ORIGINAL RESEARCH

Knowledge and Attitude of Women Towards Herbal Medicine Usage During Pregnancy and Associated Factors Among Mothers Who Gave Birth in the Last Twelve Months in Dega Damot District, Northwest Ethiopia

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Background: The use of herbal medicine is increasing globally, particularly in developing countries including Ethiopia, yet little is known regarding its effect and safety during pregnancy. Pregnant women prefer herbal medicine due to easy accessibility, traditional and cultural beliefs, and comparatively low cost. This study aimed to assess women's knowledge and attitude towards the effects of herbal medicine usage during pregnancy and associated factors among women who gave birth in the last twelve months in Dega Damot district.
Methods: A community-based cross-sectional study was conducted from January 1st to February 30th, 2021. A total of 872 women were selected using a stratified cluster sampling technique. Data were collected by face-to-face interviews using a structured, pretested, and interviewer-administered questionnaire. Data were entered into EPI data version 4.6 and exported to SPSS version 25 for analysis. Multivariable logistic regression was done and a p-value of ≤ 0.05 was used to declare the level of significance.
Results: Women's knowledge and positive attitude towards the effects of herbal medicine usage during pregnancy was 49.1% (95% CI: 46–52) and 57.3% (95% CI: 54–61), respectively. Access to media, had antenatal care visit, being urban dweller, history of herbal medicine usage, and a short distance to reach the nearby health facility were significantly associated with women's knowledge about effects of herbal medicine usage. Besides, being primiparous and short traveling time to reach the nearby health facility was significantly associated with women's attitude towards the effects of herbal medicine usage during pregnancy.
Conclusion: Women's knowledge and positive attitude towards the effects of herbal medicine usage during pregnancy was low. It is important to design strategies to improve the accessibilities of maternal health services, and expand access to media will have a great role in improving women's knowledge and attitude towards herbal medicine usage during pregnancy.
Keywords: attitude, Ethiopia, herbal medicine, knowledge, pregnancy

Introduction

Herbal medicines (HM) are plant-derived materials either raw or processed ingredients used for the prevention of a certain disease or therapeutic benefits.[1] Since pregnancy is characterized by remarkable physiological changes, herbal medicines are commonly used during pregnancy to alleviate such ailments.[2] Pregnant and nursing women are especially prone to adverse effects from herbal medicines usage as the safety profiles and appropriate dosages of most HM are not well studied in this group of populations.[3] Some of the potential adverse health effects include abortion, premature delivery, uterine bleeding, and physical and mental retardation of the child.[4–6]

The usage of HM among pregnant women is increasing across the globe, though little is known about its side effects.[7,8] Globally, around 67% of women use HM during pregnancy.[9] In Africa, there is a wide variation in HM usage during pregnancy, ranging from 2 to 100%.[10] In Ethiopia, HM usage is being common and culturally acknowledged practice during pregnancy, in which evidence reports that nearly 47.7% of women use it during pregnancy.[11] Women's attitude towards the effects of HM usage during pregnancy was 70% and 53% in Mali[12] and Saudi Arabia,[13] respectively. In addition, the knowledge of women regarding the effects of HM usage during pregnancy was 10.4% in Saudi Arabia.[13]

Most women prefer to use HM due to their easy accessibility, culturally perceiving HM are safe and effective to cure many illnesses, and comparatively low cost.[14,15] Even though not limited, some of the factors affecting women's knowledge and attitude regarding the effects of HM usage during pregnancy are marital status, residence, and maternal educational achievement.[16]

Improvement on the accessibility of maternal and child health services can reduce the usage of HM during pregnancy and prevent untoward effects on both the mother and her fetus.[17] Although the government and other non-governmental organization (NGO) partners have made great efforts for the improvement of maternal and child health, little attention was given to HM. As a result, its utilization is alarmingly increasing in Ethiopia, particularly in the study area. In addition, evidence reaching out to the knowledge and attitude of pregnant women regarding the effects of HM during pregnancy is scarce. Therefore, this study assessed the knowledge and attitude of women regarding HM usage during pregnancy and associated factors among women who gave birth in the last twelve months in Dega Damot district.

Methods
Study Design, Period, and Setting
A community-based cross-sectional study was carried out from January 1st to February 30th, 2021, in Dega Damot district, northwest Ethiopia. The district's administrative town, Feres Bet, is located about 400 km northwest of Addis Ababa (the capital city of Ethiopia) and 117 km from Bahir Dar (the capital city of Amhara regional state). Based on the 2014 population projection by the Central Statistical Agency of Ethiopia, the district has a total population of 152,343; of whom, 77,338 were women.[18] The district is administratively divided into 34 kebeles (the smallest administrative unit in Ethiopia), which are 2 urban and 32 rural kebeles. In addition, the district has one primary hospital, eight health centers, and thirty-two health posts. The overall antenatal care service utilization and institutional delivery in the district were 37.4% and 38.2%, respectively.[19]

Study Population
All mothers who gave birth in the last twelve months and reside in the selected clusters of Dega Damot district during the data collection period were included. Mothers who were seriously ill and unable to communicate throughout the data collection period were excluded.

Sample Size Determination and Sampling Procedure
The sample size for this study was determined by using a single population proportion formula by considering the following assumptions: 50% proportion of women's knowledge and attitude towards the effects of HM usage during pregnancy (since there were no similar studies in Ethiopia), 95% level of confidence, and 5% margin of error.

$$n = \frac{(Z\alpha/2)^2 p(1-p)}{d^2} = \frac{(1.96)^2[0.5(1-0.5)]}{(0.05)2} = 385$$

Where n = required sample size, z = standard normal distribution curve value for 95% confidence level = 1.96, α = level of significance, p = proportion of women's knowledge and attitude on effects of herbal medicine usage during pregnancy, and d = margin of error. By considering a design effect of 2 and a 10% non-response rate, the final sample size was 847. Dega Damot district has a total of 34 kebeles (2 urban and 32 rural). The kebeles were stratified into urban and rural. Nine kebeles (1 urban and 8 rural) were selected randomly. A house-to-house visit was conducted and all eligible women

in the selected kebeles (clusters) were interviewed. A stratified cluster sampling technique was used to draw the final sample size. Finally, due to the effect of cluster sampling, a total of 872 women were interviewed.

Measurement and Operational Definitions

Herbal medicine usage: is the intake of any herb or herbal preparation (syrup, paste, and powder) during pregnancy either self-prescribed or recommended by family members, friends, herbalists, or others to manage any symptom, or perceived to support baby's development.[9]

Adequate knowledge: Six questions were prepared to assess the knowledge of women about the effects of herbal medicine usage during pregnancy. Each yes or no question were coded into 1 and 0 respectively and for other questions with more than one possible answer, at least one correct answer was coded as 1. The minimum and maximum scores were 0 and 6, respectively. Thus, based on the variables set to assess knowledge of women on the effects of HM usage during pregnancy, women who scored above the mean (3.68) were considered as having adequate knowledge.[20]

Positive attitude towards the effects of HM usage during pregnancy: Eight questions were prepared to assess the attitude of women towards herbal medicine. Each question has a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The total score was ranged from 8 to 40. Thus, based on the variables prepared to assess the attitude of women towards the effects of HM usage during pregnancy, women who scored above the mean (26.5) score were considered as having a positive attitude.[20]

Media exposure: Those who respond at least once a week for at least one of the media types (television, radio, or magazine) are considered to be regularly exposed.[21]

Data Collection Tools, Procedure, and Quality Control

The data collection tool was developed by reviewing the literature.[14,15,20,22–24] A structured, interviewer-administered questionnaire was used to collect the data through face-to-face interviews. Initially, the questionnaire was prepared in English and translated to the local (Amharic) language, and back to English to ensure consistency. The questionnaire comprises socio-demographic characteristics, reproductive and maternity healthcare characteristics, and knowledge and attitude-related questions. The study tool was assessed by a group of researchers to evaluate and enhance the items in the question. Four diploma and two BSc midwives were recruited for data collection and supervision, respectively. A pretest was done on 5% (43) of the calculated sample size outside of the study area. One-day training was given for data collectors and supervisors to assure language clarity and to give information on interview techniques, and how to keep the information. During the actual data collection period, the questionnaire was checked for completeness daily by the supervisors.

Data Processing and Analysis

The coded data were entered into EPI data version 4.6 and then exported to SPSS version 25 for cleaning and analysis purposes. The family wealth status was analyzed by using principal component analysis (PCA). Descriptive statistics were used to present the characteristics of the study participants. The binary logistic regression analysis was done to identify the factors associated with women's knowledge and attitude towards HM usage during pregnancy. Variables having a p-value of ≤ 0.25 in the bivariable analysis were entered into a multivariable logistic regression analysis to identify independent factors associated with HM usage during pregnancy. The multicollinearity assumption was assessed using the variance inflation factor (VIF), in which VIF <10 were acceptable In the multivariable logistic regression, variables were selected in Backward Likelihood Ratio approach and a p-value of ≤ 0.05 with a 95% CI for the adjusted odds ratio was employed to ascertain the significant association.

Ethical Considerations

The study was conducted in accordance with the Ethiopian Health Research Ethics Guideline and the declaration of Helsinki. The ethical approval letter was obtained from the School of Midwifery, on behalf of the Institutional Review Board (IRB) of the University of Gondar. A formal letter of organizational approval was obtained from Dega Damot district health office. Afterward, the information regarding the purpose of the study and the rights of the participants was

provided for the study participants. Finally, written informed consent was obtained from each participant before the actual data collection.

Result

Sociodemographic and Cultural-Related Characteristics

In this study, 853 mothers were included, giving a response rate of 97.8%. Nineteen mothers were excluded from the analysis due to their refusal to participate. The median age of the participants was 31 years with an interquartile range of (27–36) years and more than half (51.6%) of the study participants were within the age group of ≥31 years. More than four-fifths (85.5%) of mothers were from rural areas. Slightly more than half (51.7%) of the study participants did not attend formal education, and 98.2% of the participants were married. Regarding the husband's educational status, nearly half (48.9%) of husbands had no formal education and (81.1%) were farmers (Table 1). In addition, 56.7% of the study participants had no history of HM usage.

Reproductive History and Maternity Health Service-Related Characteristics

Nearly three-fourths (73.0%) of the study participants were multiparous. Slightly more than two-thirds (68.5%) of the study participants had at least one ANC visit and 56.9% of them had one to three ANC visits. Moreover, 63% of the study subjects had family health insurance (Table 2).

Knowledge of Women Regarding the Effects of Herbal Medicine Usage During Pregnancy

In this study, about 34.2% (95% CI: 31–37) of women had use HM during pregnancy and 49.1% (95% CI: 46–52) of participants had adequate knowledge about the effects of HM usage during pregnancy (Figure 1). About 55.9% of the study subjects knew that HM usage during pregnancy has adverse effects. In addition, about 36.9% of the study participants identified that concomitant use of HM with conventional medicines during pregnancy could surge the potential adverse effects on both lives of the mother and unborn baby (Table 3).

Attitude of Women Towards the Effects of Herbal Medicine Usage During Pregnancy

In the current study, about 57.3% (95% CI: 54–61) of the study participants had a positive attitude towards the effects of HM usage during pregnancy (Figure 2). About 53.5% of the participants agreed that HM usage during pregnancy is not safe for mothers. In addition, about 57.2% of the study subjects agreed that HM are more effective if recommended by a health care professional (Table 4).

Factors Associated with Women's Knowledge Regarding the Effects of Herbal Medicine Usage During Pregnancy

On the multivariable logistic regression analysis, short travel time to reach the nearby health facility, urban residence, had used ANC services in the most recent pregnancy, had HM usage history, and had media exposure were the factors significantly associated with women's knowledge regarding the effects of HM usage during pregnancy.

In this study, the odds of adequate knowledge about the effect of HM usage during pregnancy were 12.7 times higher among urban dwellers as compared to women who were reside in the rural areas (AOR = 12.7; 95% CI: 5.80–15.90). Similarly, the odds of adequate knowledge regarding the effects of HM usage during pregnancy was 8.79 higher among women who had used ANC service in the most recent pregnancy as compared to those women who had not use ANC services (AOR = 8.79; 95% CI: 5.90–13.10). Having media exposure increases the maternal knowledge regarding the effects of HM usage during pregnancy by 6.34 times as compared to those mothers who did not have media exposure (AOR = 6.34; 95% CI: 3.51–11.45). In addition, the odds of adequate knowledge regarding the effects of HM usage during pregnancy was 3.06 times higher among women who were traveling < 30 minutes to reach the nearby health facility as compared to women who were traveling more than one hour (AOR = 3.06; 95% CI: 1.76–5.34). Lastly, the odds of adequate knowledge about the

Table 1 Sociodemographic and Culture-Related Characteristics of Study Participants in Dega Damot District, Northwest Ethiopia, 2021 (n=853)

Characteristics	Category	Frequency	Percentage
Age group of mothers in year	≤20	12	1.4
	21–30	401	47.0
	≥31	440	51.6
Wealth quintile	Lowest	169	19.8
	Second	172	20.2
	Middle	171	20.0
	Fourth	170	20.0
	Highest	170	20.0
Residence	Rural	729	85.5
	Urban	124	14.5
Religion	Orthodox	847	99.3
	Others[a]	6	0.7
Educational status	No formal education	441	51.8
	Primary (1–8)	170	19.9
	Secondary (9–12)	177	20.8
	College and above	65	7.5
Occupational status of women	Farmer	687	80.5
	Housewife	47	5.5
	Government employee	65	7.6
	Merchant	42	4.9
	Others[b]	12	1.5
Current marital status	Married	838	98.2
	Unmarried	15	1.8
Husbands' occupational status (n=838)	Farmer	700	83.5
	Government employee	94	11.2
	Merchant	44	5.3
Husband's educational status (n=838)	No formal education	467	55.7
	Primary (1–8)	206	24.6
	Secondary (9–12)	66	7.9
	College and above	99	11.8

Table 1 (Continued).

Characteristics	Category	Frequency	Percentage
Travel time to reach the nearby health facility	<30 minute	314	36.8
	30 minute to 1hr	203	23.9
	>1hr	336	39.3
History of HM usage	Yes	369	43.3
	No	484	56.7

Notes: [a]Muslim and protestant, [b]Student and private employee.
Abbreviation: HM, herbal medicine.

effects of HM usage during pregnancy was 1.74 times higher among women who had a history of HM usage as compared to women who had not a history of HM usage (AOR = 1.74; 95% CI: 1.17–2.59) (Table 5).

Factors Associated with Women's Attitude Towards the Effects of Herbal Medicine Usage During Pregnancy

The multivariable logistic regression analysis revealed that primiparity and short travel time to reach the nearby health facility were the factors associated with women's attitude towards the effects of HM usage during pregnancy.

In this study, the odds of a positive attitude towards the effect of HM usage during pregnancy was 10 times higher among primiparous mothers as compared to multiparous mothers (AOR = 10.1; 95% CI: 5.34–15.30).). Lastly, the odds of positive attitude towards the effects of HM usage during pregnancy was 15.5 times higher among women who were traveling less than thirty minutes to reach the nearby health facility as compared to women traveling more than one hour to reach the nearby health facility (AOR = 15.54; 95% CI: 9.93–17.31) (Table 6).

Discussion

This community-based cross-sectional study assessed women's knowledge and attitude towards the effects of herbal medicine usage during pregnancy and associated factors among women who gave birth in the last twelve months in Dega Damot district, northwest Ethiopia. Accordingly, adequate knowledge and a positive attitude towards the effects of HM usage during pregnancy was 49.1% and 57.3%, respectively. Short travel time to reach the nearby health facility, urban

Table 2 Reproductive and Maternal Health Service-Related Characteristics of Study Participants in Dega Damot District, Northwest Ethiopia, 2021 (n=853)

Characteristics	Category	Frequency	Percentage
Parity	Premipara	230	27.0
	Multipara	623	73.0
ANC utilization	Yes	585	68.6
	No	268	31.4
Number of ANC visit (n=585)	1–3	333	56.9
	≥4	252	43.1
Family health insurance	Yes	537	63.0
	No	316	37.0

Abbreviation: ANC, antenatal care.

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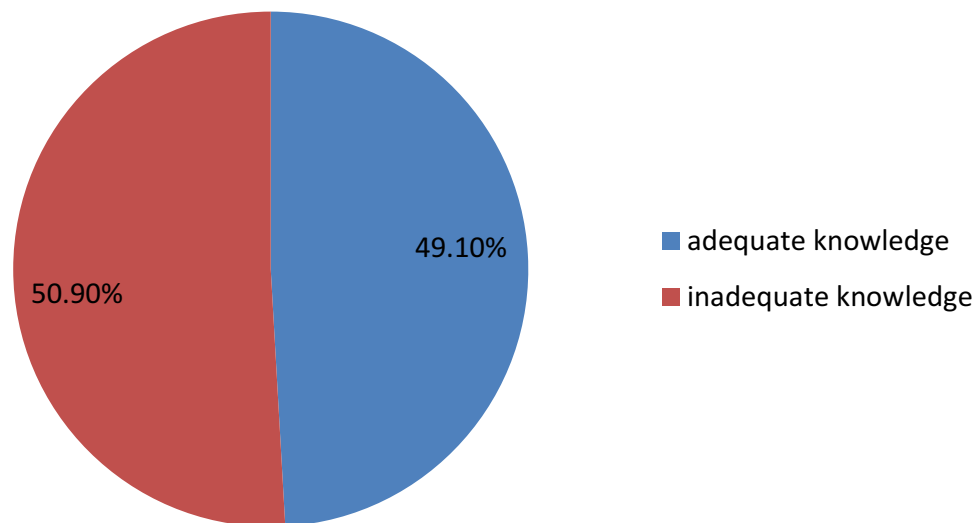
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Figure 1 Knowledge of women about the effects of HM usage during pregnancy in Dega Damot district, northwest Ethiopia, 2021.

residence, had used ANC service in the most recent pregnancy, history of HM usage, and had media exposure were the factors significantly associated with women's knowledge regarding the effects of HM usage during pregnancy, whereas primiparity and short travel time to reach the nearby health facility were the factors significantly associated with women's attitude towards the effects of HM usage during pregnancy.

This study depicted that about 57.3% of women had a positive attitude towards the effects of herbal medicine usage during pregnancy. This finding is lower than a study done in Mali, in which 70% of women had a positive attitude towards the effects of HM usage during pregnancy.[12] This variation might be due to differences in sociodemographic characteristics of the study participants. In Mali, nearly half (47.9%) of the study participants were urban residents.[12] But in this study, only 14.5% were urban residents. Urban dwellers might have adequate access to information regarding the effects of HM on both the mother and the unborn baby. According to empirical evidence, being urban residence is an enabling factor for maternal healthcare utilization.[25] This might help women to get appropriate information regarding the effects of HM usage during pregnancy. Therefore, they could have a positive attitude towards the effects of HM usage. Moreover, the study done in Mali was a facility based study. Thus, women who come for maternal healthcare services utilization were already engaged in the service offered for all pregnant and postpartum mothers. In turn, they could have a positive attitude towards the effects of HM usage during pregnancy.[12]

On the other hand, women's knowledge and attitude towards the effects of HM usage during pregnancy was higher than a study done in Saudi Arabia which is (10.4%) and (53%) respectively.[13] The possible explanation might be due to variation in study setting and period. In addition, there is a difference in maternal health service utilization in which 57.6% of study participants had at least one ANC visit in Saudi Arabia[13] while 68.6% of participants had at least one ANC visit in the current study. This may create opportunities to discuss with care providers about the effects of HM on the life of both mother and the fetus.[17] Therefore, there could be an improvement in women's attitude towards the effects of HM usage.

This study affirmed that media exposure was significantly associated with knowledge of women about the effects of HM usage during pregnancy. Thus, the odds of adequate knowledge regarding the effects of HM usage during pregnancy was 6.34 times higher among mother who had access to media as compared to those mothers with no media exposure. Nowadays, government and public health organizations are using media as a means of disseminating public health information to improve health-related knowledge and change health behaviors.[26] In turn, mothers having access to media may get information regarding the health impacts of both conventional and traditional medicines and will have a better awareness about the effects of HM usage during pregnancy on the life of the mother and unborn baby.

Table 3 Knowledge of Women About the Effects of Herbal Medicine Usage During Pregnancy in Dega Damot District, Northwest Ethiopia, 2021 (n = 853)

| No	Variables	Category	Frequency	Percentage (%)
1	Have you ever heard about herbal medicine?	Yes	678	79.5
		No	175	20.5
2	What types of herbal medicine do you know? (n=678)	*Zehneria scabra* (Haregeresa)	143	21.1
		Datura stramonium (Astenagir)	122	18.0
		Eucalyptus (Bahir zaf)	140	20.6
		Ocimum lamiifolium (Damakesse)	142	20.9
		Croton macrostachyus (bisana)	139	20.5
		Phytolacca dodecandra (Mekan endod)	77	11.4
		Euphorbia abyssinica (Kulkual)	258	38.0
3	Do herbal medicines have adverse effects? (n=678)	Yes	381	56.2
		No	297	43.8
4	What are the possible side effects of herbal medicines on maternal health? (n=381)	Abortion	276	72.4
		Minor to serious health problem	233	61.2
		Maternal death	83	21.8
5	What are the possible adverse effects of herbal medicines on neonatal health? (n=381)	Preterm birth	323	84.8
		Neonate with structural deformity	67	17.6
		Seriously neonatal illness	86	22.6
		Neonatal death	80	21.0
6	What is the effect of concomitant use of herbal and conventional medicines? (n=678)	Has no difference	183	27.0
		Has good outcome	254	37.5
		Increase adverse effects	241	35.5
7	What is the recommended source of herbal medicine? (n=678)	Health care provider	175	25.8
		Herbalist	241	35.5
		Family members	254	37.5
		Totally not recommended	8	1.2
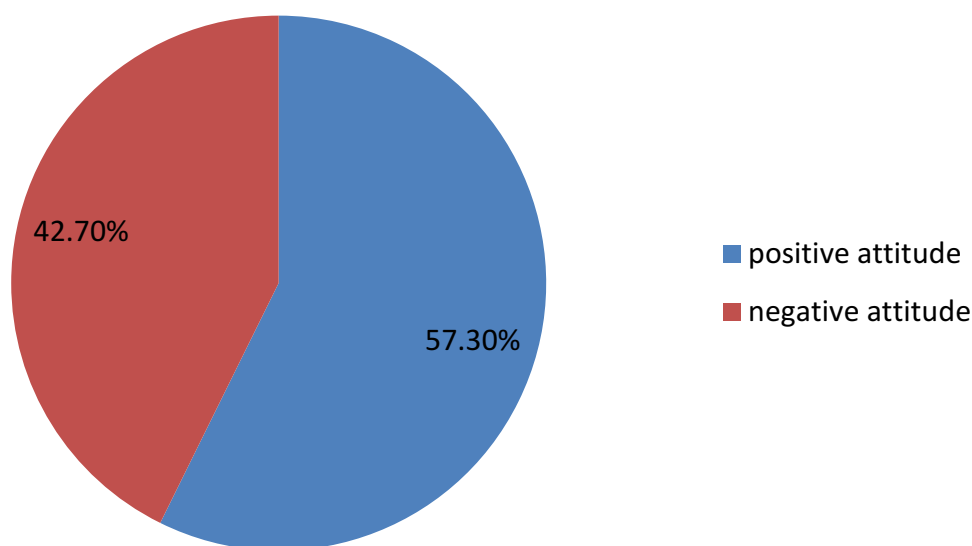
Figure 2 Women's attitude towards the effects of HM usage during pregnancy in Dega Damot district, northwest Ethiopia, 2021.

In addition, an urban residence was significantly associated with women's knowledge regarding the effects of HM usage during pregnancy. Accordingly, being an urban residence increases women's knowledge about the effects of HM usage during pregnancy by 12.7 times as compared to those women residing in rural areas. The possible explanation might be women from urban areas may have better access to media and have better understanding and acceptance of health-related information.[27] Therefore, they could have adequate knowledge regarding the effects of HM usage during pregnancy.

Table 4 Attitude of Women Towards the Effects of Herbal Medicine Usage During Pregnancy in Dega Damot District, Northwest Ethiopia, 2021 (n = 853)

No	Variables	Strongly Agree Frequency (%)	Agree Frequency (%)	Not Sure Frequency (%)	Disagree Frequency (%)	Strongly Disagree Frequency (%)
1	Herbal medicines are used only for treating minor health problems like common cold	89 (10.4)	726 (85.1)	26 (3.0)	10 (1.2)	2 (0.2)
2	Herbal medicines used during pregnancy are not safe for mother	40 (4.7)	456 (53.5)	100 (11.7)	257 (30.1)	0
3	Herbal medicines used during pregnancy are not safe for a fetus	44 (5.2)	438 (51.3)	160 (18.8)	211 (24.7)	0
4	Most herbal medicines are safe	6 (0.7)	265 (31.1)	102 (12.0)	461 (54.0)	19 (2.2)
5	Herbal medicines are more effective if recommended by health care providers	12 (1.4)	488 (57.2)	206 (24.2)	141 (16.5)	6 (0.7)
6	Herbal medicines are more effective if recommended by herbalists	1 (0.1)	260 (30.5)	211 (24.7)	377 (44.2)	4 (0.5)
7	Herbal medicine is more effective if recommended by family/relative	2 (0.2)	230 (27.0)	208 (24.4)	409 (47.9)	4 (0.5)
8	Herbal medicines are more effective than conventional medicines	11 (1.3)	461 (54.0)	201 (23.6)	170 (19.9)	10 (1.2)

Table 5 Logistic Regression Analysis of Factors Associated with Women Knowledge Regarding the Effects of Herbal Medicines Usage During Pregnancy in Dega Damot District, Northwest Ethiopia, 2021

Variables	Category	Knowledge		COR (95% CI)	AOR (95% CI)
		Adequate	Inadequate		
Residence	Rural	90	34	1	1
	Urban	588	141	1.58 (1.02,2.44)	**12.7 (5.80,15.90)***
ANC utilization	Yes	505	53	6.72 (4.66,9.69)	**8.79 (5.90,13.10)****
	No	173	122	1	1
Traveling time to reach the nearby health facility	< 30 minute	258	56	1.42 (0.97,2.08)	**3.06 (1.76,5.34)****
	30 minute to 1hr	163	40	1.25 (0.82,1.92)	1.13 (0.69,1.85)
	>1hr	257	79	1	1
Family health insurance	Yes	435	102	1.28 (0.91,1.80)	1.25 (0.82,1.90)
	No	243	73	1	1
Previous usage of HM	Yes	308	61	1.56 (1.10,2.20)	**1.74 (1.17,2.59)****
	No	370	114	1	1
Media exposure	No	409	140	1	1
	Yes	269	35	2.63 (1.76,3.93)	**6.34 (3.51,11.45)****
Wealth quintile	Lowest	134	35	1	1
	Second	137	35	1.02 (0.60,1.73)	0.98 (0.53,1.80)
	Middle	145	26	1.46 (0.83,2.55)	1.25 (0.66,2.36)
	Fourth	122	48	0.66 (0.40,1.09)	0.64 (0.35,1.16)
	Highest	140	31	1.18 (0.69,2.02)	0.87 (0.46,1.66)

Notes: *p value ≤0.05 **p- value ≤0.001.
Abbreviations: AOR, adjusted odds ratio; COR, crude odds ratio; CI, confidence interval; HM, herbal medicine; ANC, antenatal care.

Antenatal care service utilization was another important predictor that was significantly associated with women's knowledge regarding the effects of HM usage during pregnancy. The odds of adequate knowledge regarding the effects of HM usage during pregnancy were 8.79 times higher among women who had used antenatal care services as compared to women who had not ANC visits. This might be due to the fact that those women who had antenatal care follow-up may have the opportunities to communicate with health care providers about the benefits and adverse pregnancy effects of both conventional and herbal medicines on the life of the mother and the fetus.[17] In turn, they will have adequate knowledge regarding the effects of HM usage during pregnancy.

Short traveling time to reach the nearby health facility was significantly associated with women's knowledge about the effects of HM usage during pregnancy. The odds of having adequate knowledge regarding the effects of HM usage during pregnancy was 3.06 times higher among mothers traveling less than thirty minutes to reach the nearby health facility as compared to mothers traveling more than one hour. The possible explanation might be that mothers who need short traveling time to reach the nearby health facility could have better health-seeking behavior and have a better friendly relationship with the health care providers to discuss freely their doubt regarding the effects of treatment modalities.[28]

History of HM usage was significantly associated with women's knowledge regarding the effects of HM usage during pregnancy. The odds of adequate knowledge regarding the effects of HM usage during pregnancy was 1.74 times higher among women who had a history of HM usage as compared to those women who had not a history of HM usage. This

Table 6 Logistic Regression Analysis of Factors Associated with Women Attitude Towards the Effects of Herbal Medicines Usage During Pregnancy in Dega Damot District, Northwest Ethiopia, 2021

Variables		Attitude		COR (95% CI)	AOR (95% CI)
		Positive	Negative		
Current marital status	Married	478	360	0.48 (0.15,1.53)	0.69 (0.18,2.69)
	Unmarried	11	4	1	1
Parity	Premipara	176	54	3.23 (2.29,4.55)	**10.15 (5.34,15.30)***
	Multipara	310	313	1	1
Traveling time to reach the nearby health facility	< 30 minute	278	36	20.79 (13.63,31.72)	**15.54 (9.93,17.31)***
	30 minute to 1hr	120	83	3.89 (2.69,5.63)	1.48 (0.32,2.23)
	>1hr	91	245	1	1
Family health insurance	Yes	435	102	1.71 (1.29,2.26)	1.92 (1.33,2.77)
	No	243	73	1	1
Previous usage of HM	Yes	193	176	0.74 (0.53,0.92)	1.14 (0.8,1.25)
	No	296	188	1	1
Media exposure	No	294	255	1	1
	Yes	195	109	1.55 (1.16,2.07)	0.91 (0.62,1.34)
Wealth quintile	Lowest	80	89	1	1
	Second	89	83	1.19 (0.78,1.83)	1.46 (0.85,2.52)
	Middle	111	60	2.06 (1.33,3.18)	1.85 (1.06,3.22)
	Fourth	101	69	1.63 (1.06,2.50)	1.39 (0.81,2.43)
	Highest	108	63	1.91 (1.24,2.94)	1.84 (1.27,2.68)

Note: *p value ≤0.001.
Abbreviations: AOR, adjusted odds ratio; COR, crude odds ratio; CI, confidence interval; HM, herbal medicine.

might be mothers who had experience with herbal medicine intake can appreciate the benefit and untoward effects of HM usage during pregnancy.

In addition, primiparity was another important factor associated with women's attitude towards the effects of HM usage during pregnancy. The odds of positive attitude towards the effects of HM usage during pregnancy was 10.15 times higher among primiparous women as compared to multiparous women. The possible explanation might be younger age individuals have access to communication media and trust more on the information disseminated through.[27] Most of a time primiparous mothers are a younger age. Therefore, they can access health-related information from different media and will have a positive attitude towards the effects of HM usage during pregnancy.

Lastly, short travel time to reach the nearby health facility was significantly associated with women's attitude towards the effects of HM usage during pregnancy. Traveling time less than thirty minutes increases women's attitude towards the effects of HM usage during pregnancy by 15.54 times as compared to traveling time more than one hour to reach the nearby health facility. This might be easily accessibility and low cost are the foremost reasons for HM usage which leads the rural population dependent on it.[14] On the other hand, individuals living near to the health facilities are less likely to pay extra costs for transportation and have better health care-seeking behavior which creates opportunities to discuss with care providers about their family health.[29] In turn, their attitude towards the effects of HM usage during pregnancy will be improved.

Limitation of the Study

This study may have social desirability bias. To reduce social desirability bias, initially, participants were informed in detail about the purpose of the study and ways of handling the information to keep confidentiality. In addition, we did not get enough related articles to compare our results.

Conclusion

Women's knowledge and positive attitude towards the effects of herbal medicine usage during pregnancy was low. Short travel time to reach the nearby health facility, had antenatal care service utilization, had access to media, parity, history of HM usage and urban residence were factors significantly associated with women's knowledge and attitude towards the effects of herbal medicine usage during pregnancy. So, concerned stakeholders should work to improve the accessibility of maternal and child health services and better to arrange programs that will increase maternal and child health service utilization to improve knowledge and attitude of women towards the effects of HM usage during pregnancy. In addition, it is important to arrange transportation access for pregnant women to use maternal health services.

Abbreviations

ANC, antenatal care; AOR, adjusted odds ratio; CI, confidence interval; COR, crude odds ratio; HM, herbal medicine; SPSS, Statistical Package for Social Science.

Data Sharing Statement

The datasets for the current study are available from the corresponding author and can be submitted for a reasonable request.

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Author Contributions

All authors made a significant contribution to the study reported, whether that is in the conception, study design, execution, acquisition of the data, analysis and interpretation, or in all these areas; took part in drafting, revising or critical reviewing the article; give final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the study.

Disclosure

The authors declare that they have no conflict of interest for this work.

References

1. World Health Organization. *Global Report on Traditional and Complementary Medicine*. Geneva: World Health Organization; 2019.
2. Vojvodic M, Young A. Toronto notes 2014: comprehensive medical reference and review for the medical council of Canada qualifying exam Part 1 and the United States Medical Licensing Exam Step 2: Toronto notes for medical students, incorporated; 2014.
3. Conover EA. Herbal agents and over-the-counter medications in pregnancy. *Best Pract Res Clin Endocrinol Metab*. 2003;17(2):237–251. doi:10.1016/S1521-690X(02)00102-1
4. Eid AM, Jaradat N. Public knowledge, attitude, and practice on herbal remedies used during pregnancy and lactation in West Bank Palestine. *Front Pharmacol*. 2020;11:46. doi:10.3389/fphar.2020.00046
5. Laelago T. Herbal medicine use during pregnancy: benefits and untoward effects. *Herbal Med*. 2018;45:654.
6. Zamawe C, King C, Jennings HM, Fottrell E. Associations between the use of herbal medicines and adverse pregnancy outcomes in rural Malawi: a secondary analysis of randomised controlled trial data. *BMC Complement Altern Med*. 2018;18(1):1–8. doi:10.1186/s12906-018-2203-z
7. Mothupi MC. Use of herbal medicine during pregnancy among women with access to public healthcare in Nairobi, Kenya: a cross-sectional survey. *BMC Complement Altern Med*. 2014;14(1):1–8. doi:10.1186/1472-6882-14-432
8. Aljofan M, Alkhamaiseh S. Prevalence and factors influencing use of herbal medicines during pregnancy in Hail, Saudi Arabia: a Cross-Sectional Study. *Sultan Qaboos Univ Med J*. 2020;20(1):71–76. doi:10.18295/squmj.2020.20.01.010

9. Ahmed M, Hwang JH, Hasan MA, Han D. Herbal medicine use by pregnant women in Bangladesh: a cross-sectional study. *BMC Complement Altern Med*. 2018;18(1):1–9.

10. Ahmed SM, Nordeng H, Sundby J, Aragaw YA, de Boer HJ. The use of medicinal plants by pregnant women in Africa: a systematic review. *J Ethnopharmacol*. 2018;224:297–313. doi:10.1016/j.jep.2018.05.032

11. Adane F, Seyoum G, Alamneh YM, Abie W, Desta M, Sisay B. Herbal medicine use and predictors among pregnant women attending antenatal care in Ethiopia: a systematic review and meta-analysis. *BMC Pregnancy Childbirth*. 2020;20(1):1–11. doi:10.1186/s12884-020-2856-8

12. Nergard CS, Ho TPT, Diallo D, Ballo N, Paulsen BS, Nordeng H. Attitudes and use of medicinal plants during pregnancy among women at health care centers in three regions of Mali, West-Africa. *J Ethnobiol Ethnomed*. 2015;11(1):1–11. doi:10.1186/s13002-015-0057-8

13. Alsubaie SF, Alshehri MG, Ghalib RH. Awareness, use, and attitude towards herbal medicines among Saudi women-cross sectional study. *Imp J Interdiscip Res*. 2017;3(2):285–290.

14. Nega SS, Bekele HM, Meles GG, Nordeng H. Medicinal plants and concomitant use with pharmaceutical drugs among pregnant women. *J Altern Complement Med*. 2019;25(4):427–434. doi:10.1089/acm.2018.0062

15. Mekuria AB, Erku DA, Gebresillassie BM, Birru EM, Tizazu B, Ahmedin A. Prevalence and associated factors of herbal medicine use among pregnant women on antenatal care follow-up at University of Gondar referral and teaching hospital, Ethiopia: a cross-sectional study. *BMC Complement Altern Med*. 2017;17(1):1–7. doi:10.1186/s12906-017-1608-4

16. Fakeye TO, Adisa R, Musa IE. Attitude and use of herbal medicines among pregnant women in Nigeria. *BMC Complement Altern Med*. 2009;9(1):1–7. doi:10.1186/1472-6882-9-53

17. Foley H, Steel A, Cramer H, Wardle J, Adams J. Disclosure of complementary medicine use to medical providers: a systematic review and meta-analysis. *Sci Rep*. 2019;9(1):1–17. doi:10.1038/s41598-018-38279-8

18. Central Statistical Agency. *Federal Democratic Republic of Ethiopia Central Statistical Agency Population Projection of Ethiopia for All Regions at Wereda Level from 2014–2017*. Addis Ababa: Central Statistical Agency; 2014.

19. Belay A, Sendo E. Factors determining choice of delivery place among women of child bearing age in Dega Damot District, North West of Ethiopia: a community based cross-sectional study. *BMC Pregnancy Childbirth*. 2016;16(1):1–8. doi:10.1186/s12884-016-1020-y

20. Laelago T, Yohannes T, Lemango F. Prevalence of herbal medicine use and associated factors among pregnant women attending antenatal care at public health facilities in Hossana Town, Southern Ethiopia: facility based cross sectional study. *Arch Public Health*. 2016;74(1):1–8. doi:10.1186/s13690-016-0118-z

21. Central Statistical Agency. Ethiopian demographic health survey. Addis Ababa: The DHS Program, ICF, Rockville, Maryland, USA; 2016.

22. Kambonja JN. Assessing the use of herbal medicine among pregnant women in the East Mamprusi District, Northern Region, Ghana: University Of Ghana; 2018:1–82.

23. Acquah M. Factors associated with the use of herbal medicine among pregnant women in the Nkwanta North and South Districts of Oti Region, Ghana: University of Ghana; 2019:1–68.

24. Abdollahi F, Yazdani Chareti J. The relationship between women's characteristics and herbal medicines use during pregnancy. *Women Health*. 2019;59(6):579–590. doi:10.1080/03630242.2017.1421285

25. Tarekegn SM, Lieberman LS, Giedraitis V. Determinants of maternal health service utilization in Ethiopia: analysis of the 2011 Ethiopian Demographic and Health Survey. *BMC Pregnancy Childbirth*. 2014;14(1):1–13. doi:10.1186/1471-2393-14-161

26. Dugassa BF. Free media as the social determinants of health: the case of Oromia regional state in Ethiopia. *Open J Prev Med*. 2016;6(02):65.1–19. doi:10.4236/ojpm.2016.62006

27. Avcı K, Çakır T, Avşar Z, Üzel Taş H. Examination of the mass media process and personal factors affecting the assessment of mass media-disseminated health information. *Glob Health Promot*. 2015;22(2):20–30. doi:10.1177/1757975914536912

28. Nuamah GB, Agyei-Baffour P, Mensah KA, et al. Access and utilization of maternal healthcare in a rural district in the forest belt of Ghana. *BMC Pregnancy Childbirth*. 2019;19(1):1–11. doi:10.1186/s12884-018-2159-5

29. Akeju DO, Oladapo OT, Vidler M, et al. Determinants of health care seeking behaviour during pregnancy in Ogun State, Nigeria. *Reprod Health*. 2016;13(1):67–74. doi:10.1186/s12978-016-0139-7