Heliyon 8 (2022) e08854

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Research article

Use of herbal medicines during pregnancy in a group of Bangladeshi women

Sadia Jahan [a,*], Zannatul Mamnuna Mozumder [a], Diponkor Kumar Shill [b]

[a] Department of Pharmacy, Faculty of Science, Comilla University, Bangladesh
[b] Department of Pharmacy, Faculty of Science and Engineering, East West University, Bangladesh

ARTICLE INFO

Keywords:
Herb
Pregnancy
Bangladesh

ABSTRACT

Background: Pregnancy-related illnesses are commonly treated by herbal medicines in our country as well as around the world.
Objectives: The purpose of this study was to find out how common herbal use is among Bangladeshi pregnant women, what factors influence it, and how it affects pregnancy outcomes.
Methods: Random sampling was done among women who gave birth between July and September 2021 in the maternity ward of an NGO-based clinic and were requested to participate in the face-to-face questionnaire-based survey.
Results: 275 women (71.80%) out of 383 used herbs during their pregnancy. Only 27.42% of women who used herbs informed their doctors, and 91.03% of users reported no side effects. Most users thought that herbs were safer than allopathic medications (71.8%). The ground behind the choosing herb was suggestion from family members or self-medication (34.73% and 31.83%, respectively). Ginger (*Zingiber officinale Roscoe*) (73.10%), lemon (*Citrus limon L. Burm. F*) (71.27%), black seed (*Nigella sativa*) (66.55%), mustard oil (*Brassica Juncea Mane Kancor*) (65.45%), and prune (*Prunus domestica*) (41.45%) were the most widely utilized herbs. The majority of women used herbs on a daily basis. There were statistically significant differences in several socio-demographic characteristics and pregnancy outcomes between herb users and non-users.
Conclusions: The usage of herbs throughout pregnancy is quite prevalent amid Bangladeshi womenfolk, according to this study. Herbs appear to be safe when used often during pregnancy. Furthermore, physicians or medical practitioners have to play a vital role in ensuring the safe usage of herbs among pregnant women.

1. Introduction

Herbal medications are commonly viewed by pregnant women as a safe, natural substitute for conventional drugs, and they are frequently used to maintain their health or manage non-life threatening issues (Illamola et al., 2020). Herbal remedies are herbs, herbal components, herbal supplements, and final herbal goods that comprise plant materials as active substances (Organization, 2020). Despite minimal scientific evidence demonstrating the safety profile of herbal therapy, it is widely used in various regions of the world, notably in developing countries (Aljofan and Alkhamaiseh, 2020). Herbal medicines are often used as an adjunct to conventional drugs rather than as a replacement (Kennedy et al., 2013). Management of gastrointestinal infections as well as cold and flu symptoms seem to be the most main triggers for use. Herbal treatments are chosen over contemporary medicine because they are thought to be safer for the unborn child (John and Shantakumari, 2015). Ginger, cranberry, raspberry leaf, chamomile, peppermint, thyme, green tea, sage, anise, garlic, and aloe vera are the most commonly used herbs (Laelago, 2018). The prevalence of utilization of herbal medicine during pregnancy fluctuates according to region, ethnicity, educational and socioeconomic status (El Hajj and Holst, 2020). The wide variety of herbal therapies and their practices across countries makes scientifically assessing and governing them exceedingly difficult (Benzie and Wachtel-Galor, 2011). Regardless of the fact that the use of herbal is on the rise during pregnancy, clinical evidence characterizing their frequency and supporting their risk/benefit profile is scant (Vitalone et al., 2021).

Herbs can cause serious fetal abnormalities, interact with prescription drugs, and have unanticipated side effects during pregnancy and childbirth. So, details of herb use during pregnancy along with duration and frequency of usage are important to know for the well-being of both mother and baby. However, there is relatively little documented data on the use of herbal products during pregnancy in Bangladesh. The aim of this study is to see if herbal intake has an impact on pregnancy

* Corresponding author.
E-mail address: sadiajahan@cou.ac.bd (S. Jahan).

https://doi.org/10.1016/j.heliyon.2022.e08854
Received 10 December 2021; Received in revised form 29 December 2021; Accepted 25 January 2022

Table 1. Association between socio-demographic features as well as the use of herbs throughout pregnancy period.

Variable	User (N = 275, 71.80%) (n, %)	Non-user (N = 108, 28.20%) (n, %)	p-Value
Age in years			
Less than 20	37 (13.45)	0 (0.00)	P ˂ 0.001
20–30	235 (85.45)	108 (100.00)	
31–40	3 (1.09)	0 (0.00)	
Living Place			
Rural	177 (64.36)	52 (48.15)	0.067
Urban	98 (35.64)	56 (51.85)	
Educational Level			
Primary	2 (0.73)	0 (0.00)	P ˂ 0.001
High School	140 (50.91)	98 (90.74)	
College	109 (39.64)	10 (9.26)	
University Education	24 (8.73)	0 (0.00)	
Employment			
Yes	87 (31.64)	15 (13.89)	P ˂ 0.001
No	188 (68.36)	93 (85.11)	
Chronic Disease			
Yes	31 (11.27)	0 (0.00)	P ˂ 0.001
No	244 (88.73)	108 (100.00)	
Parity			
First Child	192 (69.82)	108 (100.00)	P ˂ 0.001
More than one	83 (30.18)	0 (0.00)	

consequences in a population of Bangladeshi women, to determine how common herbal use is among pregnant women, to recognize the most commonly used herbs, to explore the impact of socio-demographic characteristics on herbal product use, also to see if herbal intake has an impact on gestation outcomes.

2. Methods

The study was done as a questionnaire-based cross-sectional survey in the maternity ward of Surjer Hashi Clinic in Cumilla from July to September 2021, after receiving approval from the clinic's management. A questionnaire-based cross-sectional survey was used to conduct the research. According to hospital data, the expected number of women giving birth in the maternity unit was about 400 each month, or over 1,200 women in three months, according to hospital data. Based on this, we utilized Raosoft software (Crilly et al., 2017) to estimate a reasonable sample size, which amounted to 292, so at least 300 pregnant women was our minimum target to complete our survey. We also realized that some women may be hesitant to participate in our study, so a total of 450 women were contacted, with 383 responding to the survey, resulting in an 85.11% response rate. The mean number of women delivered per month, according to registration records, was 352.33, with an overall of 1057 cases, demonstrating that the size of the sample was larger than 30% of the population. Herbs were defined as per World Health Organization's explanation of herbal medicines in the anonymous questionnaire. Statistical Package for Social Sciences (SPSS-version 25.0) was adapted to carry out the statistical analysis. Frequencies and percentages were calculated and chi-squared tests were employed to co-relate categorical variables. In all analyses, a p-value of less than 0.05 was considered statistically significant. Because no hazardous substances were employed in the investigation, there are no ethical concerns in this paper. All of the participants volunteered and gave their full consent to take part in the study.

3. Results

Three hundred and eighty-three pregnant women were agreed to take part in the study, resulting in an 85.11% response rate. The majority of the women (89.56%) were between the ages of 20 and 30, with a high school diploma (62.14%). The majority of the women (69.82%) were from rural areas and were expecting their first child (59.79%). As demonstrated in Table 1, there were statistically significant links between socio-demographic factors as well as herb consumption.

The majority of pregnant women (90.1%) used more than one herb, and in the third trimester of pregnancy, herbs were used by around half of the women (50.91%). Most women preferred herbs to medications because they believed herbs were safer, cheaper, and more accessible (71.8%); women based their decisions primarily on family advice or self-medication (34.73%) and 31.83%); 72.58 % of them didn't tell their doctors that they used herbs; 36.29 % said they should have mentioned but forgot to do so; and overall, 72.58 % didn't tell their doctors that they used herbs.

The number and percentage of women who took herbal supplements during their pregnancy period is summed down in Table 2. The most recurrently used herbs were *Zingiber officinale Roscoe* (ginger) (73.10%), *Citrus limon (L.) Burm. f* (lemon) (71.27%), *Nigella sativa* (black seed) (66.55%), *Brassica Juncea* (mustard) (65.45%), *Prunus domestica* (prune) (41.45%), and *Allium sativum L.* (garlic) (39.27%). Some females (30.81 %) were frequent users, although in the majority of cases, herbs were only used as required. The most frequent reasons for using herbs were: nausea, constipation, cough, abdominal discomfort, heartburn, and to improve immunity. Almost all of the herbals were administered orally, with three cases involving topical preparations. Correlation amongst pregnancy or neonatal characteristics and the utilization of herbs throughout pregnancy is embodied in Table 3.

Two hundred and four women delivered after completing the full term (74.18%) with 98.54% of caesarian deliveries. The majority of the newborns weighed between 2 and 3 kg. Some neonates had issues at birth (25, or 8.97%). Commonly reported issues include: twelve had respiratory problems, eight suffered with rash and five neonates' mother did not know what the exact problem was. In case of pregnancy characteristics or neonatal outcomes, there were statistically significant differences between herb users and non-users, as shown in Table 3.

4. Discussion

A large majority of pregnant women (71.80%) consumed herbs in this study, which is similar to a former study performed in Bangladesh in 2018, which reported that 70% of expectant mothers took herbs (Ahmed et al., 2018). Similar results have been reported in other countries, such as Uganda, where 70.4% used herbs during their most recent pregnancy (Muteebwa et al., 2021). However, the prevalence of herb utilization in our research is higher than in other research conducted previously. For example, in the United Kingdom, Lone Holst et al. found that among 578 mothers between November 2007 and February 2008, 334 (57.8%) reported use of herbal remedies during pregnancy (Holst et al., 2009). In another study, the percentage among a group of women in Norway was 22.5% (Nnaemeka et al., 2021). In Australia, in 2002, 16% of women reported using at least one herbal supplement throughout their pregnancy period (Pinn and Pallett, 2002) that augmented to 36% of women in 2011 (Forster et al., 2006). In a regional hospital in Nigeria, herbal medicine consumption was found to be 36.8% among pregnant and lactating mothers (Duru et al., 2016). In Kenya, about 12% of women took herb throughout their pregnancy cycle during January and February, 2012 (Mothupi, 2014).

Zingiber officinale Roscoe (ginger), *Nigella sativa* (black seed), *Citrus limon (L.) Burm. f.* (lemon), *Brassica Juncea Mane Kancor* (mustard oil), *Prunus domestica* (prune), and *Allium sativum L.* (garlic) were the most commonly mentioned herbs in this study, which is similar to another study performed in our country (Ahmed et al., 2018). Ginger [4], [20], garlic [20], peppermint [5], and Chinese Okra [18] have been the most prevalent herbs in other studies. Given that common herbs vary by country and culture, this kind of variation is acceptable.

Table 2. The most frequently used herbs and the reported reasons for use (N = 275).

Family Scientific Name	Traditional Name	Number (n)	Percentage (%)	Routes of Administration	Aim of Use
Zingiberaceae *Zingiber officinale Roscoe*	Ginger	201	73.10	Oral	Nausea/vomiting Cold/flu Cough
Rutaceae *Citrus limon (L.) Burm. F*	Lemon	196	71.27	Oral	Cough/cold Nausea/vomiting Improved immune system
Ranunculaceae *Nigella sativa*	Black seed	183	66.55	Oral	Allergies Cold Nausea/vomiting Improved immune system
Brassicaceae *Brassica Juncea Mane Kancor*	Mustard oil	180	65.45	Oral	Cold/flu Constipation Improved immune system
Rosaceae *Prunus domestica*	Prune	114	41.45	Oral	Constipation Nausea/vomiting
Amaryllidaceae *Allium sativum L.*	Garlic	108	39.27	Oral	Cold/flu Constipation Abdominal pain
Lamiaceae *Mentha piperita L.*	Peppermint	44	16.00	Oral	Cough/cold Heartburn Hypertension
Combretaceae *Terminalia chebula*	Myrobalan	42	15.27	Oral	Nausea
Zingiberaceae *Curcuma longa*	Turmeric	49	17.82	Topical	Skin Care
Liliaceae *Aloe barbadensis miller*	*Aloe vera*	78	28.36	Topical, Oral	Skin Care Constipation
Meliaceae *Azadirachta indica A. Juss*	Neem	18	6.55	Topical	Skin Care

A large majority of women took ginger (73.10%) in this study, and the use of ginger during pregnancy was not linked to an increased incidence of congenital abnormalities (Heitmann et al., 2013). It is also beneficial for reducing the severity of nausea tendency during pregnancy, as per previous findings (Vutyavanich et al., 2001). Black seed was one of the most regularly used herbs during pregnancy, and supplementing with it may aid in the development of the child's immune system and reduce the severity of atopic dermatitis (Hwang et al., 2021). Unfortunately, there are not enough scientific reports of black seed in humans about its use and safety during pregnancy. Despite the fact that lemon is a common herb, there is no evidence about its use and safety for pregnant mothers (Akalın Uruşak, 2021). There is no conclusive evidence that garlic causes stillbirth, malformation, or teratogenicity in the fetus (Ahmed et al., 2017). Intake of peppermint during pregnancy has not been demonstrated to be hazardous to the mother or the fetus in human studies (Ahmed et al., 2017). An unwarranted dose, however, should be circumvented due to its emmenagogue features (Gruenwald et al., 2007). The use of aloe on the skin by pregnant women is unlikely to be hazardous (Johnston, 2006). But, it must not be used by mouth during pregnancy because anthraquinones are present in aloe latex, that can stimulate the uterus that may cause premature labor or abortion (Gruenwald et al., 2007). In this study, the most prominent reasons for using herbs during pregnancy were for illness, cough, skin care, enhanced immunity, and gastrointestinal problems. This is compatible with the results of other research (Ahmed et al., 2018).

Table 3. Association between pregnancy and neonatal characteristics and the utilization of herbs throughout pregnancy.

Variable	User (N = 275, 71.80%) (n, %)	Non-user (N = 108, 28.20%) (n, %)	p-Value
Gestational age in weeks			
38–42	204 (74.18)	0 (0.00)	P ˂ 0.001
Less than 42	71 (25.82)	108 (100.00)	
More than 42	0 (0.00)	0 (0.00)	
Delivery type			
Normal	4 (1.46)	0 (0.00)	0.468
Caesarean	271 (98.54)	108 (100.00)	
Medical Problems at Birth			
Yes	25 (8.97)	0 (0.00)	0.049
No	250 (91.03)	108 (100.00)	
Weight in kg			
Less than 2.5	7 (2.55)	0 (0.00)	P ˂ 0.001
2.5–3	166 (60.36)	108 (100.00)	
More than 3	102 (37.09)	0 (0.00)	

The higher prevalence of herb use during the third trimester (50.91 %) could be due to mothers' increased concern for the development of the baby's body structure and organ system during this period. The majority of users (71.8%) believed herbs were safer than medicines, which may be relevant considering that 91.03% of them reported no negative effects from any herb. Informal sources of information, such as their own views and friends/family, were cited by women as being critical in their decision to explore herbal treatment, which is consistent with previous findings (Kennedy et al., 2013) (John and Shantakumari, 2015) (Mothupi, 2014) (James et al., 2018). Also, only a small percentage of women (27.42%) reported notifying their doctor that they were using herbal products. So, proper guidance for pregnant women is demanded as consistent use of the herb without any medical recommendation may be clinically justified. In this case, doctors need to play a significant role in inquiring about herbal use among women, as some women may forget to inform them. In many other studies, the proportion of clinicians who

were informed ranged from 4.8% to 65.8% (James et al., 2018) (Holst et al., 2009) (Mothupi, 2014) (Adawi, 2012).

The oral method of administration was the most preferred among pregnant women in our study, and herbs were taken on a daily basis, indicating habitual use. As in previous studies, there were statistically significant differences between the socio-demographic characteristics of the sample and the usage of herbs (Kennedy et al., 2013) (Ahmed et al., 2018). In this study, significant statistical differences in pregnancy and neonatal outcomes were found between herb users and non-users, which is similar to findings from other studies (Cuzzolin et al., 2010) (Nordeng et al., 2011). Obviously, further investigations are required to ascertain the direct relationship between herb use and pregnancy outcomes like gestational age or birth weight.

The fact that the entire survey was completed during the pandemic adds to the study's limitations. As a result, some respondents expressed skepticism about participating in the study. Furthermore, due to the unfavorable circumstances, an in-depth analysis of the relationship between herb use and pregnancy outcome was not possible.

5. Conclusion

The usage of herbs was quite common among the pregnant women in this study. Despite the fact that women used herbs on a daily basis, no negative effects on pregnant women or newborns have been reported. Further extensive research is demanded to govern the safety profile of herbs for treating pregnancy-related issues. Physicians and other medical experts must play an essential role in ensuring that pregnant women are safe when using herbs.

Declarations

Author contribution statement

Sadia Jahan: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

Zannatul Mamnuna Mozumdera: performed the experiments; contributed reagents, materials, analysis tools or data.

Diponkor Kumar Shillb: contributed reagents, materials, analysis tools or data.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability statement

The authors are unable or have chosen not to specify which data has been used.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

Supplementary content related to this article has been published online at https://doi.org/10.1016/j.heliyon.2022.e08854.

Acknowledgements

We would like to express our deepest gratitude to all of the pregnant women who took part in the study. We would also like to express our gratitude to the Surjer Hashi Clinic's Cumilla maternity unit team.

References

Adawi, D.H., 2012. Prevalence and Predictors of Herb Use during Pregnancy (A Study at Rafidia Governmental hospital/Palestine).
Ahmed, M., Hwang, J.H., Choi, S., Han, D., 2017. Safety classification of herbal medicines used among pregnant women in Asian countries: a systematic review. BMC Compl. Alternative Med. 17, 1–11.
Ahmed, M., Hwang, J.H., Hasan, M.A., Han, D., 2018. Herbal medicine use by pregnant women in Bangladesh: a cross-sectional study. BMC Compl. Alternative Med. 18, 1–9.
Akalın Uruşak, E., 2021. Evaluation of herbal medicine use in the obstetric and gynecology department. İstanbul J. Pharm. 51, 243–255.
Aljofan, M., Alkhamaiseh, S., 2020. Prevalence and factors influencing use of herbal medicines during pregnancy in Hail, Saudi Arabia: a cross-sectional study. Sultan Qaboos Univ. Med. J. 20, e71.
Benzie, I.F.F., Wachtel-Galor, S., 2011. Herbal Medicine: Biomolecular and Clinical Aspects.
Crilly, P., Patel, N., Ogunrinde, A., Berko, D., Kayyali, R., 2017. Community pharmacists' involvement in research in the United Kingdom. Pharmacy 5, 48.
Cuzzolin, L., Francini-Pesenti, F., Verlato, G., Joppi, M., Baldelli, P., Benoni, G., 2010. Use of herbal products among 392 Italian pregnant women: focus on pregnancy outcome. Pharmacoepidemiol. Drug Saf. 19, 1151–1158.
Duru, C.B., Uwakwe, K.A., Chinomnso, N.C., Mbachi, I.I., Diwe, K.C., Agunwa, C.C., Iwu, A.C., Merenu, I.A., 2016. Socio-demographic determinants of herbal medicine use in pregnancy among Nigerian women attending clinics in a tertiary Hospital in Imo State, south-east, Nigeria. Am. J. Med. Stud. 4, 1–10.
El Hajj, M., Holst, L., 2020. Herbal medicine use during pregnancy: a review of the literature with a special focus on Sub-Saharan Africa. Front. Pharmacol. 11, 866.
Forster, D.A., Denning, A., Wills, G., Bolger, M., McCarthy, E., 2006. Herbal medicine use during pregnancy in a group of Australian women. BMC Pregnancy Childbirth 6, 1–9.
Gruenwald, J., Brendler, T., Jaenicke, C., 2007. PDR for Herbal Medicines. Thomson.
Heitmann, K., Nordeng, H., Holst, L., 2013. Safety of ginger use in pregnancy: results from a large population-based cohort study. Eur. J. Clin. Pharmacol. 69, 269–277.
Holst, L., Wright, D., Haavik, S., Nordeng, H., 2009. The use and the user of herbal remedies during pregnancy. J. Alternative Compl. Med. 15, 787–792.
Hwang, J.R., Cartron, A.M., Khachemoune, A., 2021. A review of Nigella sativa plant-based therapy in dermatology. Int. J. Dermatol.
Illamola, S.M., Amaeze, O.U., Krepkova, L.V., Birnbaum, A.K., Karanam, A., Job, K.M., Bortnikova, V.V., Sherwin, C.M.T., Enioutina, E.Y., 2020. Use of herbal medicine by pregnant women: what physicians need to know. Front. Pharmacol. 10, 1483.
James, P.B., Bah, A.J., Tommy, M.S., Wardle, J., Steel, A., 2018. Herbal medicines use during pregnancy in Sierra Leone: an exploratory cross-sectional study. Women Birth 31, e302–e309.
John, L.J., Shantakumari, N., 2015. Herbal medicines use during pregnancy: a review from the Middle East. Oman Med. J. 30, 229.
Johnston, D., 2006. Natural standard herb and supplement reference: evidence based clinical reviews. Ulster Med. J. 75, 166.
Kennedy, D.A., Lupattelli, A., Koren, G., Nordeng, H., 2013. Herbal medicine use in pregnancy: results of a multinational study. BMC Compl. Alternative Med. 13, 1–10.
Laelago, T., 2018. Herbal medicine use during pregnancy: benefits and untoward effects. Herb. Med.
Mothupi, M.C., 2014. Use of herbal medicine during pregnancy among women with access to public healthcare in Nairobi, Kenya: a cross-sectional survey. BMC Compl. Alternative Med. 14, 1–8.
Muteebwa, L., Ssetaala, A., Muramuzi, D., Nanvubya, A., Mayanja, Y., 2021. Factors Associated with Herbal Medicine Use in Pregnancy Among Postnatal Mothers in Mbarara Regional Referral Hospital in Western Uganda.
Nnaemeka, O., Phyllis, N., Chinaza, O., 2021. The use of herbal medicines in pregnancy: a cross-sectional analytic study. Int. J. Sci. Res. Dent. Med. Sci. 3, 66–72.
Nordeng, H., Bayne, K., Havnen, G.C., Paulsen, B.S., 2011. Use of herbal drugs during pregnancy among 600 Norwegian women in relation to concurrent use of conventional drugs and pregnancy outcome. Complement. Ther. Clin. Pract. 17, 147–151.
Organization, W.H., 2020. Traditional, Complementary and Integrative Medicine. Available. (Accessed 10 January 2020). http//www. who. int/traditional-complementary-integrative-medicine/en.
Pinn, G., Pallett, L., 2002. Herbal medicine in pregnancy. Complement. Ther. Nurs. midwifery 8, 77–80.
Vitalone, A., Allkanjari, O., Durazzi, F., Guizzetti, M., Aleandri, V., 2021. The use of herbal products during pregnancy: which is the risk perception. Am. J. Phytomed. Clin. Ther. 9, 1.
Vutyavanich, T., Kraisarin, T., Ruangsri, R., 2001. Ginger for nausea and vomiting in pregnancy:: randomized, double-masked, placebo-controlled trial. Obstet. Gynecol. 97, 577–582.