

Use of herbal drugs in pregnancy: a survey among 400 Norwegian women[†]

Hedvig Nordeng MScPharm^{1*} and Gro C. Havnen MScPharm^{1,2}

¹Department of Pharmacotherapeutics, University of Oslo, Oslo, Norway

²Department of Pharmacognosy, School of Pharmacy, University of Oslo, Oslo, Norway

SUMMARY

Purpose To investigate the use of herbal drugs by pregnant women.

Methods We interviewed 400 postpartum women at Ullevål University Hospital in Oslo, Norway about the use of herbal drugs, within 3 days after giving birth by using a structured questionnaire in the period from February to June 2001.

Results We found that 36% of the pregnant women had used herbal drugs during pregnancy with an average of 1.7 products per woman. The proportion of women using herbal drugs increased throughout the first, second and third pregnancy trimester. The most commonly used herbs were echinacea, iron-rich herbs, ginger, chamomile and cranberry. Among the women having used herbal drugs in pregnancy, 39% had used herbal drugs that were considered possibly harmful or herbs where information about safety in pregnancy was missing. Herbal galactagogues had been used by 43% of the women who had breastfed a prior child during their breast-feeding period. Use of herbal drugs in pregnancy had most commonly been recommended by family or friends.

Conclusion The widespread use of herbal drugs during pregnancy indicates an increased need for documentation about the safety of herbal drugs in pregnancy. To meet the needs of pregnant women, it is necessary for health care personnel to have knowledge about herbal drugs during pregnancy. Copyright © 2004 John Wiley & Sons, Ltd.

KEY WORDS — herbal drugs; complementary/alternative medicine (CAM); pregnancy; breast-feeding; pharmacoepidemiology

INTRODUCTION

Historically, women have used herbal drugs in pregnancy to treat pregnancy related illnesses and for their own health and well-being. During the last decade, an important increase in the use of herbal drugs and alternative medicine has been seen in Europe, USA and Australia.¹ A study by Eisenberg *et al.* showed that the use of herbal drugs in the USA had increased by almost 500% from 1990 to 1997.² Among more than

2000 American men and women, 12.1% had used herbal drugs in 1997.² Most studies show that women use alternative medicine to a greater extent than men.² Herbal drugs are often promoted as 'natural' and 'safe' alternatives to conventional drugs. These claims may especially appeal to pregnant women who are often concerned about their unborn child's well-being.

Herbal drugs are not currently subject to the same regulations as conventional drugs. There is little or no testing of purity, safety, or teratogenicity. Recently, there has been great focus on adverse effects of herbal drugs in medical literature.³ An important increase in inquiries about the safety of herbal drugs in pregnancy was noted in 1996 by a Canadian pregnancy and breast-feeding information centre, the Mother-Risk Centre.⁴ Also, the Department of Pharmacotherapeutics at the

*Correspondence to: Hedvig Nordeng, Department of Pharmacotherapeutics, University of Oslo, P.O. Box 1065 Blindern, N-0407 Oslo, Norway. E-mail: h.m.e.nordeng@labmed.uio.no

[†]No conflict of interest was declared.

University of Oslo, Norway, has noted an increased request for information about herbal drugs. There has been few studies on the use of herbal drugs in pregnancy. A recent survey from California found that 13% women had used dietary supplements during pregnancy. The response rate however, was low (24%).⁵ Two Finnish studies from 1991 and 1988 found that 4 and 14% of the women had used dietary supplements and/or herbal drugs respectively.⁶ These two studies however, were designed to evaluate the use of conventional drugs in pregnancy, and may have underestimated the use of herbal drugs.

The aim of the present study was to investigate the use of herbal drugs during pregnancy among 400 Norwegian women, as well as the indications for use in pregnancy. In addition, we wished to investigate who recommended the use of herbal drugs to the pregnant women.

MATERIALS AND METHODS

Study population

All women who gave birth at Ullevål University Hospital in Oslo, Norway, from February to March 2001 were evaluated continuously for study eligibility and thereafter asked to participate in the study. In all, 400 women fulfilling study inclusion criteria were interviewed within 3 days after childbirth at the post-natal ward.

Only women with a Norwegian name and nationality were included in the study, as other women may have different traditions in the use of herbal drugs. Women with a child in the intensive care unit were excluded from the study to avoid the extra burden of participation might mean.

The Regional Ethics Committee recommended the study. The women received written and oral information about the study. Thereafter, written consent was obtained. The women were informed that all the information collected was stored anonymously, and that no prior knowledge was required to participate in the study.

Data collection

The data were collected through a structured interview by a specially trained pharmacist. Each interview lasted approximately 20 minutes.

Variables

The participants were explained the definition of herbal drugs at the introduction to the study interview.

Herbal drugs were defined as all types of products (oral and dermal) that were manufactured from herbs or contained herbs as the major component. It was also required that the herbs were used to obtain better health.

The name of the herbal drug, administration form, duration and time of use in pregnancy was recorded. The use of 10 herbs was specifically asked for: echinacea, St. John's wort, valerian, ginkgo, horsetail, sage, dandelion, bearberry, hops and lemon balm. These herbs were chosen since they were found in herbal preparations that were approved by the Norwegian Medicines Agency as 'herbal pharmaceuticals' and sold mostly through pharmacies. In addition, an open-ended question was asked to identify all other herbal drugs used during pregnancy. When two different products with the same herb had been used (i.e. oral and dermal use of St. John's wort), it was coded as use of one herb, but two different products. The number of days the women had used a herbal drug were summed, and coded 1–3 days, 4–7 days, 8–14 days or >2 weeks. The total duration of use of herbal drugs in pregnancy could exceed 280 days (length of pregnancy) if more than one herbal drug was used continuously in pregnancy.

The herbs were classified as not harmful, insufficient information, or possibly harmful. References for this classification were published articles and drug monographs evaluating safety in pregnancy (Table 1).^{7–10} Among the herbal drugs classified as possibly harmful were St. John's wort (oral), sage, ginkgo, lemon balm, bearberry, Chinese herbs, diuretics, composed herbal teas of unknown origin, ginseng, parsley, long-term use of nestle or chamomile, cranberry instead of antibiotics to treat urinary tract infections (UTI), raspberry leaves in 1st or 2nd trimester, some essential oils, and herbal drugs used to loose weight.

Other questions included 'Have you used any herbal drugs before you became pregnant?' (yes/no), 'Do you think you will use herbal drugs in the future?' (yes/no), 'Have you used homeopathic drugs in pregnancy?' (yes/no), 'If you previously have breastfed, did you use herbal galactogogues during your breast-feeding periode?' (yes/no). Open-ended questions were asked about where the woman would seek information about use of herbal drugs (coded as pharmacy, herbal store, doctor, homeopath/alternative practitioner, family/friends, internet, books or other) and who recommended use of herbal drugs in pregnancy (coded as own initiative, healthcare personnel, homeopath/alternative practitioner, herbist, family/friends, books/magazines/media/internet or other). Also, the woman was questioned about the

Table 1. Traditional use and documentation of effect and safety in pregnancy

English name of herbal drug (<i>latin name</i>)	Traditional use	Documentation of effect	Documentation on safety in pregnancy
Herbs classified as not harmful to use in pregnancy			
Echinacea (<i>Echinacea purpurea</i>)	Cold, immune stimulation, dermal use: wound healing	The majority of the available studies report positive results. However, there is not enough evidence to recommend a specific echinacea product for the treatment or prevention of common colds. ¹¹	One prospective study suggests that gestational use of echinacea during organogenesis is not associated with an increased risk for major malformations. ¹²
Iron rich herbs	Iron supplementation	The effect of iron supplementation to prevent low haemoglobin is well established. ¹³	No reports on adverse pregnancy outcome after use of iron in human studies.
Ginger (<i>Zingiber officinalis</i>)	Nausea	Studies suggest that 1 g ginger daily is effective against nausea in pregnancy. ¹⁴	No reports on adverse pregnancy outcome in human studies. ⁹
Aloe (<i>Aloe vera</i>)	Dermal use: wound healing, skin disorder	Traditional use supports effect on wound healing, though clinical effectiveness of topical <i>Aloe vera</i> is not sufficiently documented at present. ¹⁵	Dermal use during pregnancy is not thought to be any cause of concern. ¹⁰
Wheat germ oil (<i>Triticum germinis oleum</i>)	Dermal use: skin softener, stretch marks, oral use: E-vitamin supplementation	Clinical effectiveness of topical wheat germ oil is not documented.	Dermal use during pregnancy is not thought to be any cause of concern. No adverse pregnancy outcome associated with intake of vitamin E. ⁹
Dandelion (<i>Taraxacum officinalis</i>)	Diuretic, urinary tract infections (UTI), digestive problems	Limited scientific documentation, although long time use as a traditional herbal drug. ¹⁰	No known problems with the use of dandelion in pregnancy. ¹⁰ Oedema alone in pregnancy should not be treated pharmacologically. UTI should be treated with antibiotics in pregnancy.
Herbs where information about safety in pregnancy is insufficient			
Black elderberry (<i>Sambucus nigra</i>)	Influenza	Only one published study showing clinical effect is published. ¹⁶	No human studies or case reports.
Cranberry (<i>Vaccinium macrocarpon</i>)	Prevention and treatment of UTI	There is yet no conclusive evidence to recommend cranberry juice for the prevention or treatment of UTIs. ^{17,18}	No human studies. UTI should be treated with antibiotics in pregnancy.
Horsetail (<i>Equisetum arvense</i>)	Diuretic, UTI, anti-rheumatic, nutritional supplement	Limited scientific documentation, though long time use as a traditional herbal drug.	No human studies or case reports. Oedema alone in pregnancy should not be treated pharmacologically. UTI should be treated with antibiotics in pregnancy.
Hops (<i>Humulus lupulus</i>)	Calmng, digestive problems, headache	Poor documentation on effect in humans, though long time use as a traditional herbal sedative. ¹⁰ One study shows effect on sleep disorders in combination with valerian. ¹⁹	No human studies or case reports. Possible oestrogenic activity. ¹⁰
Valerian (<i>Valeriana officinalis</i>)	Insomnia, restlessness	Studies show demonstrated positive effects on sleeping disorders. ²²	Four human reports do not indicate increased risk to the foetus. ⁹ Frequently used in some countries, also in pregnancy, without negative pregnancy outcome reported. ³⁰

(Continues)

Table 1. Continued

English name of herbal drug (<i>latin name</i>)	Indications of use	Documentation of effect	Documentation on safety in pregnancy
Herbs classified as potentially harmful in pregnancy			
Sage (<i>Salvia officinalis</i>)	Digestive problems, excessive transpiration, decrease milk production, mouthwash against oral infection	Lacking documentation on effect in humans, though long time use as a traditional herbal drug. ¹⁰	No human studies or case reports. Relatively high toxicity of essential oil in sage. Traditionally reputed to be an abortifacient and to affect the menstrual cycle. ¹⁰
St. John's wort (<i>Hypericum perforatum</i>)	Antidepressant, tranquiliser, sedative, dermal: wound healing	There is evidence that extracts of St. John's wort are more effective than placebo for the short-term treatment of mild to moderately severe depressive disorders. ²⁰	No negative pregnancy outcome report from two women using St. John's wort in pregnancy. ²¹
Lemon balm (<i>Melissa officinalis</i>)	Calming, colic	Poor documentation on effect in humans, though long time use as a traditional herbal sedative. ¹⁰ One study shows effect on sleep disorders in combination with valerian. ²³	No human studies or case reports.
Chamomile (<i>Matricaria recutita</i>)	Calming, digestive problems	Traditionally used as mild sedative tea and against digestive problems.	Excessive use in pregnancy should be avoided. ¹⁰ One fatal case report after maternal anaphylaxis. ²⁴
Ginkgo (<i>Ginkgo biloba</i>)	Poor circulation, cognitive impairment	The majority of randomised controlled trials available to date support that ginkgo is efficacious in delaying the clinical deterioration of patients with dementia. ²⁵ Studies suggest that <i>Ginkgo biloba</i> extract is superior to placebo in the symptomatic treatment of intermittent claudication. ²⁶	No human studies or case reports. In view of the many pharmacological actions documented, use of ginkgo should be avoided in pregnancy. ¹⁰
Horse chestnut (<i>Aesculus hippocastanum</i>)	Chronic venous insufficiency (CVI)	Horse chestnut appears to be effective and safe as a symptomatic, short-term treatment for CVI. ²⁷	No human studies or case reports.
Raspberry leaves (<i>Rubus idaeus folio</i>)	Promote easier labour	Effect is not documented in clinical trials. ²⁸	Raspberry should not be used by pregnant women with a history of premature labour. Ingestion of raspberry tea in pregnancy has been widely used, though little data exists on safety. ¹⁰
Bearberry (<i>Arctostaphylos uva-ursi</i>)	UTI	One controlled clinical study shows that bearberry may have a prophylactic effect on recurrent cystitis. ²⁹	In view of the potential toxicity of hydroquinone and the fact that UTI should be treated with antibiotics in pregnancy, the use of bearberry is contraindicated in pregnancy.

degree of information received (coded as complete, partly or none).

The socio-demographic data collected included age (coded in years as ≤ 25 , 26–30, 31–35 and ≥ 36), parity (coded as nullipara or ≥ 1 prior children), marital status (coded as married/cohabiting or single), education (coded in years as ≤ 12 , 13–14 or ≥ 15).

Statistics

Chi-square tests were used to analyse univariate associations between variables in Table 3 and the use of herbal drugs in pregnancy. The statistical analyses were performed using Statistical Package for Social Sciences (SPSS), version 10.0.

RESULTS

Study population

Few of the women invited to participate in the study, could or would not participate in the study. The reasons given for not attending were admittance from hospital before the interview could take place and inconvenience. The response rate was approximately 85%.

In all, 41/400 (10.3%) of the women were 25 years old or younger, 139/400 (34.8%) were between 26 and 30 years, 150/400 (37.5%) were between 31 and 35 years old and 70/400 (17.5%) were 36 years or older. Most women were nullipara 207/400 (51.8%), the remaining 193/400 (48.2%) had one or more prior children. Almost all the women were married or cohabiting, 387/400 (96.8%). In total, 59/400 (14.8%) had 12 years or less of education, 39/400 (9.8%) had 13–14 years of education and 302/400 (75.6%) of the women had education ≥ 15 years.

Use of herbal drugs in pregnancy

In all, 144 of the 400 women (36.0%) had used herbal drugs during pregnancy with a mean of 1.7 herbal products per woman (median: 1, range: 1–8). In total, 249 herbal products were used, containing 46 different herbs. Oral administration was reported by 125 of the 144 women (86.9%), whereas 19 of 144 women (13.2%) reported only dermal administration. Fifteen women (10.4%) reported the use of both administration forms. The most commonly used herbal drugs in pregnancy are presented in Table 2.

Table 2. The 10 most commonly used herbal drugs in pregnancy among 400 Norwegian women

Name of herb	Number of women reporting use the herb in pregnancy (% of total number women reporting use of herbal drugs in pregnancy)	Most commonly reported indication
Echinacea	33 (22.9)	Cold
Iron-rich herbs	17 (11.8)	Low iron status
Ginger	15 (10.4)	Nausea
Chamomile	13 (9.0)	Sedative and tranquilizing
Cranberry	12 (8.3)	UTI*
Aloe	10 (6.9)	Skin problems
Composed herbal teas	10 (6.9)	Diverse
Horsetail	8 (5.6)	Oedema
Black elderberry	8 (5.6)	Cold
Wheat germ oil	7 (4.9)	Stretch marks

Other herbs reported used in pregnancy were among others: St. John's wort, lemon balm, raspberry leaves, lavender, sage, ginseng, aromatic oils and composed herbal teas.

*UTI—urinary tract infections.

The median duration of oral herbal drug use in pregnancy was 19 days (mean: 84, range: 1–980¹). The median duration of dermal herbal drug use was 49 days (mean: 85, range: 1–280).

The proportion of women using herbal drugs increased throughout the first, second and third trimester of pregnancy. In all, 83/400 (20.8%) women used herbal drugs in first trimester (mean: 1.4 herbal products), 90/400 (22.5%) used drugs in second trimester (mean: 1.4 herbal products) and 104/400 (26.0%) used herbal drugs in the third trimester (mean: 1.5 herbal products).

The characteristics of the women according to herbal drug use in pregnancy are presented in Table 3. There was a lower proportion of women 36 years old or older among women using herbal drugs in pregnancy compared to women not using herbal drugs in pregnancy (25.7% vs. 74.3%, $p = 0.048$). Other characteristics analysed did not differ statistically between women using and women not using herbal drugs in pregnancy.

In all, 85.5% of the women reported use of herbal drugs prior to becoming pregnant and 90.3% reported that they would use herbal drugs in the future. Among the 141 women who previously had breastfed a child, 61 (43.3%) reported having used herbal galactagogues.

¹As some women had used more herbal preparations continuously during the whole pregnancy.

Table 3. Characteristics of 400 Norwegian women according to use of herbal drugs in pregnancy

Characteristics		Proportion of women using herbal drugs in pregnancy (%)	Proportion of women not using herbal drugs in pregnancy (%)	<i>p</i> values*
Total (%)	400 (100.0)	<i>n</i> = 144 (36.0)	<i>n</i> = 256 (64.0)	
Age (years)				
≤25	41 (10.3)	12/41 (29.3)	29/41 (70.7)	0.343
26–30	139 (34.8)	51/139 (36.7)	88/139 (63.3)	0.843
31–35	150 (37.5)	63/150 (42.0)	87/150 (58.0)	0.053
≥36	70 (17.5)	18/70 (25.7)	52/70 (74.3)	0.048
Parity				
Nullipara	207 (51.8)	75/207 (36.2)	132/207 (63.8)	0.092
≥1 prior child	193 (48.2)	69/193 (35.8)	124/193 (64.2)	0.092
Marital status				
Married/cohabiting	387 (96.8)	142/387 (36.7)	245/387 (63.3)	0.115
Single	13 (3.3)	2/13 (15.4)	11/13 (84.6)	0.115
Education (years)				
≤12	59 (14.8)	16/59 (27.1)	43/59 (72.9)	0.124
13–14	39 (9.8)	17/39 (43.6)	22/39 (56.4)	0.299
≥15	302 (75.5)	111/302 (36.8)	191/302 (63.2)	0.581
Use of galactagogue herbs if previously lactated**				
Yes	61 (43.3)	30/61 (49.2)	31/61 (50.8)	0.064
No	80 (56.7)	27/80 (33.7)	53/80 (66.3)	0.064

*Actual subgroup against all other subgroups.

**In total, 141 women answered questions about prior breast-feeding and use of herbal galactagogues.

In all, 18/400 (4.5%) reported having used homeopathic drugs in pregnancy.

Indications for use

Figure 1 presents the most commonly reported indications for use of herbal drugs in pregnancy. In all, 226 indications for use were reported (mean: 1.6, range: 1–4 indications). The most commonly reported indications were cold and respiratory tract illness (20.4%), need for nutritional supplementation (14.2%) and skin problems (13.3%). The most common pregnancy related indications were 'nausea' and to 'increase uterus tonus'.

In all, approximately 40% of the women had used herbal drugs that were considered possibly harmful or herbs where information about safety in pregnancy was missing (Table 4). A higher proportion of women had used possibly harmful drugs in the first trimester (organogenesis) than the second and third trimester (Table 4).

Sources of information on herbal drugs

When the women were asked where they would seek information about herbal drugs, the herbal store (309/400, 77.3%) and the pharmacy (209/400, 52.3%) were

the most commonly named sources of information (Table 5).

The women using herbal drugs in pregnancy reported to have been recommended herbal drug use most frequently by family or friends (67/144, 46.5%) (Table 6). Echinacea, iron-rich herbs, ginger, cranberry and composed teas were the most commonly recommended herbal drugs by family or friends. Horsetail

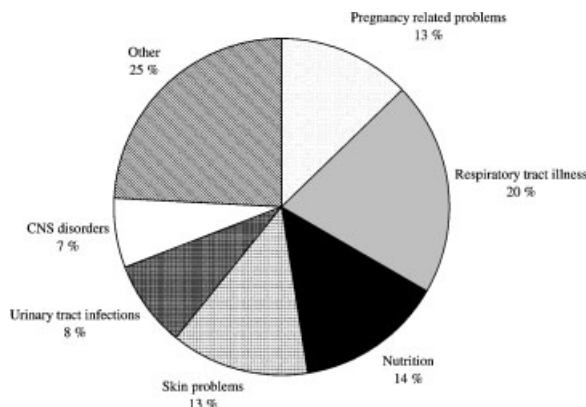


Figure 1. The most commonly reported indications for the use of herbal drugs in pregnancy among 144 women having used herbal drugs in pregnancy

Table 4. Distribution (%) of women by the harmfulness* of the herbal drug used in pregnancy by 144 Norwegian women**

Number of women	Trimester			
	1st	2nd	3rd	Any time
	83	90	104	144
Not harmful	65.1	62.8	56.3	61.1
Insufficient information	14.5	21.8	31.0	25.7
Possibly harmful	20.5	15.4	12.6	13.2
Total	100	100	100	100

*Classified according to Table 1.⁷⁻¹⁰

**If a woman had used several herbal drugs, she was classified by the most harmful group.

was most commonly taken on the women's own initiative or recommended by family and friends. Only 17/144 (11.8%) of the women had been recommended the use of herbal drugs in pregnancy by healthcare personnel, and then mostly iron-rich herbs. Herbal stores recommended a wide variety of herbal drugs, without any drug in particular recommended more frequently than others. Books/magazines/media/internet and homeopaths/alternative practitioners recommended relatively more often composed herbal teas than the other recommenders.

Among the women who had used herbal drugs in pregnancy, 52/144 (36.1%) reported that they received full information about the drug and how it should be used, 9/144 (6.3%) reported that they received information about one drug but not another, and 81/144 (56.3%) reported receiving no information at all about the herbal drugs. A total of 2/144 (1.4%) did not give any answer about the information given.

The highest proportion of women reporting receiving no information about use of the herbal drug in pregnancy occurred when the source of information was books/magazines/media/internet (65.5%) or homeopath/alternative practitioner (63.6%). The lowest percentage of women who reported receiving no information about the use of the herbal drug in

Table 5. Place reported by the women where they would seek information about herbal drugs in general, $n = 400$

	Number of women (%)
Herbal store	309 (77.3)
Pharmacy	209 (52.3)
Doctor	157 (39.3)
Homeopath/alternative practitioner	153 (38.3)
Other	72 (18.0)
Family/friends	70 (17.5)
Internet	60 (15.0)
Literature	54 (13.5)

Table 6. Who recommended use of herbal drugs in pregnancy, $n = 144$

	Number of women (%)
Family/friends	67 (46.5)
Own initiative	33 (22.9)
Books/magazines/media/internet	29 (20.1)
Herbal store	20 (13.9)
Healthcare personnel	17 (11.8)
Homeopath/alternative practitioner	11 (7.6)
Other	6 (4.2)

pregnancy occurred when the source of information was healthcare personnel (35.3%). The corresponding percentages for giving no information when the recommender was the herbal store or family/friends were 55.0 and 49.3% respectively.

DISCUSSION

In this interview study, the use of herbal drugs in pregnancy (36%) was higher than in all other published studies from western countries. Earlier studies on drug use in pregnancy have reported use of alternative drugs (herbal and homeopathic drugs) between 3.6 and 15.9%.^{5,6,30} The authors of two Finnish studies emphasised that due to the method of gathering information, their studies underestimated the use of alternative drugs in pregnancy (incidence of use was 3.6 and 14.0%).⁶ In the study by Tusi from 1999 to 2000 in California, USA, questionnaires were distributed to pregnant women. Among these women 13.3% reported the use of dietary supplements in pregnancy. The response rate was so low (24%) that these results may not be representative of the study population.⁵

Our study was designed specifically to investigate the use of herbal drugs in pregnancy. Interviewing each woman allowed the woman to ask clarifying questions. Using both open-ended questions and naming 10 specific herbs were done to identify more accurately any use of herbal drugs in pregnancy. However, as the interviews were conducted 1–3 days after childbirth, and only women with healthy children were included in the study, this study may underestimate the use of herbal drugs in pregnancy because of recall bias.

The most commonly used herbs in pregnancy in this study, echinacea, iron-rich herbs, and ginger, corresponded well to what has been found in previous studies. In the study by Tsui *et al.*,⁵ echinacea, pregnancy tea and ginger were the most frequently used herbs. The herbal drugs used during pregnancy in this study were in most cases considered not to be harmful. Iron-rich herbs are considered to be safe in

pregnancy when used in recommended therapeutical doses. The anti-nausea effect of ginger had been documented in human studies, and none of these have shown an increased risk of negative pregnancy outcome.^{14,31,32} Data on echinacea comes mostly from clinical experience and one prospective study where no difference with respect to malformations, gestational age, birth weight or fetal distress was found between the group using echinacea and the control group.¹²

In our study, herbal use was considered possibly harmful for 13.2% of the women. This is lower than found in the two studies by Hemminki *et al.*⁶ where possible dangerous or dangerous alternative drugs were used by 18–28% of the pregnant women. This may be explained by the increase in information about safety of herbal drugs in pregnancy during the last decade resulting in some of the herbs previously classified as potentially dangerous are now classified as not harmful. An example of this is dermal use of St. John's wort.

The proportion of women who used herbal drugs increased throughout pregnancy. This may be explained by the concern of drug use in the organogenetic period and/or the increase of pregnancy related problems throughout pregnancy. Strictly dermal use was reported by 13.2% of the women, thus minimising the exposure to the foetus. Most women used herbal drugs in shorter periods, i.e. under 3 weeks. Only a few women had continuous use, thus increasing the risk of adverse effects to the foetus.

The high use of herbal galactogogues by women previously having breastfed (43.3%) was surprising. This use may be related to the fact that 20–40% of breast-feeding women have perceived lactation deficiency.^{33,34} The effects of herbal galactogogues have not been well documented, and use should not be encouraged. Adverse effects in two infants have been reported after maternal ingestion of composed galactagogue tea containing liquorice.³⁵

One of the most widely practiced complementary therapy in Norway is homeopathy.¹ In this study, however, the use of homeopathic drugs in pregnancy was 4.5%, and lower than in previous studies on use in pregnancy. In a German study conducted in 1996–1997, homeopathic drugs were used by 15.7% of the pregnant women, mainly for the treatment of cold and nausea.³⁶ A survey of the records of the French Health Insurance Service of drug prescriptions among 1000 women living in south-west France showed that 15.9% women had used homeopathic drugs during pregnancy.³⁰ The lower occurrence of use among Norwegian pregnant women may be explained by a shorter

tradition of use of homeopathic drugs in Norway compared to Germany and France. Though homeopathic drugs are not considered harmful in pregnancy in classical medicine, homeopathic reference books list drugs contraindicated in pregnancy.³⁷

Sources of information about herbal drugs

This study shows that though pregnant women consider the herbal store and pharmacy to be the best sources of information on herbal drugs, they rarely obtain information here. This discrepancy may be of concern. Family or friends who most commonly recommended the use of herbal drugs in this study, may not have sufficient knowledge to advise pregnant women about the use of herbal drugs.

In this study, the women used herbal drugs on their own initiative relatively frequently (23%). This might be a result of a trend of increased responsibility for self-medication and an increasing knowledge about drugs in general in society. In the Finnish study of 1988, most alternative drugs were used in pregnancy on the woman's own initiative (78%).⁶ Self-administration of herbal drugs may result in the treatment of a condition that normally does not require medical treatment. This may be the case for horsetail used against oedema in pregnancy. In most cases horsetail was taken on the woman's own initiative or recommended by family. Also, conditions that require pharmacological treatment such as UTI may not be treated adequately, putting the mother and child at risk for complications. Recommending cranberry for the treatment of UTI is one example. It has been documented that the perception of teratogenic risk is strong among pregnant women, even for safe drugs.³⁸ Fear of antibiotics may encourage pregnant women to chose herbal drugs as cranberry or horsetail over traditional drugs in the treatment of UTI.

In this study, only 11.8% of the women reported to have received advice from healthcare personnel. This may indicate a reluctance of consulting health care personnel about alternative therapies by Norwegian pregnant woman, or Norwegian health care personnel's reluctance to give advice in such matters, or both. When 1151 Norwegian physicians were questioned about herbal drugs, 80.7% rated their knowledge as poor.³⁹ Similar results have been found in England and the Netherlands.^{40,41} Einarson *et al.* questioned 242 physicians and alternative practitioners about herbal drugs, and found that physicians are less likely to recommend herbal products to pregnant and breast-feeding women than alternative practitioners. Only one physician actually recommended a herbal product to a

pregnant patient compared with 49% of the alternative practitioners who felt comfortable doing so.⁴ In the Canadian study of echinacea in pregnancy, 70% of the women had been suggested this herbal drug by a friend or relative, however, in 60% of the cases the woman consulted a health care provider regarding use in pregnancy.¹²

The degree of information given to the women about herbal drugs in pregnancy was low, and may contribute to misuse or potentially harmful use. When health care personnel were consulted, information was not given in 35.3% of the cases, by far lower than among family/friends, herbal store, books/magazines/media/internet or homeopath/alternative practitioner. This may indicate that health care personnel are more thorough when giving information to patients/customers.

CONCLUSION

The use of herbal drugs is not uncommon among pregnant Norwegian women. The herbal drugs that were most frequently used were echinacea, iron-rich herbs, ginger and chamomile. A total of nearly 40% of the women whom had used herbal drugs in pregnancy, had used herbal drugs that were judged possibly harmful or where information about the safety of the herbal drug in pregnancy was missing. In addition, some conditions that require pharmacological treatment in pregnancy, like UTI, were treated with herbal drugs. Family and friends had most frequently recommended the use of herbal drugs in pregnancy. The widespread use of herbal drugs during pregnancy indicates an increased need for documentation about the safety of herbal drugs in pregnancy. In addition, it is necessary for healthcare personnel to discuss the use of herbal drugs with their pregnant patients.

KEY POINTS

- Use of herbal drugs in pregnancy is not uncommon.
- Conditions that require pharmacological treatment in pregnancy, such as UTI, may not be treated appropriately.
- Increased documentation about the safety of herbal drugs in pregnancy is needed.
- It is necessary for healthcare personnel to discuss the use of herbal drugs with their pregnant patients.

ACKNOWLEDGEMENTS

Professor Berit Smestad Paulsen, Department of Pharmacognosy, School of Pharmacy, University of Oslo, Oslo, Norway and Professor Britt-Ingjerd Nesheim, Department of Obstetrics and Gynecology, Ullevål University Hospital, Oslo, Norway, participated with planning and organising the study.

REFERENCES

1. Goldback-Wood S, Dorozynski A, Lie LG, *et al.* Complementary medicine is booming worldwide. *Br Med J* 1996; **313**: 131–133.
2. Eisenberg DM, Davis RB, Ettner S, *et al.* Trends in alternative medicine use in the United States, 1990–1997: results of a follow-up national survey. *JAMA* 1998; **280**: 1569–1575.
3. Friedman JM. Teratology Society: presentation to the FDA public meeting on safety issues associated with use of dietary supplements during pregnancy. *Teratology* 2000; **62**: 134–137.
4. Einarson A, Lawrimore T, Brand P, Gallo M, Rotatone C, Koren G. Attitudes and practices of physicians and naturopaths toward herbal products, including use during pregnancy and lactation. *Can J Clin Pharmacol* 2000; **7**: 45–49.
5. Tsui B, Dennehy CE, Tsourounis C. A survey of dietary supplement use during pregnancy at an academic medical center. *Am J Obstet Gynecol* 2001; **185**: 433–437.
6. Hemminki E, Mantyranta T, Malin M, Koponen P. A survey on the use of alternative drugs during pregnancy. *Scand J Soc Med* 1991; **19**: 199–204.
7. Randor S, Einarson TR, Pastuszak A, Koren G. Maternal-fetal toxicology of medicinal plants: a clinician's guide. In *Maternal-Fetal Toxicology—A Clinician's Guide*, 2nd edn, Koren G (ed.). Marcell Dekker, Inc.: New York, USA, 1994.
8. Chandler F. *Herbs: Everyday Reference for Health Professionals*. National printers: Ottawa, Canada, 2000.
9. Briggs GG, Freeman RK, Yaffe SJ. *A Reference Guide to Fetal and Neonatal Risk. Drugs in Pregnancy and Lactation* (6th edn). Lippincott Williams and Wilkins: Philadelphia, USA, 2002.
10. Newall CA, Anderson LA, Phillipson JD. *Herbal Medicines. A Guide for Health-Care Professionals*. The Pharmaceutical Press: Cambridge, UK, 1996.
11. Melchart D, Linde K, Fischer P, Kaesmayr J. Echinacea for preventing and treating the common cold (Cochrane Review). In *The Cochrane Library, Issue 3*. Update Software: Oxford, 2002.
12. Gallo M, Sarkar M, Au W, *et al.* Pregnancy outcome following gestational exposure to echinacea: a prospective controlled study. *Arch Intern Med* 2000; **13**(160): 3141–3143.
13. Cuervo LG, Mahomed K. Treatments for iron deficiency anaemia in pregnancy (Cochrane Review). In *The Cochrane Library, Issue 3*. Update Software: Oxford, 2002.
14. Niebyl JR, Goodwin TM. Overview of nausea and vomiting of pregnancy with an emphasis on vitamins and ginger. *Am J Obstet Gynecol* 2002; **185**: S253–S255.
15. Vogler BK, Ernst E. Aloe vera: a systematic review of its clinical effectiveness. *Br J Gen Pract* 1999; **49**: 823–828.
16. Zakay-Rones Z, Varsano N, Zlotnik M, *et al.* Inhibition of several strains of influenza virus *in vitro* and reduction of symptoms by an elderberry extract (*Sambucus nigra L.*) during

- an outbreak of influenza B Panama. *J Altern Complement Med* 1995; **1**: 361–369.
17. Jepson RG, Mihaljevic L, Craig J. Cranberries for preventing urinary tract infections (Cochrane Review). In *The Cochrane Library, Issue 3*. Update Software: Oxford, 2002.
 18. Jepson RG, Mihaljevic L, Craig J. Cranberries for treating urinary tract infections (Cochrane Review). In *The Cochrane Library, Issue 3*. Update Software: Oxford, 2002.
 19. Schmitz M, Jackel M. Comparative study for assessing quality of life of patients with exogenous sleep disorders (temporary sleep onset and sleep interruption disorders) treated with a hops-valerian preparation and a benzodiazepine drug. *Wien Med Wochenschr* 1998; **148**: 291–298.
 20. Linde K, Mulrow CD. St. John's wort for depression (Cochrane Review). In *The Cochrane Library, Issue 3*. Update Software: Oxford, 2002.
 21. Grush LR, Nierenberg A, Keefe B, Cohen LS. St. John's wort during pregnancy. *JAMA* 1998; **280**: 1566.
 22. Donath F, Quispe S, Diefenbach K, Maurer A, Fietze I, Roots I. Critical evaluation of the effect of valerian extract on sleep structure and sleep quality. *Pharmacopsychiatry* 2000; **33**: 47–53.
 23. Cerny A, Schmid K. Tolerability and efficacy of valerian/lemon balm in healthy volunteers: a double blind placebo controlled, multicentre study. *Fitoterapia* 1999; **70**: 221–228.
 24. Jensen-Jarolim E, Reider N, Fritsch R, Breiteneder H. Fatal outcome of anaphylaxis to camomile-containing enema during labor: a case study. *J Allergy Clin Immunol* 1998; **102**: 1041–1042.
 25. Ernst E, Pittler MH. *Ginkgo biloba* for dementia: a systematic review of double-blind, placebo-controlled trials. *Clin Drug Invest* 1999; **17**: 301–308.
 26. Pittler MH, Ernst E. *Ginkgo biloba* extract for the treatment of intermittent claudication: a meta-analysis of randomized trials. *Am J Med* 2000; **108**: 276–281.
 27. Pittler MH, Ernst E. Horse chestnut seed extract for chronic venous insufficiency (Cochrane Review). In *The Cochrane Library, Issue 3*. Update Software: Oxford, 2002.
 28. Simpson M, Parsons M, Greenwood J, Wade K. Raspberry leaf in pregnancy: its safety and efficacy in labor. *J Midwifery Womens Health* 2001; **46**: 51–59.
 29. Larsson B, Jonasson A, Fianu S. Prophylactic effect of UVA-E in women with recurrent cystitis: a preliminary report. *Curr Ther Res Clin Exp* 1993; **53**: 441–443.
 30. Lacroix I, Damase-Michel C, Lapeyre-Mestre M, Motastruc JL. Prescription of drugs during pregnancy in France. *Lancet* 2000; **356**: 1735–1736.
 31. Fischer-Rasmussen W, Kjær SK, Dahl C, Asping U. Ginger treatment of hyperemesis gravidarum. *Eur J Obstet Gynecol Reprod Biol* 1990; **38**: 19–24.
 32. Vutyavanich T, Kraissarin T, Ruangsri R-A. Ginger for nausea and vomiting in pregnancy: a randomised, double-masked, placebo-controlled trial. *Obstet Gynecol* 2001; **97**: 577–582.
 33. Insufficient milk supply (IMS). The breastfeeding process: the postpartum period. In *Breastfeeding and Human Lactation* (2nd edn), Riordan J, Auerbach KG (eds). Jones and Bartlett Publishers: USA, 1999.
 34. Hillervik-Lindquist C, Hofvander Y, Sjölin S. Studies on perceived breast milk insufficiency. *Acta Paediatr Scand* 1991; **80**: 297–303.
 35. Matheson I. Amme-te—ikke helt ufarlig. *Tidsskr Nor Lægeforen* 1995; **115**: 753.
 36. Irl C, Hasford J, The Pegasus Study Group. The PEGASUS project—a prospective cohort study for the investigation of drug use in pregnancy. *Int J Clin Pharm Ther* 1997; **12**: 572–576.
 37. Moscovic R. *Homeopathic Medicines for Pregnancy and Childbirth*. North Atlantic books, Homeopathic educational services: California, USA, 1992.
 38. Koren G, Bologna-Campeneau M, Long D, Henderson K, Feldman Y, Shear N. Perception of teratogenic risk by pregnant women exposed to drugs and chemicals in early pregnancy. *Am J Obstet Gynecol* 1989; **160**: 1190–1194.
 39. Aasland OG, Borchgrevink CF, Fugleli P. Norwegian physicians and alternative medicine. Knowledge, attitudes and experiences. *Tidsskr Nor Lægeforen* 1997; **17**: 2464–2468.
 40. Wharton R, Lewith G. Complementary medicine and the general practitioner. *Br Med J (Clin Res Ed)* 1986; **292**: 1498–1500.
 41. Visser GJ, Peters L. Alternative medicine and general practitioners in The Netherlands: towards acceptance and integration. *Fam Pract* 1990; **7**: 227–232.