Prevalence and Predictors of Use of Herbal Medicines Among The Most Recently Delivered Mothers in Tabora Municipality, Tanzania

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Abstract

Background In most of sub-Sahara African countries, herbal medicines are widely used during pregnancy and labor for various motives despite their unclear pharmacology and potential toxicity. Considering the Sustainable Development Goals, exposure to herbs during pregnancy should be restricted to safeguard the health of mothers and newborns. Thus, this study aims to assess the proportion of mothers using herbal medicines during pregnancy and delivery and to determine factors associated with the practice.

Methods We used an interview schedule to gather information among 340 mothers who delivered a live baby in the preceding two years. Using a two-stage-sampling technique, we selected and interviewed mothers at the health facilities. We compared proportions using chi-square test. We performed a Poisson logistic regression analysis to determine independent predictors of herbal use.

Results Over 60% of mothers in Tabora municipality used herbal medicines during pregnancy and delivery. Major reasons for use were shortening of labor duration, 81 (38.9%) and reducing labor pain, 58 (27.9%). Independent predictors of herbal use were distance to the nearest health facility, adjusted prevalence ratio [aPR = 1.12, 95%CI = 1.00,1.25], perception of safety about herbs, [aPR = 1.16, 95%CI = 1.05,1.29] and health care providers stance on the use of herbs, [aPR = 1.14, 95%CI = 1.04,1.25].

Conclusion Use of herbal medicine during pregnancy and delivery in Tanzania is high. Researchers should consider designing comprehensive investigations on adverse effects of herbs to the mother and the fetus. Furthermore, health care providers ought to include health education messages during antenatal visits on the undesirable effects of using herbs.

Plain English Summary

In most of sub-Sahara African countries, herbal medicines are widely used during pregnancy and childbearing for various motives such ensuring positive pregnancy outcomes, easing labor and the general health of the woman and the baby in the womb. There are some studies which indicate that out of 10 women, about two to eight use herbs during pregnancy. The women and their babies in the womb may be at risk of the potentially poisonous materials contained in the herbs. There are some known effects of using herbal materials and these may even lead to the death of the mother or the baby in the womb or both. However, few data are available on the factors which increase the likelihood of pregnant women to use herbs.

In this study, we interviewed 342 mothers delivered a live baby in the preceding two years and attending Mother and Child Health clinics with their babies. Six out of 10 mothers reported having used herbal medicines during pregnancy or delivery. Findings show mothers who viewed herbal medicines as being safe when used in pregnancy or delivery, mothers discouraged by health care providers when attending antenatal clinic against using herbs as well as those who lived far away from a health facility tended to use herbs more. Studies like this provide evidence that there is need of having strategies to control use of herbal medicines in pregnancy.

Background

It was recently estimated that maternal causes claimed 300000 lives of mothers annually and most were observed in Sub-Saharan countries [1]. In order to achieve the Sustainable Development Goal (SDG) of 70 maternal deaths per 100000 live births, efforts are being made to promote health facility delivery for all from about 60 percent being by traditional birth attendants. Traditional system exposures also include rampant use of herbal medicines which are habitually consumed raw [2]. In most of sub-Sahara African countries, herbal medicines are widely used during pregnancy and childbearing for various motives [3]. The drives include, for example, treating nausea and vomiting [4]; and strengthening pregnancy, positive pregnancy outcomes, ease labor and the general health of the woman and the fetus [5]. Frequently used herbal medicines by pregnant women in Tanzania include ginger (*Zingier officinale*), onions (*Allium cepa*) and Neem (*Azadirachtaindica*) [6]. In this study, herbal medicine use in pregnancy and delivery includes the utilization of plant products in their raw or cooked forms for various intentions as reported by the women themselves.

Despite their unclear pharmacology and potential toxicity, high proportions of women in Tanzania use herbal medicines during pregnancy and in inducing labor; 23% in Mwanza [6]. A recent systematic review of literature [7] focusing on use of herbal medicines to induce labor by pregnant women revealed proportions of herbal use in the most recent pregnancy ranging from 6.5% in Ghana [8] to 80% in Uganda [9]. Some pregnant women often perceive herbal medicines as being natural and therefore safe, regardless of the unknown risks [6, 10].

Usually herbal medicines are taken towards the end of the gestation period or at the onset of labor pains, aimed to stimulate uterine muscles leading to stronger contractions and thus, hastening labor [9]. Certain herbs are believed to have the ability of inducing labor and shortening its duration [11]; alleviating labor pains, enhancing removal of a retained placenta, as well as toning the uterine muscles post delivery [6, 12].

Furthermore pregnant women in several parts of sub-Saharan Africa may use herbal remedies to treat pregnancy-related problems due to cost-effectiveness of therapy and easy access of these products [13]. Local herbs may be taken via the oral route in which they are most often consumed as a strong tea or chewed; rectal or vaginal routes and sometimes rubbing on the pregnant abdomen [14, 15]. Herbal remedies may also be used to protect the fetus from evil in-vitro [16] and to have a healthy child [17].

Nevertheless, the use of herbs during pregnancy should be a subject of concern as many common plants might have parts that contain natural toxins that could be dangerous if consumed. Additionally, when herbal medicines are taken in large amounts, they can be detrimental to pregnancy due to presence of some chemicals that can cross the placenta [18]. With the urgent need to achieve the SDGs, exposure to herbs has to be restricted to improve maternal health. Thus, this study aimed to assess the proportion of mothers using herbal medicines during pregnancy and delivery and to determine factors that are likely to predict the use in order to achieve the goal of improving maternal health.

Methods

Study design and study area

The study adopted a cross-sectional analytical design involving women attending Reproductive, Maternal and Child Health (RMCH) clinics in a municipality setting of Tabora, in central Tanzania. According to the most recent national population census of 2012, Tabora Municipality has a total of 16709 women of childbearing age (15–49 years) [19]. Administratively, the municipality has two divisions; namely Tabora North and South with 14 and 15 wards respectively. The health system comprises of 44 health facilities of which 36 are public. Of the public health facilities, three are hospitals; three are health centers and 30 are dispensaries. Of all public health facilities, 34 provide RMCH services. The municipal report of 2012 shows that out of the 12020 women who attended antenatal care clinics, 10450 (96%) delivered at health facilities [20].

Sample Size Estimation And Sampling Procedure

We estimated a sample of 342 women based on the formula $Z^2 p(1-p)/m^2$; whereby Z being a critical value of the normal distribution at 5% level of significance, p is estimated percent (23%) of pregnant women using herbal medicines [6] and 5% for m, an estimated margin of error. We obtained a minimum sample of 273 that was adjusted for a possible 20% non-participation rate. The main inclusion criterion was a woman who delivered a live baby in the preceding two years.

RMCH services are provided by 18 and 16 health facilities in Tabora North and South divisions respectively. Proportionately, we estimated nine and eight health facilities respectively from Tabora North and South divisions. First, using systematic sampling technique, we selected health facilities from each of the two divisions. In the second stage, a random sampling technique was used to recruit women meeting the study criterion and attending RMCH clinics in the selected facilities on the days of data collection. Number selected in each facility was based on the proportion a facility contributed to maternal attendances in all selected facilities in a division put together in the previous month.

Data Collection Procedure

We collected data using semi- and structured interviews which elicited information on socio-demographic characteristics, use of herbs during the most recent pregnancy and delivery, perceived effects of using herbs in pregnancy, awareness of possible adverse effects as well as source of advice on the use of herbs. We assumed that all selected mothers were most likely to remember use of herbal medicines during their most recent pregnancy and delivery, thus, in position to give a self-report. The interview tool was first prepared in English and then translated into Kiswahili language, which is the medium of communication in Tanzania. In order to improve the content validity of the tool and other methodological issues as described by Castillo-Montoya [21] we pre-tested the instrument among few women in a near-by

health facility that was not included in the study. Only mothers consenting were interviewed in a calm environment within the health facility at exit. A team of four research assistants trained on the research objectives and fieldwork procedures collected the data in September 2018, for a period of three weeks. The research assistants were registered nurses but not working in the respective clinic.

Data Processing And Analysis

We processed and analysed data using statistical software (Statistical Package for Social Sciences). Initially, by running the frequencies for all variables we were able to detect possible out-of-range values. We summarized categorical and quantitative variables using frequency tables. We performed bivariate analysis to assess the association between reported use of herbal medicines and selected independent variables using a Chi-square test. To assess independent predictors of obstetric herbal use, factors with p -value < 0.2 in the binary analyses were selected to enter into the Poisson regression model to predict use of herbs during the most recent pregnancy and delivery. Adjusted Prevalence Ratios (aPR) and their corresponding 95% confidence intervals are presented as both measures of association and their strengths. The significance level was set at 5%.

Results

Background characteristics of study participants

We recruited 340 women who delivered in the preceding two years (participation rate 99.4%). The majority of the study participants, 142 (41.8%), were in the age category of 26–35 years. Slightly more than half, 175 (51.5%) reported completing primary education. Among all study participants, 285 (83.8%) were married or cohabiting. Majority of the respondents, 177 (52.1%) were either peasants or housewives whereas 159 (48.5%) of their spouses were also peasants. Despite of 255 (75.0%) mothers living within a walking distance of five km to the nearest health facility, only 141 (41.5%) attended antenatal clinic (ANC) at least the four recommended visits. Most of the women, 246 (72.4%), reported attending their first ANC when the pregnancy was at least three months (Table 1).

Table 1
Distribution of respondents by their background characteristics (n = 340)

Characteristic	Number (%)
Age group (years)	
16-25	83 (24.4)
26-35	142 (41.8)
36+	115 (33.8)
Marital Status	
Never married	25 (7.4)
Married/cohabiting	285 (83.8)
Previously married	30 (8.8)
Education	
None/primary incomplete	87 (25.6)
Primary complete	175 (51.5)
Above primary	78 (22.9)
Woman's occupation	
Peasant/housewife	177 (52.0)
Self-employed	127 (37.4)
Formally employed	36 (10.6)
Occupation of spouse (n=328)	
Peasant	159 (48.5)
Self-employed	91 (27.7)
Formally employed	78 (23.8)
Gestational age at booking	
0 - 3months	30 (8.8)
More than 3 months	246 (72.4)
Don't remember	64 (18.8)
Number of ANC visits	
4-Jan	145 (42.6)

Characteristic	Number (%)
More than 4	141 (41.5)
Don't remember	54 (15.9)
Distance to a nearest clinic (Km)	
≤ 5	255 (75.0)
> 5	85 (25.0)

Herbal Use During The Most Recent Pregnancy And Delivery

A large proportion of women, 208 (61.2%), reported using herbal medicines during their most recent pregnancy and delivery. While the majority, 138 (66.3%), reported high frequency use of herbal medicines (at least three times), 16 (7.7%) and 54 (26.0%) reported using herbal medicines either once or twice respectively. Of the 208 women who used herbal medicines, 57 (27.4%) said herbal medicines were easily available and 83 (39.9%) considered herbal medicines safe. The reported main routes of administration included oral, 135 (64.9%), intra-vaginal, 59 (28.4%), and topical application, 14 (6.7%).

Of the 340 respondents, less than half, 164 (48.2%) reported aware of adverse effects of using herbal medicines in pregnancy and delivery. Surprisingly, significantly more women, 153 (93.3%), reported aware of the effects of using herbal medicines during pregnancy and delivery as compared to 55 (31.3%) who were not aware ($p < 0.01$). Regardless of herbal use status, 70 (20.6%) mentioned uterine rupture, 51 (15.0%) excessive vaginal bleeding, 22 (6.5%) cited uterine infection and 21 (6.2%) reported a possibility of death of the mother or baby as untoward consequences of using herbs in pregnancy.

Among 208 mothers who ascertained having used herbs during their most recent pregnancy and delivery, 81 (38.9%) thought the most benefits of using herbal medicines were shortening of duration of labor and 58 (27.9%) alleviating labor pains (Fig. 1).

Determinants of the use of herbal medicines in the most recent pregnancy and delivery

In Table 2, we present results of bivariate analysis between use of herbal medicine during the most recent pregnancy and selected independent variables. Factors that were significantly associated with herbal medicine use included living far from a health facility, perceiving herbs as safe, source of advice towards using herbs and receiving advice against using herbs from health care providers.

Table 2
Association of herbal use in the most recent delivery and selected characteristics

Characteristic	Herbal use Number (%)	Chi-square, p-value
Age group (years)		1.68, 0.431
16-25	46 (55.4)	
26-35	88 (62.0)	
36+	74 (64.3)	
Education level		2.85, 0.239
None/prim incomplete	50 (57.5)	
Primary complete	104 (59.4)	
Secondary and above	54 (69.2)	
Occupation of spouse (N=316)		4.59, 0.101
Peasant	103 (64.8)	
Formerly employed	40 (51.3)	
Self-employed	59 (64.8)	
Distance to nearest facility (km)		5.35, 0.014
≤ 5	147 (57.6)	
> 5	61 (71.4)	
Perceived availability of herbs		1.51, 1.139
Easily available	39 (68.4)	
Not easily available	169 (59.7)	
Perceived safety of herbs (N=321)		11.73, < 0.01
Safe	64 (77.1)	
Not safe	144 (56.0)	
Source of advice		42.02, < 0.01
Friends	65 (89.0)	
Parents	33 (40.2)	

† Health Care Provider

Characteristic	Herbal use Number (%)	Chi-square, p-value
Traditional birth attendant	57 (54.3)	
Spouse	41 (66.1)	
Own decision	6 (50.0)	
HCP's† stance towards herbs use		13.15, < 0.01
Discouraged use	112 (53.6)	
Did not discourage	96 (73.3)	
† Health Care Provider		

In Table 3, we display predictors of herbal use during the most recent pregnancy and delivery among mothers who attended reproductive and child health clinics. Predictors of herbal use were distance to the nearest health facility, women's perception of herbal safety and whether the health care provider discouraged use of herbal medicines or not during antenatal visits. For example, mothers who perceived herbal medicines as being safe had 16% adjusted prevalence ratio to use herbal medicines, [aPR = 1.16, 95%CI = 1.05,1.29] as compared to those perceiving herbal medicines being unsafe. Furthermore, mothers confirming that during antenatal care visiting, health care providers did not discourage use of herbal medicines had almost 15% higher prevalence ratio of herbal medicine use as compared to those saying that health care providers discouraged the use of herbal medicine, [aPR = 1.14, 95%CI = 1.04,1.25].

Table 3
Correlates of herbal use during the most recent pregnancy and delivery among women in Tabora municipality

	Herbal use	aPR (95%CI)*	p-value
Factor	Number (%)		
Occupation of spouse			
Peasant	103 (64.8)	1.05 (0.92, 1.20)	0.455
Formal employment	40 (51.3)	1.12 (0.96, 1.30)	0.143
Self-employment	59 (64.8)	Reference	
Distance to nearest health facility (km)			
≤ 5			
> 5	147 (57.6)	1.12 (1.00, 1.25)	0.049
Perceived safety of herbs			
Very safe	61 (71.4)	Reference	
Not safe	64 (77.1)	1.16 (1.05, 1.29)	0.004
HCP's† stance towards herbs use			
Did not discourage use of herbs	112 (53.6)	1.14 (1.04, 1.25)	0.002
Discouraged use	96 (73.3)	Reference	
* Prevalence ratio (95% Confidence Interval) †Health Care Provider			

Discussion

In this study, we assessed use of herbal medicines and their determinants among mothers who delivered in the preceding two years and who were attending RMCH clinics in health facility settings in Tanzania. The findings show that more than 60% of the women used herbs during the most recent pregnancy or delivery. The significant predictors of use were distance to the nearest health facility, women's perception of herbal safety and whether the health care provider discouraged use of herbal medicines or not during antenatal visits.

The results of the present study ranges between 20–80% as reported in other related studies [6, 9, 13, 21, 22]. Furthermore, these findings are in agreement with other studies elsewhere, which confirm dramatic increment in the use of herbal medicines in pregnant women. The possible reason for the observed high usage of herbs could be due to easy availability, their perceived safety and rapid increase in promotion of

traditional medicines in the society as well as the media. It is common to see posters advertising traditional medicines and herbalists in various parts Tanzania.

A significant association has been documented between educational status of a woman and utilization of herbal remedies during pregnancy and delivery. For example, some studies in Africa suggest that women of low educational status as compared to those highly educated had a higher likelihood of using herbal remedies [13, 21, 22]. However, the current data do not support such an association. In addition, the education status of the mother did not have significant influence on the use of herbs in the most recent pregnancy or during delivery.

Plants used for herbal remedies are less expensive as compared to modern medicines and they have been culturally considered as an effective and acceptable option even when modern health facilities are available [24]. Some studies have associated use of herbs during pregnancy with lack of access to public health care [7]. Similar to observations by Mothupi, use of herbal medicines in this study is significantly associated with perceived beliefs about their safety and local availability [10].

In our study, women who resided far away (at least 5 km) to the nearest health facility had more than 10% adjusted prevalence ratio to use herbal medicines compared to women living closer to the health facilities. This may suggest that accessibility to public health care is an important attribute to using herbs during pregnancy, similar to observations elsewhere [3, 7, 13].

Medications and in particular herbs should be used with caution during pregnancy as could result in adverse effects. Apart from not having standard dosages, the pharmacology and potential toxicity of the plants used are still unclear [7]. The most important aspect is lack of awareness of pregnant women and the community about potential effects of using herbal medicines on the mother and the fetus. In the current study, less than half (48%) of the respondents were aware of the adverse effects of herbs in pregnancy and only a few of them were able to mention some of the major effects. In Ethiopia and Norway, only 14% and 12% respectively of pregnant women reported to have received health advice from healthcare workers on the use of herbs [22, 24]. Compared to women who were discouraged by health care providers against the use of herbs during pregnancy, significantly more women in the Tabora study who did not receive such advice used herbs ($p < 0.01$). This finding suggests that if women get appropriate information during pregnancy they will greatly avoid using the herbs.

Similar to studies in Ghana [14] and Ethiopia [13], oral route was the commonest means (64.9%) for taking herbs during pregnancy and labor in the Tabora study. In all these studies, women most often chewed or consumed herbs as a strong tea. On the contrary, findings in a related study in Kagera regional referral hospital, in rural north-western Tanzania revealed that only 22% of women reported using herbs orally [15]. However, the Kagera study looked at only women who used herbs for inducing abortion.

The main motive for using herbs in the current study was to shorten labor duration (38.9%). This finding is consistent with what was observed in studies in Ghana and Mwanza Tanzania, which revealed that 39% and 68% of women respectively took herbal medicines for shortening duration of labor and alleviate

pains [6]. For many years, women used herbal medicines in pregnancy to help several conditions during delivery process. For example, Nigerian women use herbal medicine to prevent complications, such as pain and bleeding [12]. Similar to findings in Tabora, studies indicate that pregnant women in some communities use herbs for the purpose of accelerating labor, preventing antepartum and postpartum haemorrhage, increasing milk production, and aiding postpartum uterine involution [6, 12]. The grounds for the high usage of herbs could in addition be attributed to their easy accessibility, perceptions that they are safe and alleviate pain; as well as the general lack of awareness of the potential side effects [13, 25].

In the Tabora study, independent predictors of using herbs during the most recent pregnancy are distance to the nearest facility, perceived safety of the herbs and the stance of health care providers towards use of the herbs. The statistically significant association between perception of safety and use of herbal remedy during pregnancy is in line with the findings of various related studies elsewhere [4, 21, 26]. The studies indicate that women who perceive herbal remedies as safe use them more than those who have negative perception about the herbs.

This study has several potential limitations. First, although we assumed mothers gave birth within two years prior to the survey were likely to remember use of herbal medicines in their most recent pregnancy; we are unable to rule completely out the possibility of information bias due to individual's ability to recall. If some of women were unable to remember, this bias could have contributed to the low estimates. Second, women were aware that use of herbal medicine during pregnancy was discouraged at each health facility. Therefore, due to social desirability bias, there is a possibility that some women concealed reporting use of herbal medicines, thus, leading to under-estimating the proportion of herbal use. Third, no research design is optimal for all purposes and since this was a cross-sectional study, it might have reservations with the generalizability of the findings. Fourth, there is possibility that the variables we considered as independent may not be exhaustive.

Conclusions

The results of the present study point out that as high as 60% of women possibly in most municipal settings in Tanzania use herbs for various reasons during pregnancy and labor. Perceived safety of the herbs and health care providers' stance towards use of herbs as well as physical distance to the nearest facility were significant predictors of the use of herbs. The study forms basis for designing intervention programs to address use of herbs during pregnancy and underscores the important role of health care providers attending pregnant women in the antenatal clinics. This is important given the high prevalence of the use of herbs during pregnancy and delivery in our community, and the relative lack of evidence of safety. Therefore, first, we recommend that researchers consider designing comprehensive investigations on adverse effects of herbal medicines used in pregnancy on the mother and the fetus. Second, health care providers ought to include health education messages on the undesirable effects of using herbs in the routine sessions they provide to women when attending antenatal care services.

Abbreviations

ANC

Antenatal Care; aPR:Adjusted Prevalence Ratio; CI:Confidence Interval; HCP:Health Care Provider; PR:Prevalence Ratio; RMCH:Reproductive, Maternal and Child Health; SDGs:Sustainable Development Goals.

Declarations

Ethics approval and consent to participate

The Muhimbili University of Health and Allied Sciences (MUHAS) Institutional Review Board approved the protocol. The Tabora Municipal Executive Director and the Municipal Medical Officer granted permission to conduct the study in the selected health facilities. We explained the aims and benefits of the study to each selected participant. We emphasized voluntary participation such that each participant was free to respond or not, to each question and to stop responding to any question at any point regardless of the services she was expecting to get. We assured strict anonymity and confidentiality to all individual participants. Before the interviews, each potential survey respondent was asked to sign (or thumb-print) the consent form. Furthermore, no names were recorded on the survey tool.

Consent for publication

Not applicable since no individual level data is shown.

Availability of data and materials

All data generated or analyzed during this study are included in this article and are available from the corresponding author on request as per institutional guidelines.

Competing interests

The authors declare no competing interests

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Authors' contributions

ATK and GCM conceptualized and developed the protocol. ATK guided data collection while GCM supervised field activities. ATK and GCM analyzed and interpreted the data and wrote the manuscript. All authors read and approved the final manuscript.

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Figures

Figure 1

Most perceived benefits of using herbal medicines in pregnancy and labor