Review Article

Prevalence of Self-Medication among Pregnant Women: A Systematic Review and Meta-Analysis

Azam Rahmani, Suren Akram Hamanajm[1], Arezoo Fallahi[2], Reza Ghanei Gheshlagh[3,4], Sahar Dalvand[5]

Nursing and Midwifery Care Research Center, School of Nursing and Midwifery, Tehran University of Medical Sciences, [5]Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, [2]Social Determinants of Health Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, [3]Social Determinants of Health Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, [4]Clinical Care Research Center, Kurdistan University of Medical Sciences, Sanandaj, Iran, [1]Department of Sociology, College of Law, Lebanese French University, Erbil, Kurdistan, Iraq

ORCID:

Azam Rahmani:
0000-0001-8528-2374;
Arezoo Fallahi:
0000-0002-6375-4614;
Reza Ghanei Gheshlagh:
0000-0002-7414-8134;
Suren Akram Hamanajm:
0000-0003-0535-760X;
Sahar Dalvand:
0000-0003-3855-7982

ABSTRACT

Background: Self-medication is prevalent among pregnant women. It can cause adverse effects such as fetal anomalies. **Objectives:** This study aimed to estimate the prevalence of self-medication among Iranian pregnant women. **Methods:** This was a systematic review and meta-analysis study. Online national and international databases (namely, Scientific Information Database, MagIran, Web of Science, PubMed, Scopus, and Google Scholar) were searched using the following keywords: "pregnancy," "gravidity," "self-treatment," "self-medication," "non-prescription," "over-the-counter," "self-administered," "self-reported," "Iran," "prevalence," "occurrence," "frequency," and "epidemiology." In total, 128 studies were retrieved. Only 13 studies fulfilled eligibility criteria, i.e. cross-sectional design and publication in Persian or English. Methodological quality of the studies was assessed using a tool with four items, namely design, sample description, sample size, and methods. Meta-analysis was performed using the random-effects model and heterogeneity among the studies was assessed using the I^2 index. **Results:** The total number of samples in the 13 analyzed studies was 4874. The overall self-medication prevalence was 38.46% (95% confidence interval: 27.42–49.49). Meta-regression analysis revealed no significant relationships between self-medication prevalence and methodological quality score ($P = 0.409$), participants' mean age ($P = 0.400$), sample size ($P = 0.248$), and publication year ($P = 0.704$). **Conclusion:** The overall prevalence of self-medication among Iranian pregnant women is 38.46%. Study findings can be used to design and implement interventions to reduce self-medication among pregnant women. Educational interventions are needed to improve the knowledge of pregnant women and health-care providers about the effects of self-medication, particularly herbal self-medication.

KEYWORDS: *Iran, Meta-analysis, Nonprescription drugs, Pregnancy, Prevalence, Self-medication*

INTRODUCTION

Self-medication refers to the intake of medications without medical prescription. It is a social, economic, and health challenge.[1] It may occur due to the inadequacy of health-care services, poverty, limited knowledge about the underlying condition,

Access this article online

Quick Response Code:

Website:
www.nmsjournal.com

DOI:
10.4103/nms.nms_77_18

medication advertisements, easy access to medications,[2] sociocultural and economic conditions, and inefficient transportation system.[3] Self-medication can cause different complications such as drug resistance, drug interactions, misdiagnosis, delayed medical help seeking, polypharmacy, drug overuse, side effects and intoxication, treatment inefficiency and prolongation, delayed recovery, and waste of money.[4]

Several studies reported that women resort to self-medication to manage their menstrual disorders, menopausal symptoms, mood imbalance, osteoporosis, and problems related to pregnancy and breastfeeding.[5,6] A study reported that more than 90% of pregnant women experienced self-medication.[7] The prevalence of self-medication among pregnant women in Tanzania, Ethiopia, northern Europe, and the United Arab Emirates was 46.24%,[8] 20.1%,[9] 62.9%,[10] and 40%,[7] respectively. Self-medication in Iran is also very prevalent[11-13] so that Iran is among the top twenty countries regarding self-medication.[14] Studies showed that self-medication prevalence among Iranian pregnant women was 54.4% in the center of Iran[11] and 30% in the West of Iran.[15]

Self-medication in pregnancy can increase the risk of fetal anomalies[16] and endanger maternal and fetal health.[17] Therefore, assessing and reducing self-medication is essential.[1] There is no conclusive evidence regarding the self-medication prevalence among pregnant women in Iran. The present study was conducted to answer the following question, "What is the prevalence of self-medication among Iranian pregnant women?"

Objectives

This study was conducted to estimate the prevalence of self-medication among Iranian pregnant women.

METHODS

This systematic review and meta-analysis was conducted on papers published in Iranian and international journals.

Data sources

Search keywords were "pregnancy," "gravidity," "self-treatment," "self-medication," "nonprescription," "over-the-counter," "self-administered," "self-reported," "Iran," "prevalence," "occurrence," "frequency," and "epidemiology." These keywords and their combinations were searched in national and international databases, namely Scientific Information Database, MagIran, Web of Science, PubMed, Scopus, and Google Scholar. Where possible, the Boolean operators, namely "AND," "OR," were used to narrow or broaden search results [Box 1].

Eligibility criteria

All studies into the prevalence of self-medication among Iranian pregnant women which had been published before June 2018 were retrieved and assessed for eligibility. Eligibility criteria were cross-sectional design and publication in Persian or English. Review studies, studies into the causes and the risk factors of self-medication, and studies with correlational, interventional, cohort, or case–control designs were not included. The reference lists of the retrieved studies were also searched to find other relevant studies. The search process was independently performed by two researchers in order to reduce data collection biases.

Data extraction

A data collection sheet was used to extract data from the retrieved studies about topic, authors' name, publication year, study setting, sample size, mean maternal age, and self-medication prevalence. Studies were selected using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guideline.[18]

Study appraisal and synthesis

Methodological quality assessment of the studies was performed using the tool introduced by Hoodin and Weber.[19] This tool consists of four items on design, sample description, sample size, and methods. Items are scored 0–3, resulting in a possible total score of 0–12 with higher scores showing greater methodological quality. In the present study, the score of this tool was used to categorize the retrieved studies as low quality (scores <5), moderate quality (scores 5–10), and high quality (scores >10).[19,20]

Box 1: The search strategy in the PubMed database

("gravity" [All Fields]) OR ("pregnancy" [MeSH Terms] OR "pregnancy" [All Fields] OR "gestation" [All Fields])
OR ("pregnancy" [MeSH Terms] OR "pregnancy" [All Fields]) OR ("gravidity" [MeSH Terms] OR "gravidity" [All Fields] OR
"pregnant" [All Fields]) AND ("self-treatment" [All Fields] OR "self-medication" [All Fields] OR "non-prescription" [All Fields] OR
"self-reported" [All Fields]) AND (("epidemiology" [Subheading] OR "epidemiology" [All Fields] OR "prevalence" [All Fields] OR
"prevalence" [MeSH Terms]) OR ("epidemiology" [Subheading] OR "epidemiology" [All Fields] OR "occurrence" [All Fields] OR
"epidemiology" [MeSH Terms] OR "occurrence" [All Fields]) OR ("epidemiology" [Subheading] OR "epidemiology" [All Fields]
OR "frequency" [All Fields] OR "epidemiology" [MeSH Terms] OR "frequency" [All Fields]) OR ("epidemiology" [Subheading] OR
"epidemiology" [All Fields] OR "epidemiology" [MeSH Terms])) AND ("iran" [MeSH Terms] OR "iran" [All Fields]))

Data analysis

As the prevalence of a phenomenon has a binominal distribution,[21] the variance of self-medication prevalence was calculated using the binominal distribution variance, and a weight was allocated to each study using the inverse variance method. The Cochrane's Q test and the I^2 index were used for heterogeneity assessment. Heterogeneity was categorized as low (below 25%), moderate (25%–75%), and high (above 75%).[22] The result of heterogeneity assessment was statistically significant ($I^2 = 98.7\%$, $Q = 954$, and $P < 0.001$); hence, the DerSimonian and Laird random-effects model was used. Meta-regression analysis was done to assess the relationships of self-medication with publication year, sample size, maternal age, and methodological quality score. Subgroup analysis was also done to estimate the prevalence of self-medication in different geographical regions of Iran and also based on medication type. The Egger's regression method for funnel plot asymmetry was used to evaluate publication bias. Sensitivity analysis was done through excluding studies one by one and assessing the effects of these exclusions on the pooled prevalence. All data analyses were performed via the STATA software (v. 12.0: StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX, USA: StataCorp LP).

RESULTS

Initially, 128 studies were retrieved, from which 98 were irrelevant, 7 were duplicates, and 10 did not fulfill eligibility criteria. These 115 studies were excluded and the remaining 13 studies were analyzed [Figure 1].

Sensitivity analysis showed that the one-by-one exclusion of the studies from the analysis did not considerably affect the pooled prevalence of self-medication. Publication bias assessment through the
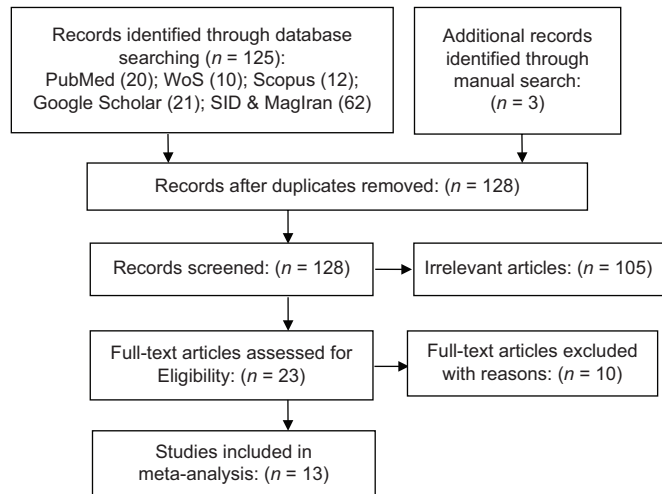

Figure 1: The process of screening and selecting relevant studies based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guideline

Table 1: Characteristics of the analyzed studies

First author	Years	Sample size	Region[a]	Medication type	Age mean (years)	Language	Prevalence (%)	Quality score
Rafiee *et al*.[14]	2018	400	4	Herbal and chemical	14-44	English	25.8	7
Karami-Matin *et al*.[15]	2016	308	4	Chemical	29.16 ± 6.44	English	29.3	7
Ebrahimi *et al*.[24]	2016	384	1	Chemical	26.33 ± 4.60	English	43.5	8
Afshary *et al*.[23]	2015	801	4	Herbal and chemical	-	English	30.6	7
Bagheri and Abbaszadeh[13]	2014	204	2	Chemical	-	Persian	54.4	10
Ghanei Gheshlagh *et al*.[12]	2013	116	3	Chemical	27.03 ± 5.75	Persian	27.6	9
Shamsi *et al*.[25]	2010	400	4	Chemical	29.9 ± 3.6	Persian	12	10
Tajik *et al*.[11]	2008	300	4	Chemical	34.9 ± 6.7	Persian	54	10
Baghianimoghadam *et al*.[26]	2013	180	2	Chemical	-	English	35	10
Doostar Sanaye and Sobhani[27]	2002	400	1	Chemical	22	Persian	19.5	9
Mohammadi Shoosi Gashte[28]	2013	801	1	Chemical	-	Persian	30.60	8
Ziaei *et al*.[29]	2008	180	1	Herbal and chemical	-	Persian	2.20	9
Sattari *et al*.[30]	2012	400	3	Chemical	26.4 ± 5.2	English	49	10

[a]Region 1: Alborz, Tehran, Qazvin, Mazandaran, Semnan, Golestan, and Qom provinces; Region 2: Esfahan, Fars, Bushehr, Hormozgan, Kohgiluyeh and Boyer-Ahmad, and Chaharmahal and Bakhtiari provinces; Region 3: West Azerbaijan, East Azerbaijan, Ardabil, Zanjan, Gilan, and Kurdistan provinces; and Region 4: Kermanshah, Ilam, Lorestan, Hamedan, Markazi, and Khuzestan provinces

Egger's regression method also showed the absence of publication bias in the studies (*P* = 0.166).

The overall and the mean sample sizes of the included studies were 4874 and 375, respectively. The smallest and largest sample sizes were related to the studies conducted by Ghanei Gheshlagh *et al.*[12] and Afshary *et al.*,[23] respectively (116 vs. 801). All studies had moderate methodological quality. Table 1 presents the characteristics of the studies.

The results of meta-analysis showed that the prevalence of self-medication among Iranian pregnant women was 38.46% (95% confidence interval [CI]: 27.42–49.49, I^2 = 98.7%, *P* = 0.001 and [Figure 2]). The lowest and highest self-medication prevalence rates were reported in studies conducted by Ziaei *et al.*[29] and Bagheri and Abbaszadeh,[13] respectively (2.20% vs. 54.4%).

Meta-regression analysis showed that self-medication prevalence was insignificantly higher in studies with greater maternal age mean (*P* = 0.40). Self-medication also had no significant relationships with the methodological quality score (*P* = 0.409), sample size (*P* = 0.248), and publication year (*P* = 0.704) of the studies [Figure 3].

The results of subgroup analysis [Table 2] showed that self-medication prevalence was significantly higher in Region 4 (45.63%, 95% CI: 17.32–73.94) and Region 2 (44.71, 95% CI: 25.70–63.72). Moreover, self-medication prevalence in the herbal and chemical medication group (48.45%, 95% CI: 11.77–85.11) was greater than the chemical medication group (33.87%, 95% CI: 24.29–43.46).
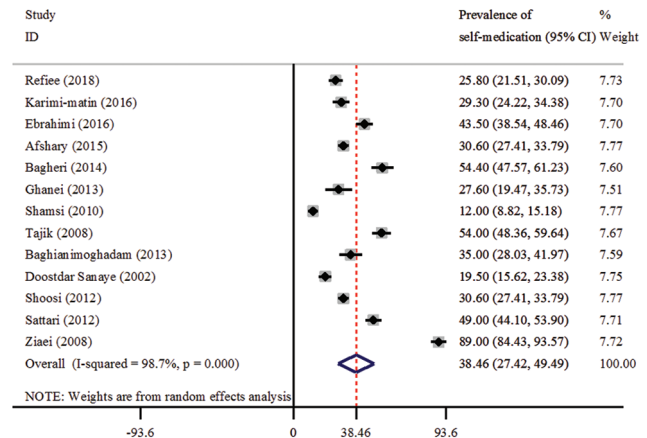

Study ID	Prevalence of self-medication (95% CI)	% Weight
Refiee (2018)	25.80 (21.51, 30.09)	7.73
Karimi-matin (2016)	29.30 (24.22, 34.38)	7.70
Ebrahimi (2016)	43.50 (38.54, 48.46)	7.70
Afshary (2015)	30.60 (27.41, 33.79)	7.77
Bagheri (2014)	54.40 (47.57, 61.23)	7.60
Ghanei (2013)	27.60 (19.47, 35.73)	7.51
Shamsi (2010)	12.00 (8.82, 15.18)	7.77
Tajik (2008)	54.00 (48.36, 59.64)	7.67
Baghianimoghadam (2013)	35.00 (28.03, 41.97)	7.59
Doostdar Sanaye (2002)	19.50 (15.62, 23.38)	7.75
Shoosi (2012)	30.60 (27.41, 33.79)	7.77
Sattari (2012)	49.00 (44.10, 53.90)	7.71
Ziaei (2008)	89.00 (84.43, 93.57)	7.72
Overall (I-squared = 98.7%, p = 0.000)	38.46 (27.42, 49.49)	100.00

NOTE: Weights are from random effects analysis

Figure 2: The forest plot of self-medication prevalence among Iranian pregnant women (95% confidence interval for each study is showed in the horizontal line left and right to the mean. The dotted line in the middle shows the total mean of self-medication prevalence. The large diamond on the dotted line represents the 95% confidence interval of the total mean)
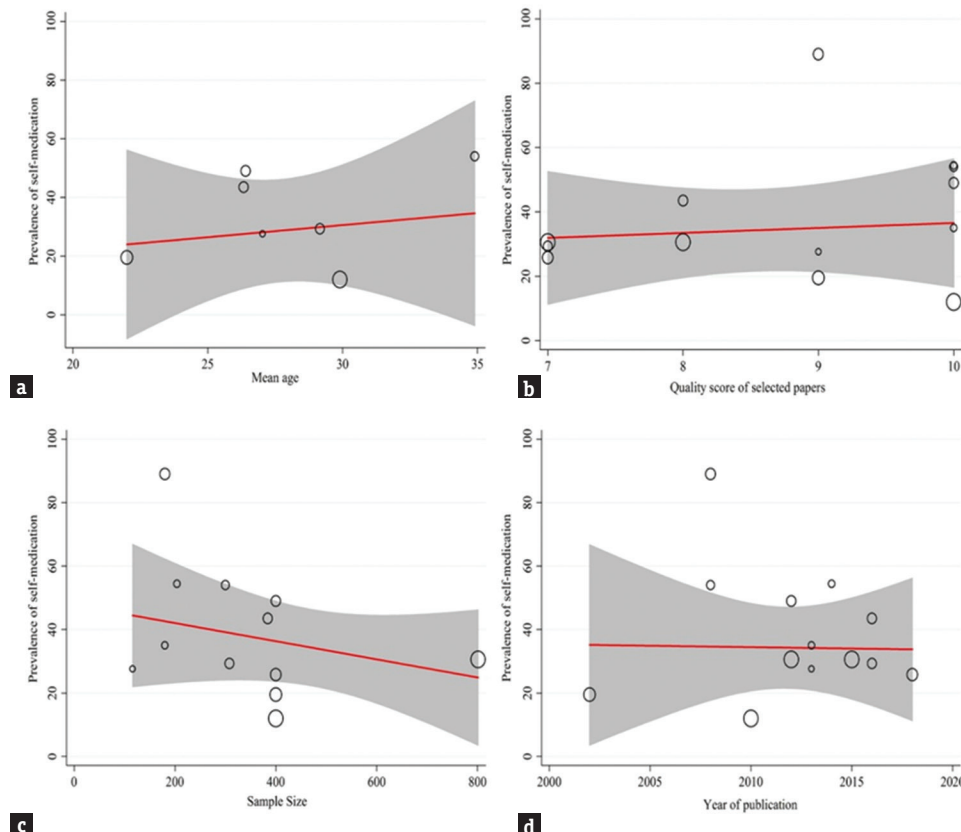

Figure 3: The meta-regression analysis of self-medication based on maternal age (a), methodological quality score (b), sample size (c), and publication year (d)

Table 2: The prevalence of self-medication based on geographical region and medication type

Group	Subgroup	Number of studies	Prevalence (95% CI)	Heterogeneity		
				I^2 (%)	Q	P
Region[a]	1	4	45.63 (17.32-73.94)	99.5	583.14	<0.0001
	2	2	44.71 (25.70-63.72)	93.4	15.18	<0.0001
	3	2	38.56 (17.59-59.52)	94.9	19.51	<0.0001
	4	5	30.22 (18.10-42.33)	97.8	178.48	<0.0001
Medication type	Herbal and chemical	3	48.45 (11.77-85.11)	99.6	508.82	<0.0001
	Chemical	9	33.87 (24.29-43.46)	97.3	297.68	<0.0001

[a]Region 1: Alborz, Tehran, Qazvin, Mazandaran, Semnan, Golestan, and Qom provinces; Region 2: Esfahan, Fars, Bushehr, Hormozgan, Kohgiluyeh and Boyer-Ahmad, and Chaharmahal and Bakhtiari provinces; Region 3: West Azerbaijan, East Azerbaijan, Ardabil, Zanjan, Gilan, and Kurdistan provinces; and Region 4: Kermanshah, Ilam, Lorestan, Hamedan, Markazi, and Khuzestan provinces. CI: Confidence interval

Table 3: The most common over-the-counter medications used by the participants of the analyzed studies

Study	The most commonly used medications
Ghanei *et al.*	Analgesics, antibiotics, vitamins, gastrointestinal medications
Shamsi *et al.*	Antibiotics, adult cold tablets, iron-containing tablets, sedatives, antipyretic, acetaminophen, multivitamins, folic acid, antiemetics, and antacids
Afshary *et al.*	Herbal products: Medications for managing neonatal jaundice, gastrointestinal medications
	Chemical products: Gastrointestinal medications, analgesics for headache and toothache drugs
Rafiee *et al.*	Herbal products: Gastrointestinal medications, medications for hypoglycemia and anemia, renal medications, common cold medications
	Chemical products: Gastrointestinal medications, urogenital medications, respiratory medications, antibiotics, medications for anemia, dermatologic medications
Keramati-Matin *et al.*	Analgesics, antibiotics, vitamins
Doostdar-Sanaye *et al.*	Medications for anemia, vitamins, gastrointestinal medications, analgesics, antibiotics

Six studies had reported the common over-the-counter medications used by pregnant women. Gastrointestinal medications, antibiotics, vitamins, and analgesics were among the most commonly used medications [Table 3].

DISCUSSION

Results showed that the overall self-medication prevalence was 38.46%. Previous studies in other countries reported varying prevalence rates for self-medication. In line with our findings, a study in the United Arab Emirates found that self-medication prevalence was 40%[7] and another study in low- and middle-income countries showed that the overall prevalence of self-medication was 31.5%.[31] Compared with our findings, some studies reported higher self-medication prevalence among pregnant women. For instance, a study in Brazil reported that 50% of pregnant women used 1–4 over-the-counter medications.[32] A study in France also showed that the prevalence of self-medication among pregnant and nonpregnant women was 72% and 48%, respectively.[33] Another study in France showed that 59% of pregnant women had experienced at least one instance of self-medication.[34] On the other hand, some studies reported lower self-medication prevalence compared to the rate in our study. For instance, self-medication prevalence was found to be 26.6% in Ethiopia and 21.9% in Mexico.[35,36]

The wide difference among self-medication prevalence rates in different areas of the world can be due to the differences in over-the-counter medication patterns and medication prescription systems in different countries. For instance, in some African countries, all medications can be bought without medical prescription.[31] Some reasons for the relatively high prevalence of self-medication in our study are the high costs of frequent medical visits, inadequate health-care insurance coverage, over-the-counter sale of most medications in drugstores, previous history of taking some medications, and inattentiveness to symptoms.[12]

In 1989, a statistical analysis by the World Health Organization in ten countries showed that approximately 60% of pregnant women took at least one over-the-counter medication other than iron-containing products and vitamins. This finding denotes that despite the thalidomide disaster in 1959, self-medication was very high in 1989.[37] A significant factor contributing to the high prevalence of self-medication in pregnancy is pregnant women's wide use of herbal products due to their misconceptions about the insignificant maternal and fetal consequences of these products.[12] Women with unplanned pregnancies are also more at risk for self-medication.[38]

The results of subgroup analysis in our study showed that the prevalence of self-medication varies in different regions of Iran. This finding is attributable to the

differences in sociocultural and health-related knowledge, beliefs, attitudes, and behaviors among Iranians in different geographical areas.[39] Moreover, subgroup analysis indicated the higher prevalence of herbal and chemical self-medication compared with chemical self-medication. This higher prevalence of herbal and chemical self-medication compared with chemical self-medication may be due to the belief that herbal products are safe even during pregnancy. However, scientific evidence shows that herbal self-medication during pregnancy can increase the risk of some adverse effects.[40] In Iran, families and friends usually recommend the use of herbal products, while health-care providers generally avoid from such recommendations.[23,41]

One potential limitation of the present study was that all analyzed studies had moderate methodological quality. Moreover, incomplete result reporting in the studies prevented more in-depth analysis of the data. Some studies also had dealt with both herbal and chemical products without providing any differential data for these two types of product. Future studies are recommended to use stronger methodological designs (in terms of comparison group and sampling method) to provide more accurate estimate of self-medication prevalence among pregnant women. Moreover, as most previous studies into the prevalence of herbal self-medication in Iran did not address the sources of herbal product prescription, studies are needed to provide detailed data in this area.

The first step to solve a problem is to accurately estimate it in its sociocultural context. The results of this study can be used to plan and implement interventions for reducing self-medication among pregnant women. These interventions may focus on knowledge development among pregnant women and health-care providers regarding self-medication during pregnancy and the potential maternal and fetal adverse effects of herbal self-medication.

CONCLUSION

The overall prevalence of self medication among Iranian pregnant women is 38.46% and it varies in different regions of Iran. Study findings can be used to design and implement interventions to reduce self medication among pregnant women. Educational interventions are needed to improve the knowledge of pregnant women and health care providers about the effects of self medication, particularly herbal self medication.

Acknowledgment

REFERENCES

1. Azami-Aghdash S, Mohseni M, Etemadi M, Royani S, Moosavi A, Nakhaee M. Prevalence and cause of self-medication in Iran: A systematic review and meta-analysis article. Iran J Public Health 2015;44:1580-93.
2. Ahmad A, Patel I, Mohanta G, Balkrishnan R. Evaluation of self medication practices in rural area of town Sahaswan at Northern India. Ann Med Health Sci Res 2014;4:S73-8.
3. Fruth B, Ikombe NB, Matshimba GK, Metzger S, Muganza DM, Mundry R, *et al.* New evidence for self-medication in bonobos: Manniophyton fulvum leaf- and stemstrip-swallowing from Luikotale, Salonga National Park, DR Congo. Am J Primatol 2014;76:146-58.
4. Bi P, Tong S, Parton KA. Family self-medication and antibiotics abuse for children and juveniles in a Chinese city. Soc Sci Med 2000;50:1445-50.
5. Tesch BJ. Herbs commonly used by women: An evidence-based review. Am J Obstet Gynecol 2003;188:S44-55.
6. Sado E, Kassahun E, Bayisa G, Gebre M, Tadesse A, Mosisa B. Epidemiology of self-medication with modern medicines among health care professionals in Nekemte town, Western Ethiopia. BMC Res Notes 2017;10:533.
7. Abduelkarem AR, Mustafa H. Use of over-the-counter medication among pregnant women in Sharjah, United Arab Emirates. J Pregnancy 2017;2017:4503793.
8. Marwa KJ, Njalika A, Ruganuza D, Katabalo D, Kamugisha E. Self-medication among pregnant women attending antenatal clinic at Makongoro health centre in Mwanza, Tanzania: A challenge to health systems. BMC Pregnancy Childbirth 2018;18:16.
9. Befekadu A, Dhekama N, Adem M. Self-medication and contributing factors among pregnant women attending antenatal care in Ethiopia: The case of Jimma university specialized hospital. Med Sci 2014;3:969-81.
10. Lupattelli A, Spigset O, Twigg MJ, Zagorodnikova K, Mårdby AC, Moretti ME, *et al.* Medication use in pregnancy: A cross-sectional, multinational web-based study. BMJ Open 2014;4:e004365.
11. Tajik R, Shamsi M, Mohammad Beygee A. Survey prevalence of self medication and factors effected in woman's Arak City. Sci J Hamadan Nurs Midwifery Fac 2008;16:29-39.
12. Ghanei Gheshlagh R, Hemmati Maslakpak M, Vajiheh B. Self-medication in pregnant women. J Res Dev Nurs Midwifery 2013;10:92-8.
13. Bagheri A, Abbaszadeh F. Comparing the self-medication and supplement therapy in pregnant women in kashan rural and urban areas. J Mazandaran Univ Med Sci 2014;24:151-7.
14. Rafiee A, Moradi Gomyek H, Haghighizade M. Self-treatment during pregnancy and its related factors. J Holist Nurs Midwifery 2018;28:129-36.
15. Karami-Matin B, Hosseini S, Mahboubi M, Aghaei A, Fattahi M, Etesamifard, T. Predicting factors related to selfmedication among pregnant women referred to health centers in Kermanshah county. Int J Trop Med 2016;11:337.
16. Šlamberová R. Drugs in pregnancy: The effects on mother and her progeny. Physiol Res 2012;61 Suppl 1:S123-35.

17. Kuruvilla S, Schweitzer J, Bishai D, Chowdhury S, Caramani D, Frost L, *et al.* Success factors for reducing maternal and child mortality. Bull World Health Organ 2014;92:533-44.

18. Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLoS Med 2009;6:e1000097.

19. Hoodin F, Weber S. A systematic review of psychosocial factors affecting survival after bone marrow transplantation. Psychosomatics 2003;44:181-95.

20. Ghanei Gheshlagh R, Ebadi A, Dalvandi A, Rezaei M, Nourozi Tabrizi K. A systematic study of resilience in patients with chronic physical diseases. Nurs Midwifery Stud 2017;6:e36401.

21. Pritchard NA, Tebbs JM. Estimating disease prevalence using inverse binomial pooled testing. J Agric Biol Environ Stat 2011;16:70-87.

22. Higgins JP, Thompson SG. Quantifying heterogeneity in a meta-analysis. Stat Med 2002;21:1539-58.

23. Afshary P, Mohammadi S, Najar S, Pajohideh Z, Tabesh H. Prevalence and causes of self-medication in pregnant women referring to health centers in Southern of Iran. Int J Pharm Sci Res 2015;6:612.

24. Ebrahimi H, Atashsokhan G, Amanpour F, Hamidzadeh A. Self-medication and its risk factors among women before and during pregnancy. Pan Afr Med J 2017;27:183.

25. Shamsi M, Bayati A, Mohamadbeygi A, Tajik R. The effect of educational program based on Health Belief Model (HBM) on preventive behavior of self-medication in woman with pregnancy in Arak, Iran. Pejouhandeh 2010;14:21-36.

26. Baghianimoghadam MH, Mojahed S, Baghianimoghadam M, Yousefi N, Zolghadr R. Attitude and practice of pregnant women regarding self-medication in Yazd, Iran. Arch Iran Med 2013;16:580-3.

27. Doostar Sanaye M, Sobhani A. Pattern of drug consumption and its changes during the first trimester of pregnancy. J Qazvin Univ Med Sci 2002;20:55-61.

28. Mohammadi Shoosi Gashte S. Determine the Frequency and Causes of Self- Medication in Women's Health Centers in Ahvaz. Masters Thesis; 2013. Available from: http://eprints.ajums.ac.ir/id/eprint/4027/1/m39384.pdf.pdf. [Last accessed on 2019 Aug18].

29. Ziaei T, Ozgoli G, Yaghmaee F, Akbarzade Bagheban A. Knowledge, attitude and practice of pregnant women about self-medication during pregnancy in health centers affiliated to Shahid Beheshti university of medical sciences. Adv Nurs Midwifery 2008;18:35-9.

30. Sattari M, Dilmaghanizadeh M, Hamishehkar H, Mashayekhi SO. Self-reported use and attitudes regarding herbal medicine safety during pregnancy in Iran. Jundishapur J Nat Pharm Prod 2012;7:45-9.

31. Adanikin AI, Awoleke JO. Antenatal drug consumption: The burden of self-medication in a developing world setting. Trop Doct 2017;47:193-7.

32. Araújo DD, Leal MM, Santos EJ, Leal LB. Consumption of medicines in high-risk pregnancy: Evaluation of determinants related to the use of prescription drugs and self-medication. Brazilian J Pharm Sci 2013;49:491-9.

33. Cabut S, Marie C, Vendittelli F, Sauvant-Rochat MP. Intended and actual use of self-medication and alternative products during pregnancy by French women. J Gynecol Obstet Hum Reprod 2017;46:167-73.

34. Lacroix I, Damase-Michel C, Lapeyre-Mestre M, Montastruc JL. Prescription of drugs during pregnancy in France. Lancet 2000;356:1735-6.

35. Beyene KG, Beza SW. Self-medication practice and associated factors among pregnant women in Addis Ababa, Ethiopia. Trop Med Health 2018;46:10.

36. Alonso-Castro AJ, Ruiz-Padilla AJ, Ruiz-Noa Y, Alba-Betancourt C, Domínguez F, Ibarra-Reynoso LD, *et al.* Self-medication practice in pregnant women from central Mexico. Saudi Pharm J 2018;26:886-90.

37. Shamsi M, Bayati A. A survey of the prevalence of self-medication and the factors affecting it in pregnant mothers referring to health centers in Arak city, 2009. Jahrom Med J 2009;7:34-42.

38. Jiménez E, Bosch F, López A, Costa J, Cos R, Baños JE. Patterns of regular drug use in Spanish childbearing women: Changes elicited by pregnancy. Eur J Clin Pharmacol 1998;54:645-51.

39. Mortazavi SS, Shati M, Khankeh HR, Ahmadi F, Mehravaran S, Malakouti SK. Self-medication among the elderly in Iran: A content analysis study. BMC Geriatr 2017;17:198.

40. Strandberg TE, Järvenpää AL, Vanhanen H, McKeigue PM. Birth outcome in relation to licorice consumption during pregnancy. Am J Epidemiol 2001;153:1085-8.

41. Sabery M, Adib-Hajbaghery M, Rafiee S. Satisfaction with and factors related to medicinal herb consumption in older Iranian adults. EurJ Integrat Med 2019;25:100-5.