

Prevalence Rate and Factors Related to Self-medication in Preventing COVID-19 Disease in Pregnant Women

Borzooe F.¹ MSc, Heshmatifar N.² MSc, Mohamadzadeh Tabrizi Z.³ MSc,
Rastaghi S.⁴ MSc, Davarinia Motlagh Quchan A.*³ MSc

¹ “Non-communicable Diseases Research Center” and “Department of Operating Room, School of Paramedics”, Sabzevar University of Medical Sciences, Sabzevar, Iran

² “Department of Medical Surgical Nursing, School of Nursing and Midwifery” and “Non-communicable Diseases Research Center, Sabzevar University of Medical Sciences, Sabzevar, Iran

³ Department of Anesthesia, Faculty Member of Paramedics, Sabzevar University of Medical Sciences, Sabzevar, Iran

⁴ “Student Research Committee” and “Department of Biostatistics, School of Health”, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract

Aims: Self-medication is one of the most common self-care methods that can have dangerous side effects in people, especially in pregnant women. The present study was conducted with the aim of investigating the prevalence and factors related to self-medication and the use of medicinal plants and chemical-mineral supplements in the prevention of COVID-19 in pregnant women referring to Sabzevar health care centers.

Instruments & Methods: This descriptive-analytical study was conducted on 109 pregnant women referring to Sabzevar health care centers in 2020 during the second peak of the coronavirus in Iran. Data were collected using an online self-medication questionnaire and analyzed by SPSS 20 software and chi-square test.

Findings: The mean age of the participants was 29.5 ± 8.68 years. The prevalence of self-medication during the last three months in pregnant women to prevent COVID-19 was 82.5%. Fear of infection, miscarriage, premature birth due to COVID-19, and crowded health centers were the most prevalent causes of the excessive use of supplements. Vitamin D, Vitamin C, ginger and thyme were the most common substances used for self-medication.

Conclusion: Self-medication in pregnant women in order to prevent COVID-19 disease is quite prevalent and is a great threat to the health of mother and fetus during pregnancy.

Keywords

COVID-19 [<https://www.ncbi.nlm.nih.gov/mesh/2052179>];

Pregnancy [<https://www.ncbi.nlm.nih.gov/mesh/68011247>];

Self-Medication [<https://www.ncbi.nlm.nih.gov/mesh/68012651>]

*Corresponding Author

Tel: +98 (939) 1019058

Fax: +98 (51) 44018319

Post Address: Faculty Member of Paramedics, Sabzevar University of Medical Sciences, Sabzevar, Iran.

Postal Code: 9617913114

Email: a.davarinia@yahoo.com

Received: March 2, 2022

Accepted: July 10, 2022

ePublished: October 6, 2022

Introduction

Nowadays, disparate developments have occurred in various fields and people have more access to different medicines. However, this easy access has turned into a harmful social phenomenon, which is the excessive consumption as well as the use of non-prescribed drugs [1]. Self-medication is one of the most common forms of self-care [2]. The World Health Organization (WHO) defines self-medication as access or consumption of one or more industrial or herbal drugs without a physician's diagnosis and prescription or medical supervision [3]. According to the statistics of the WHO, the self-medication rate in Iran is 3 times higher than the world average and Iran is among the first 20 countries in consumption of drugs and the runner-up in Asia after China [4].

Considering that consumption of traditional medicines is rooted in the Iranian culture and beliefs, since ancient times, Iranians consider these medications less harmful and more effective [5]. On the other hand, due to its disparate climate, Iran has a wide range of medicinal plants, so their easy access has increased self-treatment [6].

Both mineral supplements and medicinal plants are easily accessible and sold in the markets in the form of pills, powder, liquid, and capsule. Considering that medicinal plants usually do not have a specific dose, they can have threatening consequences for the mother and the fetus [7]. Pregnant women use medicinal herbs for various reasons, and it is believed that medicinal herbs are safe and without side effects, while medicinal herbs have side effects or drug interactions for the mother [8, 9].

The rate of self-medication with these drugs increases significantly in critical and epidemiological conditions [10]. The COVID-19 pandemic is one of these critical conditions. The unknown nature, morbidity, mortality, high transmission speed, lack of any specific treatment for this new virus, and publication of inaccurate medical information in social media have resulted in the increase of self-medication by medicinal plants and mineral chemical supplements [11, 12]. Actually, the prevalence of COVID-19 and the effectiveness of supplements such as Vitamin D, Zinc, and Vitamin C in boosting the immune system have encouraged people to self-medicate, but it should be noted that unsupervised consumption can have adverse effects and consequences [13]. Even though all age groups are susceptible to COVID-19, pregnant women are among the critical groups due to their weak immune system [14].

Fear of infection with COVID-19 and the stress of possible miscarriage and preterm labor following COVID-19 may be reasons for overuse of herbs and supplements. In a study conducted by Hosseini *et al.* in 2017 on 350 pregnant mothers in Bojnourd, 63.4% of mothers used medicinal plants during pregnancy. The most common reason was common

cold and the most used medicinal herbal was mint. Almost all of them procured medicinal plants from the medicinal herb shops [5].

Due to the ever-increasing spread of consumption of medicinal plants and supplements, especially by pregnant women, plus the lack of knowledge regarding the side effects of self-medication, comprehensive studies must be carried out in this regard. Therefore, considering the importance of drug consumption during pregnancy, the present study was conducted with the aim of investigating the prevalence and factors related to self-medication and the use of medicinal plants and chemical-mineral supplements in the prevention of COVID-19 in pregnant women referring to Sabzevar health care centers.

Instrument and Methods

This cross-sectional descriptive-analytical study was conducted on 109 pregnant women from July to October 2020 during the second peak of COVID-19 in Sabzevar, Iran. The required sample size for the study was determined 110 pregnant women based on the previous study [15], using G*Power software with an effect size of 0.3, type 1 error of 0.05, confidence level of 95%, and a test power of 0.95%. A cluster sampling method was used. As a result, Sabzevar was divided into 4 regions according to the 16 health centers of the city. Two centers were randomly selected from each region. Then, the samples were selected from each center according to the number of pregnant women referring to that center and based on the Integrated Health System (known in Persian as SIB). Participants were included in the study after obtaining online written consent through social networks.

A three-part questionnaire was used to collect data: The first part consisted of demographic information including age, education level, occupation, type of insurance, residence location, underlying medical conditions, gestational age, gravida, pregnancy-related problems in the past week, and exposure to the corona virus through infection of family members. The second part included a question about self-medication in the last three months, and the third part included 99 questions about how to take drugs, the causes and factors leading to self-medication, and the types of drugs used, i.e. mineral and chemical supplements and traditional medicinal plants of Iran.

To determine the validity, the viewpoints of 10 faculty members were used and their opinions were applied in the questionnaires. For the reliability of the questionnaire, test-retest was carried out and Cronbach's alpha was determined as 0.76.

The questionnaires were designed online and the questionnaire link was sent to the participants via social network, WhatsApp, Telegram or Short Message Service (SMS). The purpose of the study

was explained at the beginning of the questionnaire so that participants could complete and submit the questionnaire in a completely consciously. The data were analyzed using SPSS software 20. Mean and Standard Deviation (SD) were used for quantitative variables, and frequency and percentage were used for qualitative variables. The relationship between research variables was measured using chi-square test.

Findings

The mean age of the participants was 29.55 ± 8.68 years and the mean gestational age was 25.21 ± 11.86 weeks. Regarding education, 49.5% of the pregnant mothers had university degrees. The majority of participants (67.0%) were housewives. 62 people (56.9%) of pregnant women were multigravida, among the participants, 2 (1.8%) suffered from hypertension, 9 (8.3%) suffered from gestational diabetes, and 5 participants (4.6%) suffered from other diseases. Corona virus infection was observed in family members in 19 people (17.4%). In total, the prevalence of self-medication to prevent the COVID-19 within the last three months amounted to 90 participants (82.5%). Other demographic characteristics of the research participants are presented in Table 1.

Table 1) Frequency distribution of demographic characteristics of pregnant women and their relationship with self-medication (n=109)

Variable	No. (%)	P-value*
Education		
Primary school	6 (5.5)	0.001
Secondary and high school	12 (11.0)	
Diploma	37 (33.9)	
University	54 (49.5)	
Infection of coronavirus disease in at least one family member		
Yes	19 (17.4)	0.001
No	90 (82.6)	
Gravida		
Nulligravida	47 (43.1)	0.001
Multigravida	62 (56.9)	
Occupation		
Housewife	73 (67.0)	0.012
Self-employed	15 (13.7)	
Governmental	21 (19.3)	
Residence location		
Urban	84 (77.1)	0.321
Rural	25 (22.9)	
Insurance coverage		
Yes	102 (93.6)	0.235
No	7 (6.4)	
Pregnancy consequences during past week		
Weakness, fatigue	14 (12.8)	0.017
Headache	12 (11.0)	
Dyspnea	5 (4.5)	
Constipation	35 (32.1)	
Nausea	24 (22.0)	
Pelvic pain	20 (18.3)	
Muscular cramps	18 (16.5)	
Vomiting	9 (8.25)	
Self-medication		
Yes	90 (82.5)	0.001
No	19 (17.4)	

*Chi-Square

Self-medication had a significant relationship with gravida, pregnancy complications within the last week, at least one family member being infected with the coronavirus, underlying diseases, occupation, and education level ($p < 0.001$), while there was no significant relationship between self-medication and residence location and insurance coverage ($p > 0.05$; Table 1).

Fear of contracting the corona virus, abortion, premature birth, and overcrowding in health centers were the most common reasons for self-medication, respectively (Table 2).

Table 2) Frequency distribution of factors affecting self-medication to prevent COVID-19 infection in pregnant women (n=109)

No Factors	No. (%)
1 Fear of contracting the corona virus	64 (71.11)
2 Fear of miscarriage or premature birth or any problem for the fetus	59 (65.55)
3 Crowded medical centers and doctors' office	44 (48.88)
4 Self-care (recommended by others, drugstores, media)	35 (38.88)
5 Previous experiences with the medication	32 (35.55)
6 Easy access to medicines	25 (27.77)
7 Sale of non-prescription drugs by drugstores	20 (22.22)
8 Inexpensive medicines	14 (15.55)
10 Distant doctor's office	12 (13.33)
11 Inability to pay for the doctor	12 (13.33)
12 Not having enough time to visit a doctor	10 (11.11)

The most common mineral chemical supplements used by pregnant women were Vitamin D, 50000 IUs (International Units), which was used by 33 participants (36.50%). The next common drugs were vitamin C and multivitamin (Diagram 1). The consumption pattern of the drugs indicated two thirds of the participants who self-medicated, consumed Vitamin D, 50000 IUs, Calcium, and Omega-3 two times per week, and Vitamin C and multivitamin daily and Vitamin B groups and Zinc sulfate once a week.

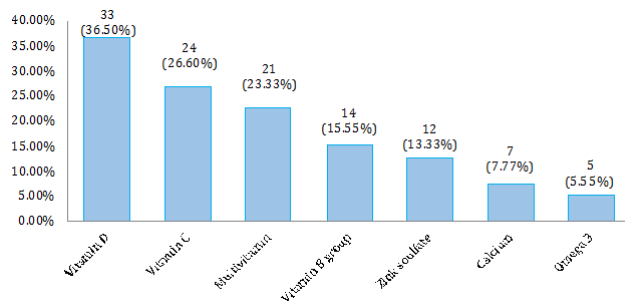


Diagram 1) Frequency and percentage of use of self-medication drugs in the prevention of COVID-19 in pregnant women

Prevalence Rate and Factors Related to Self-medication ...

Ginger (62.22%) and thyme (48.88%) were the most common Iranian traditional medicines used by the participants. Then, burning and inhalation of Harmala (Espand seed) and Anbarnasara (female donkey dung) were the most common forms of self-medication (Diagram 2). Most of the participants (56.66%) mentioned the daily consumption pattern of all herbal medicines.

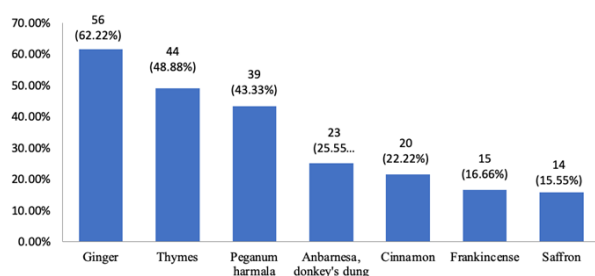


Diagram 2) Types of traditional medicine in self-medication to prevent COVID-19 in pregnant women.

Discussion

The correct and proper use of drugs, whether synthetic or herbal, is an important part of health and treatment policies in society, especially in high-risk groups. The present study was conducted with the aim of investigating the prevalence and factors related to self-medication and the use of medicinal plants and chemical-mineral supplements in the prevention of COVID-19 in pregnant women referring to Sabzevar health care centers.

The findings of this research showed that the prevalence of self-medication during the last three months in pregnant women in order to prevent COVID-19 was significant, which indicates the crisis after the COVID-19 outbreak, especially in pregnant women.

The present research revealed that there is a significant relationship between gravidity and self-medication during the COVID-19 epidemic. In other words, multigravid women are more likely to self-medicate because their previous pregnancy experience has reduced their fear of using non-prescribed drugs. The lower rate of self-medication in nulligravida women may be due to the importance of the physician's opinion about the pregnancy process. There was no significant relationship between insurance coverage and self-medication, which may be due to the lack of coverage of supplement medicines by insurance. The significant relationship between self-medication in pregnant women and the infection of at least one family member with the corona virus was probably caused by this fear and their tendency to self-medicate.

The most common chemical mineral supplements consumed by pregnant women were Vitamin C and Vitamin D, which may be due to the education of the media and the general public about the benefits of

using various types of supplements, especially these two types of vitamins in the prevention of COVID-19. But in these trainings, there were no necessary warnings about the side effects of these drugs, especially for pregnant women. Improper self-medication can have adverse consequences for the mother and fetus. Shojaeefar *et al.* stated that its excessive consumption following the COVID-19 pandemic causes brain cell damage, cancer and liver toxicity [16].

Other considerable results in the present study include the consumption of other types of supplements, such as calcium and omega-3, which there is no scientifically proven evidence concerning their effects on the treatment of the COVID-19, and self-medicating by these drugs can be alarming during pregnancy.

The prevalence of the use of medicinal plants in disparate regions of Iran has been reported between 19.2% and 20.2% during pregnancy [17]. In the present study, the prevalence of self-medication with medicinal plants was more than the previous studies. In a study by Sema *et al.*, 38% of pregnant women reported self-medication in Ethiopia. In their research, medicinal plants were used more than chemical drugs [18]. In a study carried out by Frawley *et al.*, 48.6% of pregnant women used medicinal plants, which indicates a high rate of consumption of traditional medicines during pregnancy. The results of their study were consistent with the results of the present research [19]. It can be assumed that the co-occurrence of these two crises, crisis due to pregnancy and the outbreak of the contagious and deadly COVID-19 disease has resulted in self-medication.

In the present study, the findings indicate a high rate of self-medicating with medicinal plants among pregnant women. In most developing countries, the use of traditional and medicinal plants originates from their social culture, and on the other hand, it seems that sufficient education and information about the dangers of self-medication of medicinal plants have not been provided to pregnant women. Therefore, training and providing information in this regard is very crucial. Iranians have always utilized plants and food products for treatment and believe that foods have a hot or cold nature [5]. Thus, traditional Iranian medicine emphasizes the consumption of foods with hot nature to prevent the COVID-19 infection. Accordingly, pregnant women started to eat more food with hot nature to prevent the COVID-19. Since the traditional drugs are scientifically unknown, therefore, it is very important to investigate the side effects of self-medication on the mother and the fetus.

Other results of this study indicated that the most used medicinal plants were ginger with 62.22% and thyme with 48.88%. Ginger is a medicinal substance that has been used for centuries in the traditional medicine of Iran, India and China to treat vomiting

and morning sickness, dyspepsia, flatulence, etc. [20-22]. Even though no considerable incompatibility or side effects have been reported regarding the consumption of ginger during pregnancy, there is always concern about the effects of excessive use of ginger for a long time in pregnant women. It is not recommended to consume more than 1 to 2 grams of ginger during pregnancy, and this drug cannot be used for a long time due to its anticoagulant effect and the risk of miscarriage [22, 23]. Thyme is a plant from the mint family that is used in the treatment of respiratory diseases such as asthma and as an anti-inflammatory drug in traditional medicine [24]. A large amount of thyme is toxic and its consumption during pregnancy is not recommended [25]. Despite some traditional healers believe that ginger and thyme are effective drugs against the COVID-19 disease, there is not enough research to prove their effectiveness. It is recommended to carry out more studies in this field.

Other findings revealed that 43.33% of pregnant women burned Harmala (Espand seeds) and female donkey dung (Anbarnasara) to prevent the COVID-19. Inhalation of these medicinal smokes has an important place in ancient Iranian culture and is known to have antimicrobial effects [26]. However, due to their unknown effects on the fetus, they may reduce oxygenation to the fetus. Thus, they must not be used for self-medication merely due to the non-scientific recommendations of people and social networks. It was discovered that some of the traditional plants such as saffron can cause miscarriage [27], however, in the present research, 15.55% of pregnant women consumed saffron due to its hot nature and the possibility of boosting the immune system of the body against the COVID-19 disease, while they are completely unaware of the catastrophic consequences of consuming saffron. Although this plant has been used the least in the present study, it shows the lack of knowledge of pregnant women in this field. Despite all its medicinal and therapeutic properties, it was not an effective drug in the treatment of COVID-19 because there are no medical tests to prove its effect on COVID-19.

The most common reasons for self-medication were fear of contamination, fear of miscarriage and premature birth or any other problem for the fetus, i.e., approximately half of women consumed supplements to protect their baby without a doctor's recommendation. The relatives' recommendations to consume drugs and the previous experience with the drugs were other common factors leading to self-medication. In the end, it is recommended to give the necessary training in the field of drug use to pregnant women. Also, pharmacy operators

should refrain from providing medicine to customers without a doctor's prescription.

The researchers did their best to present a comprehensive report of the results of self-medication with herbs and supplements in pregnant women during the COVID-19 crisis. The emergence of COVID-19 and the numerous changes in its clinical manifestations over time may affect the drug of choice and the prevalence of its use at the time of data collection. In addition, special circumstances caused by COVID-19 can affect how data is collected. Therefore, it is suggested to conduct studies on the general population, and considering that this is a cross-sectional study, it is recommended to carry out case-control and cohort studies to investigate the pattern of drug consumption, corona virus infection rate and severity of symptoms in pregnant women.

Conclusion

Self-medication in pregnant women in order to prevent COVID-19 disease is quite prevalent and is a great threat to the health of mother and fetus during pregnancy. Not considering these side effects of drug use can lead to an increase in abnormalities in the fetus.

Acknowledgment: We hereby express our gratitude to the Research Department. Besides, we express our appreciation to the employees of the health centers who cooperated in this research and the pregnant women who participated in this study.

Ethical Permission: The present study was approved by the Ethical Research Committee of Sabzevar University of Medical Sciences with code IR.MEDSAB.REC.1399.020.

Authors Contribution: Borzoe F. (First author), Introduction author/ Methodologist/ Original researcher (25%); Heshmatifar N. (Second author), Introduction author/ Discussion author (20%); Mohamadzadeh Tabrizi Z. (Third author), Introduction author/ Discussion author (15%); Rastaghi S. (Fourth author), Statistical analyst (15%); Davarinia Motlagh Quchan A. (Fifth author), Introduction author/ Methodologist/ Original researcher (25%)

Funding/Supports: This study was supported by Sabzevar University of Medical Sciences.

Conflict of Interest: The authors declare no conflict of interests.

References

- 1- Bagheri A, Eskandari N, 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 (114):151-7. [Persian]
- 2- Chaboksavar F, Irandost M, Irandost Sf, Sharifirad G, Jalilian F, Khalili S. Application of educational method of helping child to family for self-medication. *Rahavard Salamat J.* 2018;3(3):36-43. [Persian]

- 3- Najafipour R, Shishehbor F, Ahmadiania H, Rezaeian M. The frequency of self-medication in medical students of Rafsanjan University of Medical Sciences in 2016. *J Rafsanjan Univ Med Sci.* 2018;17(4):331-44. [Persian]
- 4- Rahbar A, Gharlipour Z, Arsang-Jang S, Ebraze A, Kazazlou Z. Perceived benefits and barriers about self-medication among women referring to health center in Qom City-2016. *J Arak Univ Med Sci.* 2017;20(2):33-45. [Persian]
- 5- Hosseini SH, Rajabzadeh R, Nosrati H, Naseri F, Toroski M, Mohaddes Hakkak H, et al. Prevalence of medicinal herbs consumption in pregnant women referring to Bojnurd Health Care Centers. *Iran J Obstet Gynecol Infertil.* 2017;20(9):33-40. [Persian]
- 6- Mahmoudian A, Golshiri P, Rezaei G, Akbari M. Patients' Satisfaction form Iranian Traditional Medicine. *J Isfahan Med Sch.* 2012;30(208):1550-8. [Persian]
- 7- Dabirifard M, Maghsoudi Z, Dabirifard S, Salmani N. Frequency, causes and how to use medicinal herbs during pregnancy. *Iran J Obstet Gynecol Infertil.* 2017;20(4):66-75. [Persian]
- 8- Sereshty M, Azari P, Rafiean M, Kheiri S. Use of herbal medicines by pregnant women in Shahr-e-Kord. *J Reprod Infertil.* 2006;7(2):125-31.
- 9- Hilmi Adawi D. Prevalence and predictors of herb use during pregnancy (a study of Rafidia governmental hospital/Palestine) [Dissertation]. Israel: An-Najah National University; 2012.
- 10- Gholipour K, Tabrizi JS, Haghgoshayee E, Soltani R, Mousazadeh Y, Rasi V. Investigating factors affecting self-medication and its pattern among students of Tabriz University of Medical Sciences, Iran, in 2012. *J Health Syst Res.* 2016;11(4):736-40. [Persian]
- 11- Chouhan K, Prasad SB. Self-medication and their consequences: a challenge to health professional. *Asian J Pharm Clin Res.* 2016;9(2):314-7.
- 12- Kim Sooi L, Lean Keng S. Herbal medicines: Malaysian women's knowledge and practice. *Evid Based Complement Alternat Med.* 2013;2013:438139.
- 13- Mudenda S, Witika BA, Sadiq MJ, Banda M, Mfuno RL, Daka V, et al. Self-medication and its consequences during & after the Coronavirus Disease 2019 (COVID-19) pandemic: A global health problem. *Europ J Environment Public Health.* 2020;5(1):em0066.
- 14- Shariatzadeh M, Sarfaraz Z, Alazemani NF, Azizi H, Ahmadi Y. The effect of COVID-19 on the health status of pregnant women and their neonates: A systematic review study. 2020;9(1):4-14. [Persian]
- 15- Emmanuel A, Achema G, Afoi BB, Maroof R. Self medication practice among pregnant women attending antenatal clinic in selected hospitals in Jos, Nigeria. *Int J Nurs Health Sci.* 2014;1(6):55-9.
- 16- Shojaeefar E, Malih N, Rezaei N. The possible double-edged sword effects of vitamin D on COVID-19: A hypothesis. *Cell Biol Int.* 2021;45(1):54-7.
- 17- Soleymani S, Makvandi S. Rate of herbal medicines use during pregnancy and some related factors in women of Ahvaz, Iran: 2017. *Iran J Obstet Gynecol Infertil.* 2018;21(5):80-6. [Persian]
- 18- Sema FD, Addis DG, Melese EA, Nassa DD, Kifle ZD. Prevalence and associated factors of self-medication among pregnant women on antenatal care follow-up at University of Gondar Comprehensive Specialized Hospital in Gondar, Northwest Ethiopia: A cross-sectional study. *Int J Reprod Med.* 2020;2020:2936862.
- 19- Frawley J, Adams J, Steel A, Broom A, Gallois C, Sibbritt D. Women's use and self-prescription of herbal medicine during pregnancy: an examination of 1,835 pregnant women. *Womens Health Issues.* 2015;25(4):396-402.
- 20- Shawahna R, Taha A. Which potential harms and benefits of using ginger in the management of nausea and vomiting of pregnancy should be addressed? A consensual study among pregnant women and gynecologists. *BMC Complement Altern Med.* 2017;17(1):204.
- 21- Khorasani F, Aryan H, Sobhi A, Aryan R, Abavi-Sani A, Ghazanfarpour M, et al. A systematic review of the efficacy of alternative medicine in the treatment of nausea and vomiting of pregnancy. *J Obstet Gynaecol.* 2020;40(1):9-10.
- 22- Willetts KE, Ekangaki A, Eden JA. Effect of a ginger extract on pregnancy-induced nausea: A randomised controlled trial. *Aust N Z J Obstet Gynaecol.* 2003;43(2):139-44.
- 23- Smith C, Crowther C, Willson K, Hotham N, McMillian V. A randomized controlled trial of ginger to treat nausea and vomiting in pregnancy. *Obstet Gynecol.* 2004;103(4):639-45.
- 24- Kaeidi A, Rahmani MR, Hassanshahi J. The protective effect of Carvacrol and Thymol as main polyphenolic compounds of thyme on some biologic systems in disease condition: a narrative review. *J Rafsanjan Univ Med Sci.* 2020;19(1):81-96. [Persian]
- 25- Zolfaghari H. Treatment of the common people. *J Islam Iran Trad Med.* 2013;4(2):138-60. [Persian]
- 26- Shahabi S, Hassan ZM, Mahdavi M, Dezfouli M, Rahvar MT, Naseri M, et al. Hot and cold natures and some parameters of neuroendocrine and immune systems in traditional Iranian medicine: a preliminary study. *J Altern Complement Med.* 2008;14(2):147-56.
- 27- Bostan HB, Mehri S, Hosseinzadeh H. Toxicology effects of saffron and its constituents: a review. *Iran J Basic Med Sci.* 2017;20(2):110-21.