half (45.1%) had three or more ANC visits, and more than half (55.9%) were pregnancies that were planned.

Using Indigenous Herbal Medicine While Pregnant

Out of the total of 628 respondents, 47.8% (95% CI: 43.8%–51.6%) used indigenous herbal medicine during their current pregnancy. From this, 16.3%, 45%, 29.3%, 3.3%, 3.7%, and 2.3% used only the first trimester, only the second trimester, only the third trimester, only the first and second trimesters, only the second and third trimesters, and all trimesters, respectively.

Most commonly used IHMs by pregnant women and their reasons for use

In this study, the most commonly used IHMs were garden cress (*Lepidium sativum*) (27%), bitter leaf (*Vernonia amygdalina*) (20.3%), moringa (*Moringa oleifera*) (19.7%), flax seed (*Linum usitatissimum*) (15.3%), ginger (*Zingiber officinale*) (14.7%), eucalyptus tree (*Eucalyptus globulus*) (13.7%), and fenugreek (*Trigonella foenum-graecum*) (12%) (Table 2).

The most common reasons for IHMs use were related to gastro-intestinal system problems: intestinal parasites(27%), nausea and vomiting(21.7%),constipation(20%), to increase appetite(17.3%), relief of stomach aches(9.7%), indigestion (7.7%) and abdominal cramps (7%).

The others were related to headache (17.7%), malaria (10.7%), high blood sugar (9.7%), and blood pressure (7.7%) (Table 2). When asked where they got their IHMs, the majority of ANC-attending pregnant women said traditional healers (60%), religious places (14%), market places (13.7%), a neighbor (3%), self-preparation (2.7%), and more than once source places (6.7%). The most common sources of information listed were neighbors and friends (41.3%) and family and relatives (24.7%) (Figure 2).

The vast majority (91.3%) of study participants took IHM via oral routes; the rest, 5.7% and 3%, were through nasal inhalation and topical form, respectively. Out of all, 16.7% had an untoward effect after IHM intake, and only 3.5% had discussions about it with health professionals, and malaises (42.6%), abdominal pain (12.5%), vomiting (17%), and headaches (14.9%) were the most common types of unfavorable effects reported. The most commonly stated influential reasons for using IHMs were the perception that "indigenous herbal medicines are more effective" (43.7%) and "safe in pregnancy" (17%) (Figure 3).

Factors associated with IHM use by pregnant women

In the multivariable logistic regression analysis, rural residence (AOR=2.54, 95% CI:1.71-3.77) level of education: no formal education(AOR=5.47, 95% CI: 2.40-12.46), primary level(AOR=4.74, 95% CI: 2.15-10.44), being housewife(AOR=4.15,95%CI:1.83-9.37), low number of ANC visits (AOR=2.58,95% CI:1.27-5.25), and insufficient knowledge of IHM (AOR=4.58, 95% CI:3.02-6.97)were significantly associated with IHM use during the current pregnancy (Table 3).

Discussion

This study was conducted to assess indigenous herbal medicine use and its associated factors among pregnant women attending ANC at public health facilities in Dire Dawa Administration, eastern Ethiopia, from December 01 to 30/2022

We found that 47.8% (95% CI: 43.8–51.6%) of pregnant women used indigenous herbal medicine during their current pregnancy. This finding was in line with studies in Turkey (47.3%)(35), western Ethiopia (50.4%)(34) and northern Ethiopia, Gonder (48.6 %)(29), Dese (51.2%)(36). Such consistency might be because of some socio-demographic characteristics like age—the majority of study participants in these studies were between 20 and 30 years old—educational level—the majority had secondary and primary level education—and being unemployed, housewives, or married.

This study's findings, however, were lower than those of previous studies in Bangladesh (70%) (7), Iran (71.3%) (11), Zimbabwe (69.9%) (37), Mali (79.9%) (38), Sierra Leone (82.7%) (39), Uganda (76.7%) (24) and southern Ethiopia (73.1%) (40). The possible explanations for this discrepancy might be variations in some socio-demographic characteristics of study participants, like age and education level, residence, sample size, and study period differences. The discrepancy also might be due to differences in parity, knowledge, and attitudes of pregnant women toward IHMs.

Besides, the finding of this study was higher than studies done in Italy (27.8%) (41), South Africa (41.5 %) (42), Nigeria (36.8%) (43), Northern Uganda (20%) (21), and northern Ethiopia (36.3%) (44). This discrepancy might be due to socio-cultural variations like residence area and education level. Access to reproductive health education and health care settings may make a greater difference in some countries, such as Iran, Bangladesh, and Nigeria, than in Ethiopia. Moreover, sample sizes and time variations associated with study periods could be the cause of such variation.

According to this study, the odds of IHM use during pregnancy were more than two times higher among rural residents as compared to urban residents. This was comparable with studies done in north Ethiopia (29). This discrepancy might be due to differences in the accessibility of conventional medicine and health care settings, as well as health information, in rural and urban areas. northern Ethiopia

Pregnant women who had no formal or primary-level education were more than five and four times more likely to use IHM than those who had secondary or higher education. This finding was in line with the study conducted in Turkey (35), Nigeria (43), southern Ethiopia (40), and (35, 36, 44).

Pregnant women who were housewives and had insufficient knowledge of IHM were almost four times more likely to use IHM compared to their counterparts. This finding was in line with the study conducted in southern Ethiopia (40). The possible explanation might be due to the fact that housewives and uneducated women might have a lack of awareness about IHMs, including its risk during pregnancy to themselves and their fetus, and a positive perception towards IHMs.

Moreover, this study identified the number of ANC visits having a significant association with the use of IHM by pregnant women as a new variable. Pregnant women who attended fewer ANCs were more than two times more likely to use IHM compared to those who attended more ANCs. This might be due to adequate counseling during ANC, like risk and nutritional counseling. Furthermore, at the binary level, this study also showed the presence of traditional healers in the area has an association with the use of IHM by pregnant women, but this needs further study.

The study's strength was that it focused on IHM use among pregnant women, which is a common phenomenon with potentially harmful effects on pregnant women and fetuses, and this is an important topic in obstetrics. Besides, the data collectors were local language speakers and knew the local norms and times at which participants were comfortable (after ANC cares); this was very helpful to probe the actual information and reduce the non-response rate. Moreover, the study included many public health facilities (both urban and rural), which increases the external validity of the study.

Limitation of the Study: This study had some limitations; due to the cross-sectional nature of the study, it did not show causal relationships between variables. Because we used the interview response method, we were limited by recall bias and some social desirability biases. However, scientific procedures were used to minimize the possible effects of these limitations, such as a contextually modified and pre-tested questionnaire, using easy and simple words to understand, giving time to memorize, and explaining the aims of the study. Besides, we had provided intensive training for data collectors and supervisors before the actual data collection on how to approach and interview the participants privately to minimize social desirability bias.. Therefore, using appropriate and scientific procedures at the time of interviewing participants addressed these limitations.

Conclusion: The use of indigenous herbal medicine during pregnancy was more common and widespread than in other research. The predictors were residence, education level, occupation, number of ANC visits, and knowledge of IHMs. The most commonly used IHMs were garden cress (*Lepidium sativum*), bitter leaf (*Vernonia amygdalina*), moringa (*Moringa oleifera*), flax seed (*Linum usitatissimum*), ginger (*Zingiber officinale*), eucalyptus tree (*Eucalyptus globulus*), and fenugreek (*Trigonella foenum-graecum*).

The most commonly stated reasons for IHM use during pregnancy were related to gastro-intestinal system problems: intestinal parasites, nausea and vomiting, constipation, to increase appetite, stomach aches, indigestion, and abdominal cramps. Headache, malaria, high blood sugar, and high blood pressure were also stated.

Recommendation: Recommendations were forwarded for the responsible body based on study findings as follows:

Planners of maternal health programs ought to develop innovative approaches that increase pregnant women's awareness of IHMs. The government, non-governmental organizations, and other stakeholders could focus on creating awareness through mass-media campaigns targeting pregnant women, especially housewives, those with lower education, and rural areas.

Health professionals can make a real difference through counseling during ANC visits, and **researchers could conduct additional research using various methodologies.**

Abbreviations

IHM: Indigenous Herbal medicine, ANC: Antenatal Care, AOR: Adjusted odds, CI: Confidence Interval, COR: Crude odds ratio, SPSS: Statistical Package for Social Sciences

Declarations

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Declaration: We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

Ethical approval and consent to participate

Ethical clearance was obtained from the institutional ethical review board of Dire Dawa University with protocol number DDU-IRB-2022-113

An official letter of permission was sent to Dire Dawa administration Health Bureau (DDAHB) from Dire Dawa University Research Affairs Directorate (RAD) and then an official letter of cooperation was written to each public health facilities from DDAH. The health facility administrators were informed about the objective of the study and confidentiality issues. The participants also were informed clearly about the objective, and rights to participate or refuse or withdraw the interview. Study participants' privacy was respected and their confidentiality was maintained throughout the research process by giving code, omitting their names. After all, voluntary informed consent was obtained from study participants.

Competing interests: The authors would like to declare that they have no any competing interests

Authors' contribution

Authors' contribution:

Aminu Mohammed: Conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, software, writing, original draft, writing review and editing

Bezabih Amsalu: Data curation, formal analysis, funding acquisition, investigation, methodology, software, writing, original draft, writing review and editing

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All authors read this manuscript and finally approved for submission

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Availability of data and materials

All the data of this study are available from the principal investigator and corresponding author upon request.

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Tables

Table 1: Distribution of study participants by their socio-demographics, Dire Dawa Administration, Eastern Ethiopia, 2022 (n=628)

Variables	Category	Frequencies	Percentage
Age (in complete years)	>30	194	30.9
	20-30	345	54.9
	<20	89	14.2
Residence	Rural	373	59.4
	Urban	255	40.6
Level of education(women)	No formal education	152	24.2
	Primary(1-8)	207	33
	High school(9-10)	132	21
	Preparatory and diploma	95	15.1
	Degree and above	42	6.7
Marital status	Married	571	90.9
	Single	36	5.7
	Divorced	13	2.1
	Widow	8	1.3
Level of education(husband, n=571)	no formal education	95	16.6
	Primary(1-8)	147	25.7
	High school(9-10)	155	27.1
	Preparatory and diploma	129	22.6
	Degree and above	45	7.9
Occupation	House wife	321	51.1
	Merchant	164	26.1
	private employee	100	15.9
	public employee	43	6.8
Monthly income	<100USD	174	27.7
	100-150USD	380	60.5
	>150 USD	74	11.8
Religion	Muslim	289	46
	Orthodox	213	33.9
	Protestant	103	16.4
	Catholic	23	3.7

Table 2: Commonly used IHMs and reasons for use by pregnant women, Dire Dawa Administration, Eastern Ethiopia, 2022 (n=300)

Local name/English name	Scientific name	Frequency	Reason of use with frequency	Part use	Other additive used with
"Abish"/fenugreek	<i>Trigonella foenum-graecum</i>	36	-Increase appetite(30) -lowering blood sugar/diabetes(6)	Seed and leaf	fexo and moringa
"Sinafch"/mustard=21	<i>Brassica nigra</i>	21	-Increase appetite(10) -lower depression/"to be alert"(11)		
"Lewz"/peanut =9	<i>Arachis hypogaea</i>	9	-lower insomenia(6) -depression (3)	root	banana/Musca paradisiac
"Koseret"/verbenaceae=11	<i>Lippia abyssinica</i>	11	-cough(6) -fever(3) -antimicrobial(2)		
"Girar"/Hamaresa/Acacia	<i>Acacia abyssinica</i>	15	Headache(15)	leaves	
"Girawa"/bitter leaf=61	<i>Vernonia amygdalina</i>	61	-headache(29) -intestinal worm (21) -Indigestion(6) -constipation(5)	roots or leaves	
"Tikur azmud"/black cumin	<i>Nigella sativa</i>	18	-Headache=9 -common cold=5 -cough=4	Seed	
"Dammakessie"	<i>Ocimum lamifolium Hochst</i>	15	-Common cold(9) -Inflammation of leg(3) -diabetes(3)	leaves	Ginger garlic
"Eret"/aloe	<i>Aloe sinana</i>	9	Malaria disease(9)	leaves	honey or sugar
"Nech shinkurt"/garlic	<i>Allium sativum</i>	17	Malaria disease(17)	bulb	ginger
"Papaye"/papaya	<i>Carica papaya</i>	13	-Malaria(6) -typhoid(7)	Leaves/fruits	water & sugar
"Kurkura"/Christ's thorn	<i>Ziziphus spina-</i>	22	-Diarrhea(12)	leaves	

jujube	<i>christi</i>		-Diabetes(7) -dementia(3)		
"Shifera"/moringa	<i>Moringa oleifera</i>	59	- constipation(29) -gastritis(9) -indigestion (11) -Candidiasis(4) -diabetes(6)	Leaf buna	
"Tenaadam"/Rue	<i>Ruta chalepensis</i>	27	-Abdominal cramp/colic(16) -constipation (4) -common cold (7)	leaves	zinger garlic
"Zingibil"/Ginger	<i>zingiberofficinale</i>	44	-Nausea and vomiting(24) -Digestion problem(6) -Relieving pain/backache, leg cramps (9) -Intestinal parasite and bacterial (5)	root	with honey
"Nech bahirzaf"/eucalyptus tree	<i>Eucalyptus globulus</i>	41	-nausea and vomiting(41)	Fresh leaf /Dried leaf is put on fire and smoked	1
"Talbaa"/flax seed	<i>Linum Usitatissimum</i>	46	-increase appetite(12) -constipation (22) -to treat stomach ulcer(12)		
"Citashekhussien"	<i>Cymbopogon citratus</i>	9	Intestinal parasite(9)		
"Gambello"	<i>Gardenia ternifolia</i>	19	-Stomach ache(11) -fever(4) -hypotension(4)		
"Roka"	<i>Tamarindus indica</i>	11	-Abdominal pain(5) -parasite(3) -diarrhea(3)	fruit	

"Ye Kosso zaf fire"	<i>Hagenia abyssinica</i>	21	Intestinal parasites(21)	
"Duba"/ pumpkin	<i>Cucurbita pepo L</i>	6	Gastritis treatment(6)	Leaves
"Fexo"/garden cress	<i>Lepidium sativum L</i>	81	-Hepatitis E (9) -GIT parasites(41) -hemorrhoids(7) - Blood pressure(11) -lowering blood sugar with moringa (20)	For BP and DM bulb of garlic,ginger with honey
"Annan Kuti"/spearmint	<i>Mentha spicata</i>	8	-Blood pressure (5) -asthma (3)	moringa
"Dunfurie"	<i>Leucas deflexa</i>	7	-Blood pressure(3) -fever(4)	moringa
"Bekerkitie"	<i>Lantana camara L</i>	5	-Fungi(2) -asthma(3)	buna
"Hadheessa"	<i>Teclea Nnobilis</i>	6	-swellings of body parts(6)	leaves
"Birbirsu"	<i>Podocarpus Falcatus</i>	17	tooth ache (17)	bark
"Botoroo"	<i>Stereospermum Kunthinium</i>	28	-tooth ache (28)	bark
"Waleensuu"	<i>Erythraea Abyssinica</i>	10	treat tooth ache (10)	stem
"Bisana"	<i>Croton macrostachyus</i>	4	Gonorrhea(2) -Joint pain(2)	

Note: some pregnant women used more than one IHMs, those who used only 1 IHM were =45, 2 IHMs=114 and 3 IHMs =141

Table 3: Bivariate and multivariable logistic regression analysis result indicating factors associated with IHM use among ANC attendant pregnant women, Dire Dawa Administration, eastern Ethiopia, 2022 (n=628)

Variables	Category	COVID-19 Vaccine acceptance		COR(95% CI)	AOR(95% CI)	P- value
		Yes	No			
Age(in completed years)	>30	85(43.8%)	109(56.2%)	1.72(1.037-2.86)*	1.13(0.61-2.09)	.707
	20-30	164(47.5%)	181(52.5%)	1.48(0.93-2.37)	1.13(0.64-1.99)	.668
	<20	51(57.3%)	38(42.7%)	1	1	
Residence	Urban	160(62.7%)	95(37.3%)	1	1	
	Rural	140(37.5%)	233(62.5%)	2.80(2.02-3.90)***	2.54(1.71-3.77)	0.000
Education level	No formal education	43(28.3%)	109(71.7%)	6.34(2.97-13.51)***	5.47(2.40-12.46)	.000
	Primary(1-8 th grade)	71(34.3%)	136(65.7%)	4.79(2.31-9.92)***	4.74(2.15-10.44)	.000
	High school(9-10 th grade)	99(75.0%)	33(25.0%)	0.83(0.38-1.81)	0.85(0.36-1.98)	.704
	Preparatory and diploma	57(60.0%)	38(40.0%)	1.67(0.76-3.65)	1.44(0.60-3.45)	.409
	Degree and above	30(71.4%)	12(28.6%)	1	1	
Occupation	Housewife	130(40.5%)	191(59.5%)	2.74(1.41-5.34)**	4.15(1.83-9.37)	.001
	Private employee	56(56.0%)	44(44.0%)	1.47(0.70-3.08)	1.66(0.68-4.07)	.268
	Merchant	86(52.4%)	78(47.6%)	1.69(0.84-3.40)	2.19(0.94-5.09)	.069
	Public employee	28(65.1%)	15(34.9%)	1	1	
Number of ANC	3 and more	156(55.1%)	127(44.9%)	1	1	
	1-2	144(41.7%)	201(58.3%)	1.71(1.25-2.35)**	2.58(1.27-5.25)	.009
Gestation	First	50(42.4%)	68(57.6%)	1.63(1.02-2.61)*	1.38(0.77-2.47)	.274
	Second	154(46.1%)	180(53.9%)	1.40(0.97-2.02)	1.37(0.88-2.14)	.166
	Third	96(54.5%)	80(45.5%)	1	1	
prior IHM use experience	No	176(51.6%)	165(48.4%)	1	1	
	Yes	124(43.2%)	163(56.8%)	1.40(1.02-1.92)*	0.84(0.42-1.71)	.638
IHM use for other health problem	No	279(49.1%)	289(50.9%)	1	1	
	Yes	21(35.0%)	39(65.0%)	1.79(1.03-3.12)*	1.74(0.88-3.46)	.113

Knowledge(IHM)	Sufficient	240(60.2%)	159(39.8%)	1	1	
	Insufficient	60(26.2%)	169(73.8%)	4.25(2.98-6.07)***	4.58(3.02-6.97)	.000
Perception	Unfavorable	207(50.7%)	201(49.3%)	1	1	
	Favorable	93(42.3%)	127(57.7%)	1.41(1.01-1.96)*	1.46(0.97-2.18)	.068
Presence of traditional healer in near	>5 kilometer	277(49.7%)	280(50.3%)	1	1	
	≤5 kilometer	23(32.4%)	48(67.6%)	2.06(1.22-3.49)**	1.44(0.75-2.76)	.268

Significant at:*p=<0.05, **p=<0.01, ***p=0.000, 1=reference

Figures

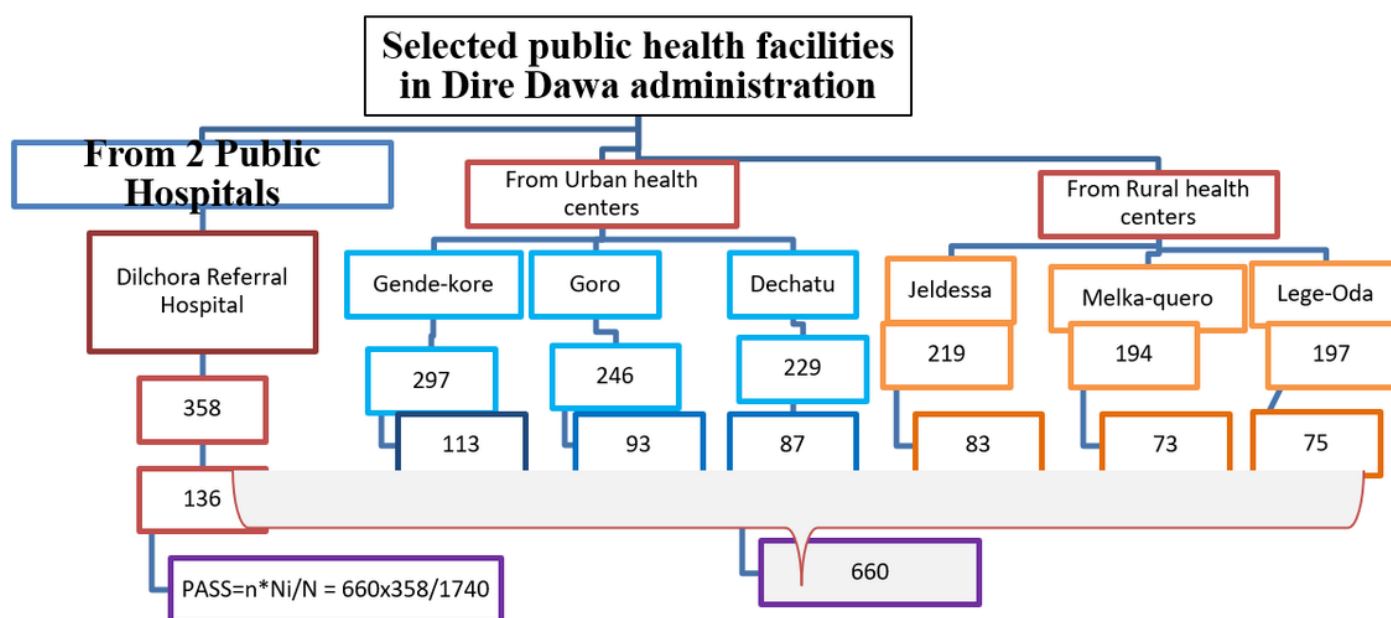


Figure 1

Diagram presentation of sampling procedure for the study on indigenous herbal medicine use and its associated factors among pregnant women attending ANC at public HF in Dire Dawa Administration, eastern Ethiopia, 2022 ;where PASS=proportionally allocated sample size

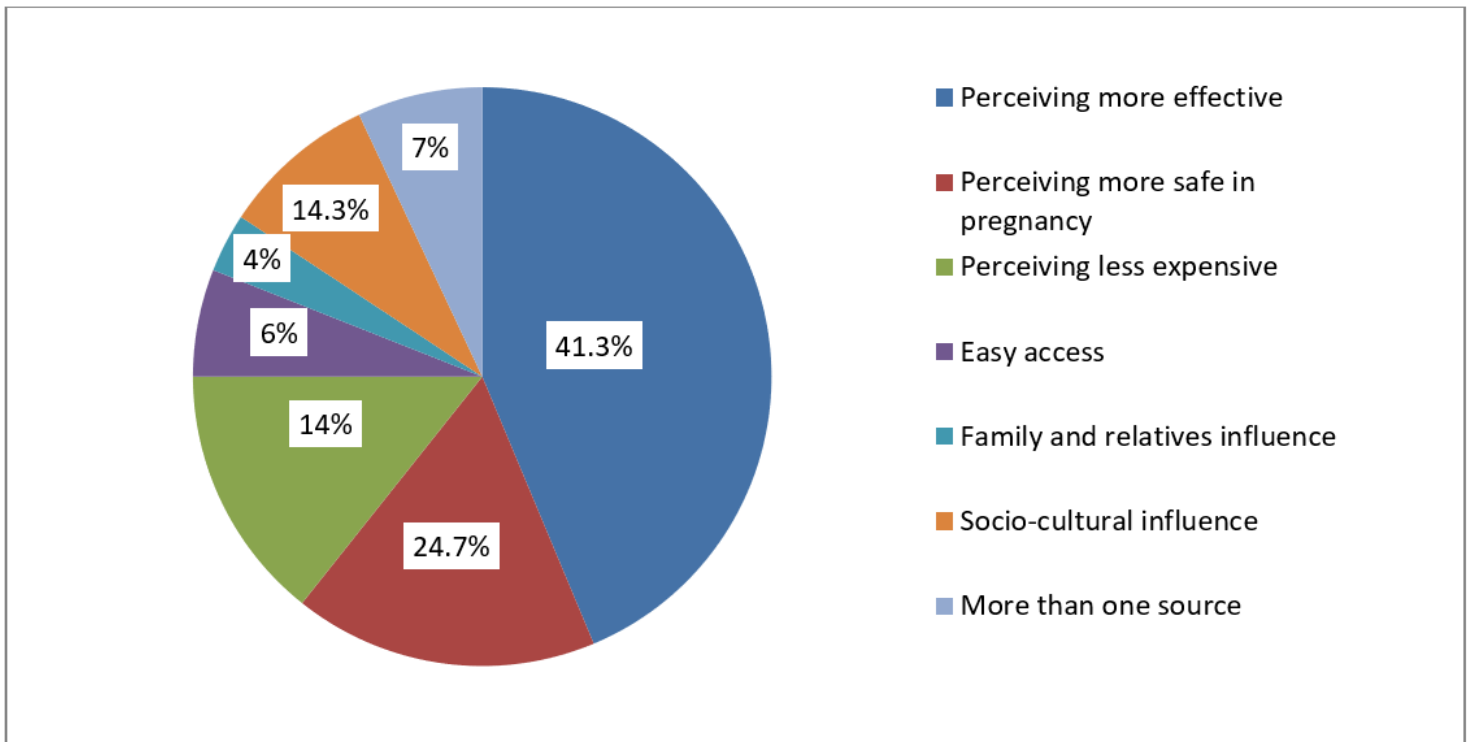


Figure 2

Sources of information about IHMs among ANC attending pregnant women, Dire Dawa Administration, eastern Ethiopia, 2022 (n=300)

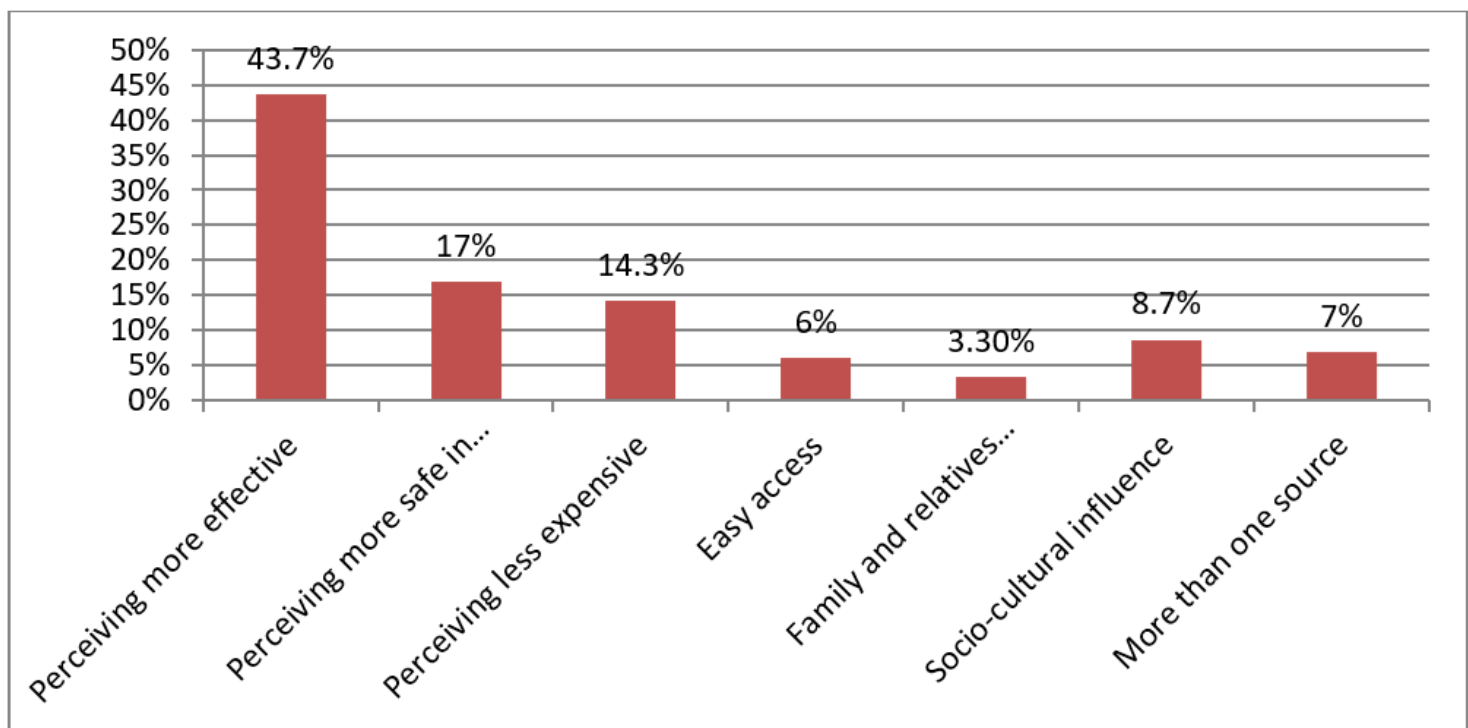


Figure 3

Influential reasons for the use of IHMs among ANC attending pregnant women, Dire Dawa Administration, eastern Ethiopia, 2022 (n=300)

