

Original Paper

Not-prescribed Use of Herbal Products and Supplements Among Pregnant Women



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ABSTRACT

Introduction: Not-prescribed use (NPU) of herbal products and supplements during pregnancy is a potent risk for both mother and fetus and a big challenge for anesthesiologists. However, little is known about this topic in Guilan Province, Iran.

Objective: This study aimed to determine how pregnant women take supplements and herbal medications.

Materials and Methods: This analytical cross-sectional study was conducted in 2022. Eligible pregnant women enrolled in the survey, and a checklist containing items about maternal demographic data and the maternal pattern of herbs and supplements used during pregnancy was filled out through a face-to-face interview. Multivariate logistic regression, the Chi-square, and the Mann-Whitney U statistical tests were used to analyze the data.

Results: The data from 682 women were analyzed. A total of 488 women (71.6%) were less or equal to 30 years old; 498(73%) lived in urban areas; 508(74.5%) were homemakers; 444(65.1%) had under-diploma or diploma education, 292(42.8%) were gravid one or 251(36.8%) gravid two. In addition, 25.1% reported using at least one herbal remedy during pregnancy, and 90% took supplements; 0.7% had NPU of supplements and 93.6% took herbal products. About 10% did not take any supplements. Iron (23.3%) and folic acid (23.1%) were the most frequently taken supplements, and thyme (20.2%) and mint (17.5%) were the most commonly taken herbs. Using logistic regression, we found that urbanization (OR=1.91, 95% CI, 1.6%, 3.14%, P=0.01), employment (OR=2.21, 95% CI; 1.46%, 3.33%, P=0.0001), and higher gravidity (OR=2.03, 95% CI; 1.22%, 3.36%, P=0.006) increases the probability of consuming supplements and herbal products during pregnancy.

Conclusion: The lack of physicians' supervision of the herbal therapy process among pregnant women in an academic center was worrying. However, most women received the supplements based on healthcare professionals' advice. A few women did not take essential supplements.

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Highlights

- Consumption of herbal products or supplements among pregnant women is prevalent.
- Urbanization, higher gravidity, and being employed were associated with a higher probability of consuming herbal products and supplements.
- Iron, folic acid, thyme, and mint were the most commonly taken supplements and herbs.

Plain Language Summary

Not-prescribed use (NPU) of supplements or herbal products during pregnancy is common among pregnant women, as they prefer to relieve their complications, such as nausea and vomiting, with natural components. However, due to the potential risks of this behavior during pregnancy, it should be avoided until strong evidence of safety is available.

In this study, 90% of pregnant women used supplements during pregnancy, while only 0.7% were NPU. About 25.1% took herbal remedies at least once during pregnancy, while 93.6% took NPU. Iron and folic acid were the most commonly used supplements, and thyme and mint were the most frequently taken herbs. It was also found that urbanization, employment, and higher gravidity increased the probability of consuming supplements and herbal products during pregnancy.

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Introduction

Not-prescribed use (NPU) of complementary supplements and herbal medicine during pregnancy has been increasing over the past two decades.

Studies have demonstrated that the prevalence of herbal use during pregnancy ranges from 1% to 60% in different societies [1]. Several studies have shown that middle-aged white people with higher levels of education and better economic status tend to use supplementations more than others [2]. Regarding supplements during pregnancy, the use of the necessary and recommended ones by physicians, such as acid folic, is essential, while NPU of them could be harmful [3-5]. Today, herbal and complementary supplements with different properties, especially for pregnant women, are readily available at local herb markets and pharmacies and sold at a lower cost. Some factors justify their higher use among pregnant women; pregnancy is associated with several complications such as nausea and vomiting, constipation, and fatigue that sometimes are not sufficiently treated by conventional medical treatments. In addition, pregnant women prefer to relieve their symptoms with these natural components, which are presumed safer compared to industrial drugs [6-8]. However, due to the passage of active ingredients of the herbs through the placental barrier and reaching the fetus, the safety of herbal products during pregnancy is

debatable [9]. According to a recent systematic review, the use of herbal medicinal products during pregnancy should be avoided until strong evidence of safety is available [10]. NPU of herbal products or supplements during pregnancy is also a challenge for anesthesiologists. Some pregnant women are candidates for cesarean section due to obstetrics indications, and some should receive general anesthesia in certain conditions despite several disadvantages of regional anesthesia [11, 12].

In this regard, dietary supplements, vitamins, or herbs could significantly interfere with the anesthetic drugs. Hemodynamic fluctuations, nausea and vomiting, altered drug metabolism, intraoperative arrhythmias, hypoglycemia, allergic reactions, increased bleeding, increased sedative effects of anesthetics, and cardiovascular instability may occur. Therefore, it is necessary to discontinue them at a certain time before operation [13]. In general, if the type of supplementation or herbs is unknown, it is recommended to stop them at least two weeks before delivery [14]. The consumption status of herbs and supplements is affected by the regions, ethnic backgrounds, cultures, and demographics [15]. Therefore, a better understanding of the conditions in each area seems vital to help improve mother-infant health programs and policies. The frequency of consumption of herbal products was investigated [16], which was valuable in this field. However, it had many defects, and the main problem was the non-prescribed

consumption of the herbs, and the status of receiving supplements was not investigated. Therefore, this study aimed to examine the pattern of arbitrary consumption of herbal products and supplements among pregnant women.

Materials and Methods

This analytical cross-sectional study was conducted on pregnant women who were referred to an academic center affiliated with Guilan University of Medical Sciences (GUMS) for vaginal or cesarean delivery in 2022. The center performs 3500 to 4000 deliveries annually. According to the inclusion criteria, 682 mothers entered this study.

The inclusion criteria were women with term pregnancy admitted to an academic referral center in Rasht City for delivery, living in Guilan Province, being able to communicate, and having a stable hemodynamic status. The exclusion criteria were women who did not give informed consent for any reason and referral pregnant women as they might have different traditions in the consumption of herbal components or supplements.

A researcher-made questionnaire containing questions about maternal demographic data (age, education, residency, and occupational status) and the maternal pattern of herbs and supplements used during pregnancy was used. The questionnaire items were presented to 10 Obstetrics and Anesthesiology Department faculty members, and they confirmed its validity. The reliability of the questionnaire was not assessed due to the type of questions. All questions were answered by "yes" or "no." At the beginning of the interview, enough information about the study was provided to all 682 eligible mothers, and an herbal compound was described as any remedy product from herbs to prevent or cure illness or achieve better health [10]. Then, their written consent was obtained. A medical student filled out the questionnaire through a direct interview on the day after delivery.

The face-to-face interview was chosen because it would provide more comprehensive and reliable information than a self-administered questionnaire.

The collected data were entered into and analyzed using the SPSS software, version 21. Percentages and frequencies were used to express different variables. The chi-square and Mann-Whitney U tests were performed to analyze the data. Multivariate logistic regression analysis determined factors associated with herbal

products and supplemental use. Odds ratio (OR) with a 95% confidence interval (CI) were also calculated. A $P < 0.05$ was considered statistically significant.

Results

A total of 710 women were interviewed, with a response rate of 96.3% (28 refused to participate). The data from 682 participants, with a mean age of 28.01 ± 5.33 (18-42) years, were analyzed. A total of 488 women (71.6%) were less or equal to 30 years old, 498 (73%) lived in urban areas, 508 (74.5%) were homemakers, 444 (65.1%) had under diploma or diploma grades, 292 (42.8%) were gravid one and 251 (36.8%) gravid two. Also, 49 participants (7.2%) reported no consumption of herbal products or supplements, and 121 (17.7%) used both herbal products and supplements during pregnancy. In addition, 614 (90%) took supplements and 140 (20.5%) used herbal products during pregnancy. About 93.6% used herbal products without healthcare professionals' supervision (Table 1).

Iron (23.3%) and folic acid (23.1%) were the most frequent ones in supplements, and thyme (20.2%) and mint (17.5%) were the most taken herbs among pregnant women (Table 2). Residency, gravidity, and occupation status had a significant relationship with using supplements and herbal products (P). Also, age ($P = 0.02$) and education ($P = 0.01$) had relationships with herbal product consumption (Table 3).

Logistic regression analyses (Table 4) found that living in urban areas increases the probability of using supplements during pregnancy by 3.59 times compared to rural residents (OR=3.59, 95% CI; 2.05%, 6.3%, $P = 0.0001$). It was also found that women with gravid II were 2.7 times more likely to use supplements during pregnancy than women with gravid I (OR=2.75, 95% CI; 1.1%, 6.86%, $P = 0.029$), and being employed increases 2.47 times the probability of taking supplements during pregnancy (OR=2.47, 95% CI; 1.16%, 5.22%, $P = 0.018$). In terms of herbal use, it was found that urbanization increases the probability of consuming herbal products during pregnancy by 1.91 times compared to rural residents (OR=1.91, 95% CI; 1.6%, 3.14%, $P = 0.01$).

Moreover, Table 5 presents the logistic regression model for variables related to herbal products. The results showed that gravid II women were 1.72 times more likely to consume herbal products during pregnancy than gravid I women (OR=1.72 95% CI; 1.05-2.82, $P = 0.029$) and gravidity III were 2.03 times more likely to consume herbal products than women with gravid

Table 1. Individual and social characteristics of the studied pregnant women and using herbal products and supplements during pregnancy

Variables		No. (%)
Age (y) Mean±SD (Min-Max): 28.01±5.33 (18-42)	≤30	488(71.6)
	>30	194(28.4)
Educational status	Illiterate	8(1.2)
	Elementary-middle school	138(20.2)
	Under diploma-diploma	444(65.1)
	Academic	92(13.5)
Residency	Urban	498(73)
	Rural	184(27)
Gravidity	One	292(42.8)
	Two	251(36.8)
	Three	103(15.1)
	Four	31(4.5)
	Five	5(0.7)
Occupational status	Employed	174(25.5)
	Housewife	508(74.5)
Time to use supplements	1 st three months	43(7)
	1 st and 2 nd trimesters	28(4.6)
	2 nd and 3 rd trimesters	18(2.9)
	1 st , 2 nd and 3 rd trimesters	525(85.5)
Recommending person	Health care professionals	610(99.3)
	Other	4(0.7)
Time to use herbal products	1 st trimester	52(37.1)
	2 nd trimester	13(9.3)
	3 rd trimester	23(16.4)
	1 st and 2 nd trimesters	3(2.1)
	1 st , 2 nd and 3 rd trimesters	49(35)
Recommending person	Healthcare professionals	9(6.4)
	Other	131(93.6)

Table 2. The frequency of consumption of various herbal products and supplements during pregnancy by responders

Herbal Product (Common Name, Scientific Name)	Herbs	Use	Administration	Reason for Use or Expected Therapeutic Effects	No. (%)	Supple- ments	No. (%)
Thyme (Thymus Ulgaris)	Oregano genus Origanum	Flowers, leaves, and oil	Taken by mouth	Bronchitis, whooping, cough, sore throat, stomach pain	60(20.2)	Iron	594(23.3)
Mint (Mentha)	Lamiaceae	Fresh or dried leaves	Taken by mouth	Queasy stomachs, calming stress, promoting restful sleep.	52(17.5)		
Ginger (Zingiber officinale)	Zingiberaceae	Roots (rhizome)	Taken by mouth	Nausea, upset stomach, and other stomach issues	38(12.8)	Folic acid	589(23.1)
Cinnamon (Cinnamomum verum)	Laurels	Bark	Taken by mouth	Irritable bowel syndrome or other gastrointestinal problems, the common cold, flu	31(10.4)		
Others	-	-	Taken by mouth	-	28(9.4)	Multivitamins	493(19.3)
Chicory (Cichorium intybus)	Asteraceae (Daisy family)	Flowers	Taken by mouth	Appetite stimulant, gallstones, gastroenteritis, sinus problems	21(7.1)	Calcium	443(17.3)
Green tea (Camellia sinensis)	Theaceae	Leaves	Taken by mouth	Mental alertness, digestive symptoms, headaches, weight loss.	18(6.1)		
Borage flower (Borago officinalis)	Boraginaceae	Flowers and leaves	Taken by mouth	Fever, cough, depression, increase urine flow, prevent inflammation of the lungs, sedative	12(4)	Vitamin D	243(9.5)
Quince seeds (Cydonia oblonga)	Rosaceae	Seeds	Taken by mouth	Coughing, bronchitis, asthma, nausea, morning sickness, digestive issues	9(3)		
Fennel (Foeniculum vulgare)	Umbellifers	Dried seeds	Taken by mouth	Digestive problems, heartburn, intestinal gas, bloating, loss of appetite	5(1.7)	Omega 3	106(4.1)
Musk willow (Salix aegyptiaca)	Willow	Bark	Taken by mouth	Fever, chronic and acute inflammation, pain, and infection, treat anemia and vertigo	5(1.7)		

Herbal Product (Common Name, Scientific Name)	Herbs	Use	Administration	Reason for Use or Expected Therapeutic Effects	No. (%)	Supple- ments	No. (%)
Orange blossom (Citrus sinensis)	Rutaceae	Flower	Taken by mouth	Stomach ache, anxiety and insomnia	4(1.3)	Vitamin C	41(1.6)
Jujube (Ziziphus)	Buckthorns	Seeds, fruit, and bark	Taken by mouth	Bone health, anxiety, insomnia, appetite stimulant or digestive aid	4(1.3)		
Camel thorn (Vachellia erioloba)	Legumes	Whole plant	Taken by mouth	Diaphoretic, diuretic, expectorant and laxative aid	3(1)	Zinc	39(1.5)
Carrot seeds (Carota sativa)	Umbellifer	Seeds	Taken by mouth	Cholesterol lowering, anti-bacterial, anti-fungal, anti- inflammatory, analgesic, and wound healing	3(1)		
Licorice (Glycyrrhiza glabra)	Fabaceae	Roots	Taken by mouth	Cough, bacterial, and viral infections	2(0.7)	Other	7(0.3)
Lemon (Citrus limon)	Rutaceous	Fruit	Taken by mouth	Common cold, flu, kidney stones	2(0.7)		

Table 3. The relationship between study sociodemographic variables and the maternal pattern of herbs and supplements uses

Variables	Mean±SD/No. (%)			P	Mean±SD/No. (%)		P
	Herbal Product				Supplement		
	Status	Yes	No		Yes	No	
Age (y)		28.9±4.86	27.79±5.43	0.02*	28.08±5.4	27.44±4.72	0.408*
Education	Illiterate	5(62.5)	3(37.5)	0.01**	8(100)	0 (0)	0.136**
	Elementary-middle school	22(15.9)	116(84.1)		129(93.5)	9(6.5)	
	Under diploma-diploma	97(21.8)	347(78.2)		399(89.9)	45(10.1)	
	Academic	16(17.4)	76(82.6)		78(84.8)	14(15.2)	
Residency	Urban	114(22.9)	384(77.1)	0.012**	462(92.8)	36(7.2)	0.0001**
	Rural	26(14.1)	158(85.9)		152(82.6)	32(17.4)	
Gravidity	One	55(18.8)	237(81.2)	0.006**	254(87)	38(13)	0.018**
	Two	43(17.1)	208(82.9)		227(90.4)	24(9.6)	
	Three and more	42(30.2)	97(69.8)		133(95.7)	6(4.3)	
Occupational status	Employed	55(31.4)	120(68.6)	0.0001**	166(94.9)	9(5.1)	0.013**
	Housewife	85(16.8)	422(83.2)		448(88.4)	59(11.6)	

*The Mann-Whitney U test, **The chi-square test.

Table 4. Related variables to use of supplements by regression model

Variables	B	SE	Wald	df	P	OR	95% CI	
							Lower	Upper
Urban	1.280	0.287	19.959	1	0.0001	3.597	2.051	6.308
Gravid II	1.015	0.465	4.761	1	0.029	2.759	1.109	6.865
Being employed	0.905	0.382	5.594	1	0.018	2.471	1.168	5.228
Constant	-25.714	13637.041	0.0001	1	0.998	0.0001		

Table 5. Related variables to use of herbal products by regression model

Variables	B	SE	Wald	df	P	OR	95% CI	
							Lower	Upper
Urban	0.650	0.253	6.584	1	0.010	1.915	1.166	3.145
Gravid II	0.546	0.250	4.756	1	0.029	1.726	1.057	2.820
Gravid III & higher	0.709	0.258	7.568	1	0.006	2.031	1.226	3.365
Being employed	0.794	0.209	14.407	1	0.000	2.211	1.468	3.331
Constant	-1.968	0.774	6.465	1	0.011	0.140		

I (OR=2.03, 95% CI; 1.22%, 3.36%, P=0.006). Furthermore, being employed increases 2.21 times the probability of consuming herbal products during pregnancy compared to non-employed women (OR=2.21, 95% CI; 1.46%, 3.33%, P=0.0001).

Discussion

Non-prescribed and unreported use of herbs and supplements is a huge concern for anesthesiologists as they may cause serious drug interactions [17-19]. This geographical and ethnic study was conducted to estimate the frequency of use and the micronutrient contribution of dietary supplements among pregnant women. Many studies report that consumption of herbal products during pregnancy in Iran ranges from 19.2% to 71.3% [19-22], while this study shows that the frequency of consumption of herbal substances is 20.5%.

Thyme and mint were the most commonly used herbs in our study, while in other populations, topical almond oil [2], ginger [23], and ginseng [24] were the most

popular ones. Regarding supplementations, this study revealed that 10% of the women do not take complementary medicine.

Jun et al. investigated the prevalence of the consumption of dietary supplements among pregnant women in the United States. They reported that 77% of pregnant women used at least one dietary supplement, while half of them used supplements as recommended by physicians. Among pregnant women, those aged 20 to 34 in the first trimester of pregnancy and a lower-income family were less likely to take supplements. Most pregnant women took supplements that contributed nutrients in higher doses than the recommended allowable doses. On the other hand, inadequate intake of necessary nutrition components was of concern among pregnant women not taking supplements. They suggested a potential need for healthcare providers to discuss the importance of the correct supplement use at recommended doses during prenatal visits [25].

Despite that, most cases had physicians' orders, as some are essential during pregnancy. Particular attention should be paid to this small percentage, and the reason for not taking supplements such as folate and iron should be searched for. It should be noted that the problem is worldwide spread, and studies reported that it is nearly universal and polypharmacy is common [25, 26].

Regarding the consumption pattern of herbal products, it was revealed that more than half of the women took them in the first trimester. It was also found that younger ages, higher levels of education, urbanization, and occupation were significantly related to higher herb consumption. Most women use supplements during the whole pregnancy, and urbanization and occupation have a significant relationship with using more supplements.

In the study by Facchinetti et al. in Italy, half of the subjects reported using herbal products once at least during pregnancy, and more than one-quarter had a regular daily intake of herbal compounds [2]. Sattari et al. reported that 44.9% of the women took herbal products during pregnancy without a physician's advice. Also, 39.8% believed these components could be used safely with no caution [27]. Soleimani et al. reported that only 19.2% of their samples used herbal medicines during pregnancy, but most were not supervised by a physician [22]. A study by Karimian in Kashan City in the center of Iran showed that more than 50% of the studied pregnant women used medicinal herbs. They found that subjective norms were the main predictor of herbal usage [20]. In Yazdi et al. study in one of the southern provinces of Iran, it was demonstrated that about half of women used herbal therapy and other self-medicated complementary alternative medicine [19]. Different cultures, beliefs, and ethics could justify the reason for the discordance among studies. In addition, the method of data collection was not the same. A direct interview after or before delivery will yield more reliable results than other methods, such as national registries or questioning times after childbirth. Indeed, the way and timing of the interview affect the quality and precision of the gathered information. Vegetation of different areas, availability of medicinal supplements and herbal products according to the rules, and strictness in pharmaceutical systems are also influential factors.

This study assessed the prevalence of NPU of both herbal products and supplements during pregnancy in an academic referral hospital. However, excluding the private sector should be considered as the limitation

of the survey. Furthermore, the possibility of forgetting and being unable to accurately recall the consumption pattern, especially in the case of herbs, should be accepted as another research limitation.

Our suggestion for future studies is to evaluate the relationship between NPU of herbs and supplements and pregnancy outcomes and fetus abnormalities by considering influential factors such as genetics, parenteral social and economic status, and other environmental factors [28].

This study concludes that herbal use during pregnancy is almost popular but worrisome because healthcare professionals do not recommend their usage. In contrast, supplements are based on health care professionals' advice. The main concern relates to pregnant women not using supplements and, consequently, having inadequate intakes of folate and iron. Healthcare providers should pay enough attention and discuss NPU herbal products and necessary supplementation during pregnancy.

Ethical Considerations

Compliance with ethical guidelines

The [Guilan University of Medical Sciences](#) Research Ethics Committee approved the study protocol and registered it (Code: IR.GUMS.REC.1400.498).

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Authors' contributions

Conceptualization and study design: Gelareh Biazar and Misa Naghdipour Mirsadeghi; Data analysis and data interpretation: Zahra Rafiei Sorouri and Seyed Mohamadreza Tabatabaei Taher; Drafting of the manuscript: Fatemeh Hosseinzadeh and Sara Farzadi; Statistical analysis: Mandana Mansour Ghanaie; Critical revision of the manuscript for important intellectual content: Gelareh Biazar, Fatemeh Hosseinzadeh, and Mandana Mansour Ghanaie; Final approval: All authors.

Conflict of interest

The authors declared no conflict of study.

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