Factors influencing the use of herbal medications during pregnancy at Public Health Center, Indonesia

Fardila Elba¹, Dani Hilmanto¹ and Sandeep Poddar²

Abstract
Introduction: There has been an increase in the usage of herbal remedies, particularly among pregnant women, across the globe. The prevalence of herbal medicine use during pregnancy ranged from 54.3% to 96.6% in the region studied, indicating a rising trend in the use of herbal medicine during pregnancy. Cold and flu symptoms and stomach problems were the most prevalent reasons people turned to this drug.

Materials and methods: This study’s samples were pregnant women in the working area of Ciwaruga Public Health Center, which has eight villages. The samples were taken using a proportional simple random sampling technique until 96 respondents were obtained. The percentage of moms who took herbal medication was the primary outcome variable, and participants were chosen for the research using a systematic sampling procedure. A digital database was used to store quantitative data that had been coded.

Results: The factors significantly associated with the use of herbal medicines during pregnancy were perception (OR 2.18; CI 1.02–4.66), having ever used herbal medicines during a previous pregnancy (OR 3.87; CI 1.46–10.25), and healthy reproductive is other reasons (OR 7.98; CI 4.45–14.30).

Conclusion: Pregnant women in the Ciwaruga Public Health Center area often turn to herbal remedies, which may indicate a lack of access to mainstream medical treatment. They believe that herbal medications are useful and that using them during a prior pregnancy is linked.

Keywords
Pregnancy, herbal medicine, maternal health services, Public Health Center, medical treatment

Introduction
Pregnancy is a physiological process that involves almost all-female organ systems. During the physiological changes in pregnancy, a woman’s body experiences some discomfort, such as nausea, vomiting, lightheadedness, constipation, and sleep disturbances during pregnancy.¹ To overcome this, some pregnant women use Over the Counter (OTC) drugs, look for modern medicine with a doctor’s prescription, or use herbs.²

According to WHO (World Health Organization), in 2021, countries in Asia, Africa, and Latin America will use herbal medicine to complement the primary treatment they receive. Even in Africa, as much as 80%. Based on the Regulation of the Minister of Health of the Republic of Indonesia, which states that as many as 40% of Indonesia’s population uses traditional medicines and as much as 70% are in rural areas, around 59.12% of Indonesians have consumed herbal medicine. As many as 95.6% feel that herbal medicine effectively improves health. The population uses traditional medicine for primary treatment.³

¹Department of Public Health Science, Padjadjaran University, Kabupaten Sumedang, Jawa Barat, Indonesia
²Lincoln University, Petaling Jaya, Selangor, Malaysia

Corresponding author:
Fardila Elba, Department of Public Health Science, Padjadjaran University, Jl. Raya Bandung Sumedang KM.21, Hegaranah, Kec. Jatinangor, Kabupaten Sumedang, Jawa Barat 45363, Indonesia. Email: fardilaelba@yahoo.com
Research from Uganda in 2021 states that out of 68 participants, 25.3% of the prevalence of using herbal medicines during pregnancy, 33.7% of participants used herbs during childbirth, and 48.9% used herbal medicine based on suggestions from family, friends, or relatives. Until now, the herbal medicines used have not been scientifically tested, so the safety of using them during pregnancy is not guaranteed because they may cause teratogenic effects that can harm the fetus, leading to fetal defects. Factors that influence it include, among others, some characteristics that may affect the use of herbal medicines, including age, ethnicity, gravidity, maternal occupation, family income, maternal education level, and means of examination. Socio-demographic characteristics and social and cultural influences can also influence the use of herbal medicines in pregnant women.

The common understanding of pregnant women about the use of herbal medicines must be assessed as a public health problem because, based on previous studies, there are gaps in the understanding of pregnant women about the risks of herbal medicines being consumed both by the mother and the fetus. Risks or side effects that can occur to the fetus consist of direct and indirect effects. These direct effects can cause damage or impairment of fetal development with congenital abnormalities or death. The indirect impact can be impaired placental function, which disrupts the intake of food and oxygen to the fetus, resulting in the baby not developing properly or being born with a low body weight. Besides, the drug can also cause uterine contractions, thereby reducing blood flow to the fetus or even stimulating premature birth.

In Indonesia, the legal basis for traditional medicine is in the Decree of the Minister of Health of the Republic of Indonesia concerning the National Traditional Medicine Policy. Scientifically tested so that it can be widely used for self-medication and informal services. Licensing and Implementation of Midwifery Practices, it is stated that in providing health services, midwives are only authorized to offer blood-added tablets to pregnant women and give high doses of vitamin A to postpartum mothers, so there is no regulation that midwives have the authority to administer modern medicine or herbal medicine. Based on this background, the researchers are interested in researching the prevalence and factors of using herbal medications in pregnant women. This is because herbal medicines are still quite high in developing and developed countries.

**Materials and methods**

This research is a descriptive and analytical study using a cross-sectional approach. This study’s samples were pregnant women in the working area of Ciwaruga Public Health Center, which has eight villages. Of the eight villages that were the research sites, proportional sampling was carried out by taking Rwanda (RW), with the highest number of pregnant women. In the selected RWs, a simple random sample of pregnant women will be chosen using a lottery technique to determine the research sample. Calculations were made to determine the minimum sample size using the sample size formula for categorical descriptive research:

\[
n = \frac{Z_{\alpha}^2 \times P \times Q}{d^2}
\]

Information:
- \( n \) = number of samples
- \( Z_{\alpha} \) = alpha standard deviation (\( \alpha \) used is 0.05 so \( Z_{0.05} = 1.96 \))
- \( P \) = proportion of variable categories studied. Since there has been no research like this, the \( p \) value is set at 50% to obtain a minimum sample size. \( p = 0.5 \)
- \( Q = 1 - P \) (\( 1 - 0.5 = 0.5 \))
- \( d \) = the precision value is 10% or 0.1.

Based on the formula above, the estimated sample size required can be calculated as follows:

\[
n = \frac{(1.96)^2 \times 0.5 \times 0.5}{0.1^2}
\]

\[
n = 3,8416 \times 0.25
\]

\[
n = 0.9604 \text{ round to 96}
\]

The samples were taken using a proportional simple random sampling technique that is a method of sampling in which the investigator divides a finite population into subpopulations and then applies random sampling techniques to each subpopulation until 96 respondents were obtained. The inclusion and exclusion criteria in this study are as follows:

(1) Inclusion criteria
   1. Pregnant women who live in the working area of Ciwaruga Public Health Center
   2. Pregnant women in the first, second, and third trimesters who live in the working area of Ciwaruga
   3. Pregnant women who are willing to sign an informed consent and participate in this study.

(2) Exclusion criteria
   1. Pregnant women who were not available at the time of data collection.
Statistical Package for Social Science (SPSS) 13 was used to clean and analyze data at three levels. The percentage of mothers who took herbal medication was the primary outcome variable, and participants were chosen for the research using a systematic sampling procedure. A questionnaire including 31 questions served as the data collection tool. Microsoft Excel was used to code and insert the data into the computerized database. In a univariate analysis, proportions were used to describe categorical variables, while means, input, and standard deviation were used to characterize continuous variables (SD). When doing a bivariate analysis, two tests were employed to see whether there was a difference in factors between women who used herbal medicines during pregnancy and those who did not: the chi-square test and the student t-test.

Odds ratios and 95% confidence intervals (CI) were used to assess individual, socio-cultural, obstetric/maternatal, and health-care system characteristics. Herbal medicinal usage during pregnancy was studied using multivariable logistic regression and stepwise environmental techniques to identify characteristics independently linked with herbal therapeutic use. As a part of the multivariable analysis, significant bivariate variables and scientifically relevant components were included. p-Values <0.05 were considered for statistical significance. The results are summarized in bar graphs, tables, and text.

**Result**

Based on the research results obtained as follows:

Based on Table 1 characteristics, it can be seen that of the 96 respondents who participated in this study, 80.2% of pregnant women were of healthy reproductive age, 80.2% were homemakers, 59.4% of respondents had a family income below the uncleared margin rules (UMR), and 51.0% of respondents had a senior high school education. The proportion of pregnant women in the second and third trimesters was almost the same, namely 44.8% and 43.8%. 38.5% of respondents were primigravida (first pregnancy), and 40.6% were nulliparous (never having given birth before). Almost all respondents (92.7%) chose antenatal care from private midwives. The proportion of pregnant mothers’ perceptions about herbal medicine was not effective from what she knew to science and effect among pregnant women was 59.4%.

Based on Table 2, it can be seen that the age of pregnant women (p ≤ 0.001; OR = 7.98; 95% CI: 4.45–14.30), use of herbal medicines before pregnancy (p ≤ 0.001; OR = 2.51; 95% CI: 1.21–5.19), parity (p = 0.041; OR = 0.50; 95% CI: 0.25–0.98), and the range of access to target health facilities (p < 0.001; OR = 2.43; 95% CI: 1.46–4.05), have a significant influence on the health of pregnant women.

Based on the results of Table 3, it was found that some of the most influential factors on reproductive health or the health system were ever used herbal medicine, which had a value of 3.87 times, which could have an impact on the perception of pregnant women on the importance of the latest knowledge regarding the effects of herbal medicines used unsafely during pregnancy, which was 2.18 times more dangerous than those who did not take over-the-counter drugs during the current pregnancy.

**Discussion**

The types of herbal medicine consumed are herbal in the form of ginger, palm extract, and honey. Based on the results of this study, it can be seen that from 96 pregnant women, 77 (80.2%) respondents were pregnant women of healthy reproductive age, and 93.75% of people took herbal medicines during pregnancy. Some pregnant
Women already have the habit of consuming herbal medicine before becoming pregnant. Some pregnant women take herbal medicines not registered by the Business Online Marketing (BOM) Agency in the first trimester to reduce complaints such as problems with the digestive tract, namely nausea/vomiting. In line with Febriyeni’s research, ginger contains 19 components for the body, one of which is gingerol, the most important compound and has been shown to have potent anti-emetic activity by blocking serotonin. This chemical compound can cause the stomach to contract so that it can cause nausea.9 Nur Azizah said that ginger contains essential oils which have a refreshing effect and block the vomiting reflex, and gingerol content that can smooth the blood so that the nerves work properly.10

Apart from ginger, this study found respondents consumed date palm juice during pregnancy. In Indonesia, many dates are produced in the form of date juice. Date juice contains minerals, namely iron, which is essential for increasing hemoglobin levels. In line with research conducted by Raini that date palm juice can increase hemoglobin levels in pregnant women, this is supported by Natasha’s theory that hemoglobin forming factors such as Fe, B12, and folic acid are all found in dates.12 However, it must be noted that the iron content in dates as much as 0.90 mg is not sufficient to meet the iron needs of pregnant women if it is not accompanied by regular consumption of Fe tablets.

One type of special drink that functions for treatment and health care is date extract.11 Apart from ginger, this study found respondents consumed date palm juice during pregnancy. In Indonesia, many dates are produced in the form of date juice. Date juice contains minerals, namely iron, which is essential for increasing hemoglobin levels. In line with research conducted by Raini that found date palm juice can increase hemoglobin levels in pregnant women, this is supported by Natasha’s theory that hemoglobin forming factors such as Fe, B12, and folic acid are all found in dates.12 However, it must be noted that the iron content in dates, as much as 0.90 mg, is not sufficient to meet the iron needs of pregnant women if it is not accompanied by regular consumption of Fe tablets.

In this study, it was also found that respondents consumed honey during pregnancy. Respondents started using honey and herbs in the first trimester. After all, they did not want to take modern medicine because they felt that consuming honey and herbs was sufficient to meet nutritional needs during pregnancy and that herbs were safer to drink. The research found that honey contains vitamin C, vitamin A, iron, and vitamin B12, which form red blood cells and hemoglobin so honey can prevent anemia in pregnant women.

Table 2. Obstetric/maternal and health system factors associated with use of herbal medicine during pregnancy.

| Characteristics                      | Use herbal medicine | No herbal medicine | OR      | p-Value |
|--------------------------------------|---------------------|--------------------|---------|---------|
| Obstetric/maternal factors           |                     |                    |         |         |
| Age                                  |                     |                    |         |         |
| <20                                  | 6                   | 2                  | 7.98 (4.45–14.30) | <0.001 |
| 20–35                                | 58                  | 19                 |         |         |
| >35                                  | 8                   | 3                  |         |         |
| Used HM previous pregnancy           | 90                  | 6                  | 2.51 (1.21–5.19) | <0.001 |
| Parity                               |                     |                    |         |         |
| Nulliparous                          | 32                  | 7                  | 0.50 (0.25–0.98) | 0.042  |
| Primiparous                          | 28                  | 7                  |         |         |
| Multiparous                          | 14                  | 8                  |         |         |
| Number of ANC                        |                     |                    |         |         |
| <4                                   | 58                  | 12                 | 1.18 (0.72–1.96) | 0.508  |
| >4                                   | 10                  | 16                 |         |         |
| Health system factors                |                     |                    |         |         |
| Drugs access HM                      |                     |                    |         |         |
| Available                             | 12                  | 10                 | 0.64 (0.39–1.06) | 0.080  |
| Not available                         | 66                  | 8                  |         |         |
| Cost of health service               |                     |                    |         |         |
| Expensive                            | 8                   | 12                 | 1.49 (0.89–2.49) | 0.124  |
| Not expensive                        | 68                  | 8                  |         |         |
| Distance for HF                      |                     |                    |         |         |
| ≤5 km                                | 10                  | 15                 | 2.43 (1.46–4.05) | 0.001* |
| >5 km                                | 50                  | 21                 |         |         |

HF: health facility; HM: herbal medicine; OR: odd’s ratio; 95% CI: confidence interval.
Fischer’s exact test, *p-value significant (<0.05).
women. Honey is a supernatant sugar liquid and contains sugars in the form of fructose and glucose, which are monosaccharide sugars that the intestine can absorb. Honey also contains vitamins, minerals, amino acids, and aromatic ingredients.13

In cases of nausea and vomiting, including hyperemesis gravidarum, ginger can also be used as an anti-nausea and anti-vomiting agent. The maximum daily use is one gram of dry ginger powder. Additionally, garlic can boost a woman’s immune system, which helps develop a healthy fetus and newborn. Consumption garlic during pregnancy can prevent preeclampsia and protein retention in the urine.14 The use of herbs is an alternative treatment for respondents to reduce complaints such as problems in the digestive tract, namely nausea/vomiting. Some pregnant women already have the habit of consuming herbal medicine before becoming pregnant. Some pregnant women do not want to take modern medicine because they feel that consuming herbal honey is sufficient to meet nutritional needs during pregnancy and think that herbs are safer to consume.15

The use of herbal medicines must be considered to reduce the risk of fetal morbidity and mortality. Based on research, most women do not realize that the first trimester is the most critical period of pregnancy when fetal organogenesis occurs. Therefore, using herbal medicines during pregnancy is not recommended because some herbal treatments have not been scientifically proven and can have disadvantages such as fetal distress, premature birth, suppression of fetal growth, decreased fetal survival, and congenital abnormalities.16,17

The lifestyle that tends to return to nature causes people to prefer herbal medicine because it is believed to have no side effects, and the price is higher. The use of herbal medicines by the community is also based on religious factors. Thus, making decisions about the use of herbal medicines is not only based on belief, use, and the efficacy of herbal plants but also experience and is often associated with religious values. In this case, the role of midwives as health workers is needed. This states that the part of health workers must be able to be communicators and facilitators. The staff member must provide information to the patient. Giving data is indispensable to increasing public knowledge and attitudes toward health and disease. Counseling can be an effective intervention to increase knowledge, attitudes, and results of the practice of drug use during pregnancy.18

### Conclusion

Pregnant women at the Ciwaruga Public Health Center often utilize herbal remedies, which may indicate a lack of access to western-style conventional treatment. When deciding whether to use herbal remedies while pregnant, consider whether you have used them in previous pregnancies and whether you strongly believe in their efficacy and safety. Many people believe that herbal medications may be used as an alternate means of therapy, with oral administration being the most common technique. Because of these worries, it’s important to have community education campaigns and include qualified traditional herbal practitioners and everyone else in the community who has a say in how pregnant women’s health needs are met.

### Acknowledgements

The success of this research cannot be separated from the support of various parties. Authors are thankful to Padjadjaran University and Lincoln University College for academic support.

### Author contributions

All authors have contributed significantly and all authors agree with the content of the manuscript.

### Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

### Ethics approval and consent to participate:

In this study, researchers obtained ethical approval from the Padjadjaran University. This paper has already to Ethics Clearance No. 279/UN6.KEP/EC/2019. This survey maintained anonymity, and the data collected was kept private and used for research purposes only. The parents of the participants signed informed consent before the research process.

### Table 3. Multivariable logistic regression model for use of herbal medicines.

| Characteristic                              | AOR          | p-Value |
|--------------------------------------------|--------------|---------|
| Age (<35/≥35 years)                        | 1.05 (0.42–2.60) | 0.915   |
| Self-medication (yes/No)                   | 1.10 (0.46–2.61) | 0.835   |
| Perception (effective/not effective)       | 2.18 (1.02–4.66) | 0.044*  |
| Distance from health facility (>5 km/≤5 km)| 1.45 (0.71–2.97) | 0.310   |
| Ever used herbal medicine (yes/no)         | 3.87 (1.46–10.25) | 0.006*  |

HM: herbal medicine; OR: odd’s ratio; 95% CI: confidence interval.
*p-Value significant (<0.05).
Significance for public health

There is a correlation between the educational level of women, the family income level, and the age of women when it comes to the usage of herbal medication during pregnancy. During pregnancy, herbal remedies were used to cure nausea and vomiting, lower the risk of pre eclampsia, hasten the labour process, and treat conditions such as the common cold and urinary tract infection. Concerningly, a number of herbs that have been shown to have unfavourable effects on pregnancy and the developing fetus were also utilized often in this study. The vast majority of pregnant women utilized these herbs during the first trimester, which is widely recognised as being the most important stage of pregnancy. As pregnant women need more care so they should be taught about the dangers of herbal remedies and the significance of seeking medical advice from a healthcare expert before using herbal medicine.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

References

1. Jahan S, Mozumder ZM and Shill DK. Use of herbal medicines during pregnancy in a group of Bangladeshi women. *Heliyon* 2022; 8(1): e08854.
2. Sarecka-Hujar B and Szulc-Musioł B. Herbal medicines—are they effective and safe during pregnancy? *Pharmaceutics* 2022; 14(1): 171.
3. World Health Organization. Access to medicines and health products programme products programme annual report, https://apps.who.int/iris/bitstream/handle/10665/342314/WHOEURO-2021-2104-35776-47442-eng.pdf?sequence=3&isAllowed=y (2021, accessed 20 December 2021).
4. Nabiryé J and Josephine N. Prevalence of herbal medicine use among pregnant women in Zirobwe Health Centre III, Luwero District in Uganda. *Stud J Health Res Afr* 2021; 2(9): 12.
5. Kaadaaga HF, Ajeani J, Ononge S, et al. Prevalence and factors associated with use of herbal medicine among women attending an infertility clinic in Uganda. *BMC complement Altern Med* 2014; 14(1): 1–6.
6. Thipanyane MP, Nomathala SC, Oladimeji O, et al. Perceptions of pregnant women on traditional health practices in a rural setting in South Africa. *Int J Environ Res Public Health* 2022; 19(7): 4189.
7. Musiana HR, Tuharear and Saing Z. Disclosure of herbal medicines use on mother and children health care in Temate Island Indonesia. *Univers J Public Health* 2021; 9(6): 492–498.
8. Notoatmodjo S. *Metodologi penelitian kesehatan (VI).* Jakarta: PT Rineka Cipta, 2022.
9. Febrinata F and Delfina V. Pengaruh Pemberian Minuman Jahe Dan Daun Pandan Terhadap Frekuensi Mual Muntah Pada Ibu Hamil Trimester I. *Jurnal Ilmu Kependidikan Dan Kebidanan* 2021; 12(9): 47–57.
10. Azizah N, Kundra Jim and Novelia S. The effect of ginger decoction on emesis gravidarum among trimester I pregnant women. *Nurs Health Sci J* 2022; 2(1): 5–9.
11. Arianti SA and Yuliani M. Efektifitas minuman jahe (zingiber officinale) dan sari kurma (phoenix dactylifera) untuk mengurangi hiperemesis gravidarum. *Holistik Jurnal Kesehatan* 2021; 15(3): 546–553.
12. Panjaitan R, Husna N, Zega AD, et al. Effect of giving date drinks on the increase in hemoglobin in pregnant women with anemia at Grandmed Lubuk Pakam Hospital. *Jurnal Kebidanan Kestra* 2021; 4(1): 21–24.
13. Samal J. Ayurvedic preparations for the management of Iron Deficiency Anemia: A systematic review. *Ayu* 2016; 37(3–4): 163–169.
14. Ladelo T. Herbal medicine use during pregnancy: benefits and untoward effects. In: Builders PF (ed.) *Herbal medicine*. London: Intech Open, 2018, pp. 103–119.
15. Rianti R, Choiruniss R and Rukmaini R. Pengaruh Pemberian Madu Terhadap Kadar Hemoglobin Ibu Hamil Trimester III di BPM Ny “T” Kecamatan Purwadadi Kabupaten Subang. *Jurnal Kebidanan Kestra* 2021; 13(2): 148–155.
16. Makhapila M, Makalliwa G and Mong’are S. Complementary and alternative medicine utilization among pregnant women attending antenatal care clinics in Tongaren Sub-County, Kenya: a cross-sectional survey. *Women Midwives and Midwifery* 2022; 2(1): 65–83.
17. Millinga VP, Im HB, Hwang JH, et al. Use of herbal medicines among breastfeeding mothers in Tanzania: a cross-sectional study. *Front Pharmacol* 2022; 13: 751129.
18. Alemu Anteneh T, Aklilu Solomon A, Tagele Tamiru A, et al. 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. *Drug Healthc Patient Saf* 2022; 14: 37–49.