

Nausea and vomiting in Iranian Traditional Medicine based on Avicenna's viewpoint

Mohammad Nazari¹, Ali Taghizadeh², Hossein Orafaei³, Hassan Rakhshandeh⁴, Mojtaba Mousavi Bazzaz⁵, Jafar shokri⁶, Sadegh Shokri⁷

¹ Assistant Professor, Ph.D. in Iranian Traditional Medicine, School of Iranian Traditional and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

² Associate Professor, Department of Oncology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

³ Professor in Industrial Pharmacy, Department of Pharmaceutics, School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran

⁴ Assistant Professor, Department of Pharmacology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

⁵ Associate Professor, Department of Community Medicine, School of Medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran

⁶ Master of Theology, Ahwaz Judiciary office, Ahwaz, Iran

⁷ Ph.D. Candidate, School of Iranian Traditional and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Type of article: Original

Abstract

Background: Nausea and vomiting decrease one's quality of life significantly, and, despite various treatments, they are still uncontrollable, especially in acute illness. Perhaps it would be useful to search for new concepts and therapies for dealing with these issues at other medical schools. The aim of this research was to elucidate the causes of nausea and vomiting in Iranian Traditional Medicine (ITM) based on Avicenna's viewpoint in The Book of "Canon of medicine".

Methods: We reviewed the Canon of Medicine and other reference textbooks of ITM to get the experts' viewpoints, such as Kamel-al-Sanaeh, Al-Havi, and Zakhireh-kharazmshahi, and we searched PubMed, Scopus, Embase, ISI and Science Iranian Database (SID) in November and December 2014 using keywords.

Results: Basic terms associated with nausea and vomiting in ITM are Gha'y (vomiting), Tahavo'a (retching), Gathayan (nausea), and Taghallob-al-nafs (continuous nausea). Different factors can induce these problems with direct or indirect change in the quantity/quality of humors in the body's systems or the stomach. Treatments are based on the correction of humors and modifications of lifestyle. ITM has recommended medicinal herbs for severe nausea and vomiting. For example, they may be effective in treating chemotherapy-induced nausea and vomiting (CINV).

Conclusion: ITM suggests that almost the nausea and vomiting associated with almost all major diseases originate from abnormalities in either the quantity/quality of humors. The gold standard for managing nausea and vomiting is lifestyle modifications with attention to responsible humors. Some therapeutic protocols in ITM may be applicable today. Perhaps redefining the diseases and updating the expression of these concepts and approaches can lead to the development of complementary and alternative treatments for nausea and vomiting.

Keywords: traditional medicine, Avicenna, humor, temperament, nausea, vomiting

Corresponding author:

Dr. Sadegh Shokri, School of Iranian Traditional and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran. Tel: +98.5138552188, Fax: +98.5138535980, E-mail: Shokris1@mums.ac.ir

Received: January 04, 2015, Accepted: February 11, 2015, Published: June 05, 2015

© 2015 The Authors. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

1. Introduction

Nausea and vomiting are common symptoms of various illnesses. They are very unpleasant side effects of illness, and they sometimes can lead to the disability of the patient. However, it is difficult to accurately assess the economic burden of nausea and vomiting, especially when considering only the more common causes of acute nausea and vomiting, such as postoperative illness, pregnancy, and chemotherapy. However, it is apparent that the socioeconomic burden to affected patients and society is significant (1). It may be helpful to search for new solutions for these issues in non-conventional medical schools, such as Iranian Traditional Medicine (ITM) or Persian medicine, also called Hikmat that is practiced primarily in the Muslim community (2). ITM physicians (hakims) had a key role in development of medicine in the medieval period. Avicenna (980–1037 AD) provided an index that was used by most of these hakims after him. The greatest Avicenna's work in medicine was a book entitled *Al-Qanun fi'l-tibb (Canon of Medicine)*, which was the main source for medical education and practice in Europe until the 16th century (3-5). Its third volume (*Kitab*) describes the diseases such as nausea and vomiting (In that time, they used to be known as diseases not simple symptoms). We consider Avicenna's view in ITM and books of ITM hakims, such as Al-Havi (author: Rhazes), Kamel-al-Sanaeh (author: Haly Abbas), Zakhireh-Kharazmshahi (author: Seyed Ismaeel Jorjani), that wrote about nausea and vomiting. The general objective of this study was to elucidate Avicenna's viewpoints about nausea and vomiting in ITM, including the following items; 1) definition of nausea, vomiting, and related terms; 2) aetiology; 3) physiopathology; 4) symptoms and signs of diseases that cause nausea and vomiting; 5) treatment; and 6) as an example of the application of ITM to a new problem, consideration of the conformity of chemotherapy-induced nausea and vomiting (CINV) and finding new treatments.

2. Materials and Methods

2.1. Identifying relevant publications

In order to determine Avicenna's opinions concerning etiologies, symptoms, signs, and treatments of nausea and vomiting, as well as the possibility of using his ideas for new diseases, e.g., CINV, we reviewed the manuscripts and printed the Canon of Medicine, Kamel-al-Sanaeh, Al-Havi, Zakhireh-Kharazmshahi, Tibbe Akbari, and Exir A'azam. According to ITM experts, these books have complete explanations about nausea and vomiting and they are available in the Iranian Traditional and Complementary Medical School's library at Mashhad University of Medical Sciences (MUMS). We also searched the PubMed, Scopus, Embase, ISI and Science Iranian Database (SID), and articles were selected that had partial or complete descriptions of specific issues according to ITM and Avicenna's viewpoint.

2.2. Search strategy

This research was carried out in November and December 2014. We searched phrases such as 'nausea and Iranian Traditional Medicine,' 'Nausea and Persian Medicine,' 'nausea and Avicenna,' 'vomiting and Iranian Traditional Medicine,' 'vomiting and Persian Medicine,' and 'vomiting and Avicenna' irrespective of the time of publication and language.

3. Results

3.1. Search results

We found nine articles in PubMed and Scopus and two articles in SID. However, the nine articles in PubMed and Scopus were not related to our objective. The two articles from SID presented information that matched our objective.

3.2. Definitions of nausea, vomiting, and related terms

Gha'y means gastric motion and oral expulsion of the content of the stomach. Tahavo'a means gastric motion for oral expulsion of the stomach's contents but the inability to do so. Gathayan refers to the state in which the patient is restless and there is a need to vomit, but neither gastric motion nor oral expulsion of the contents occurs because the contents are attached to the gastric villous. Taghallob-al-nafs is continuous Gathayan. In Avicenna's view, the origin of all things is four elements, i.e., fire, air, water, and Earth. Each element has two qualities, i.e., fire is warm and dry; air is warm and damp; water is cold and damp; and Earth is cold and dry. These elements are concepts rather than physical bodies. The normal temperament is composed of the proper and complete interaction of these qualities of these elements. Each organ has a specific ratio of elements that form its temperament, and the resulting combination of the organs' temperaments comprises the body's overall temperament. The brain, heart, and liver have the most impact. Humor is a fluid and R'atb (means detachable, attachable and shapeable) body that produced by the transformation of food in hepatic processing (Hazm-e Kabedi) in the first step. Humors contribute to

maintaining the body's temperament. Categories of all organs' diseases are: 1) dystemperament, 2) micro/macro dissociation in structure, and 3) abnormality in size, shape, creation, number, or position. The participation (Mosharekati) organ refers to the pathological origin, which is another organ, such as nausea and vomiting in brain trauma (secondary disease), and the stomach is the participating organ. One's lifestyle is made up of six principles of health (Setteh Zaruriyah).

3. 3. Etiology of nausea and vomiting

Nausea and vomiting can be due to a) stomach diseases; b) pathogens that come from outside the stomach/body c) the stomach's acting as a participating organ. Table 1 lists the most important etiologies. These factors may affect the stomach by changing its temperament and/or functions. Normal humors are not produced in the stomach. Mental and psychological factors also are common.

Table 1. Nausea and vomiting: related etiology, symptoms and signs, and treatments in ITM

Etiology	Symptoms and signs of disease	Treatments
Safra is produced in the stomach (the most severe type)	Thirst, gastric inflammation, bitter taste and greenish-yellow color of vomited material	Drugs that extract / suppress the Safra, such as safra monzij/moshil **, avoiding choleric foods, and other lifestyle modifications.
Balgham is produced in the stomach	Borborygmi, distention, sweet, salty and insipidus taste and transparent vitreous (zozaji) color of vomited material	Evacuation of phlegm by balgham monzij/moshil, changing the temperament and phelegmatogen behaviors, avoiding certain foods, and other lifestyle modifications
Sauda is produced in the stomach	Borborygmi, stomach and spleen distention, sour taste; black color of vomited material, lack of thirst	Evacuation of sauda by monzij/ moshil, changing the temperament, and melanchogen behaviors, avoiding certain foods, and other lifestyle modifications
Stomach participation	Nausea and vomiting are periodic and related to original organ involvement	Treatments of the original organ and the stomach
Materials distilled from all or part of the body into the stomach	related to the underlying diseases	Treatment of the underlying diseases
Spoiling of food into the stomach	Symptoms and signs of indigestion, maldigestion	Being aware of the timing of eating, the amounts of foods and beverages consumed, and other lifestyle modifications
Didan (Parasites)	Gripe (ma'ghs), weak pulse, dry cough, cold extremities, bruxism, low-mass stools, constipation, early hungry, overnight sialorrhea	Eliminate them with ITM drugs based on the type of worms and lifestyle modifications
Gastric weakness and other dystemperament	Related to type of dystemperament and other types of gastric weakness	Stomach tonics (Moghavviat), temperament correction with ITM protocols, and lifestyle modifications
Bohran*	Related to types of Bohran	In good bohran, observation. In bad bohran, treatment related to the type of material being vomited and the patient's condition
Watching emetogenic scenes, eating, smells	Without history of related physical diseases	Avoiding , relaxation
Headaches (Soda'a)	Related to types of Soda'a	Related therapy
Ghoulanj (colic)	Severe abdominal pain, difficulty in defecation and related to types of Ghoulanj	Related therapy
Drugs	Related to the type of drug and the target organ	Related to drug type

* Significant changes in disease that occur suddenly; and quickly lead to improvement or deterioration of health (6).

** ITM drug compounds, used in therapy for humoral dysequilibrium.

3.4. Symptoms and signs of diseases that cause nausea and vomiting

As mentioned above, symptoms and signs (Table 1) are related to the factors that induce nausea and vomiting. These factors may have their own preliminary symptoms and signs, which culminate in nausea and vomiting, or the opposite may occur in which the problem begins in the stomach. The presence of multiple factors may create additional symptoms and signs.

3.5. Physiopathology

The important mechanism of nausea and vomiting is the disequilibrium in the gastric temperament. In this state, the body's nature uses its forces to return the stomach to healthy equilibrium, as discussed below.

3.6. Treatments

Each person has an exclusive temperament, as is the case for fingerprints. Every patient has her or his own disease characteristics. Diseases are common, but each patient is unique. In other words, there are common therapeutic protocols, but the therapeutic intervention in a given patient is exclusive. The brief treatments shown in Table 1 are related to the common protocols. Modifying one's lifestyle, managing the humors that are responsible for nausea and vomiting, and managing non-humoral disorders have rules that should be considered.

3.7. An example of using ITM concepts related to nausea and vomiting in a new problem

We observed similarities between the safra concept and the free radicals that are released by chemotherapy drugs, and this is discussed below. Saffra induces the most severe nausea and vomiting, but some medicinal herbs exist for this state, and they may be helpful in controlling CINV.

4. Discussion

4.1. Definitions of nausea, vomiting, and related terms

In conventional medicine, nausea is a subjective symptom and an unpleasant feeling in the epigastrium or throat of the impending need to vomit. Vomiting is forceful expulsion of the contents of the stomach and intestines through the mouth (7). Retching is the non-productive need to vomit (8). There are definitions that indicate the compatibility between (gha'y, vomiting), (Gathayan, nausea), and (tahavo'a, retching). Taghallob-al-nafs does not have a synonym (9, 10). Normal humors include safra (warm and dry yellow bile), Balgham (cold and damp phlegm), Dam (warm and damp Sanguine), and Sauda (cold and dry black bile). All of organs and tissues comprised them; for example normal blood is the proper combination of these normal humors (11, 12). Principles of lifestyle (or *Setteh Zaruriyah Hefzos-sihha*) are a) ambient air (climate and environment); b) the food and drink one takes in; c) proper physical activity (Harakat) and rest (Sokoon); d) psychological activities (A'araze nafsani); e) getting enough sleep; and f) evacuation and retention (13, 14).

4.2. Etiology of nausea and vomiting

All normal humors are produced in the liver. Normal safra is used for nourishment, e.g., the lungs and enforcement of agents in the body's narrow channels; the remaining part is stored in the gallbladder and then poured into the intestines to cleanse them from stool and slimy (Lazij) balgham and anal irritation (defecation sensation). Dystemperament of the stomach is one of the pathological situations that safra produces, acting as a pathogen that irritates the stomach and cardia. Normal balgham always is associated with blood, and it exists very near the organs and tissues, because under appropriate heat, it is transformed to sanguine at the appropriate time or it degrades and is consumed partly for nourishment, i.e., by the brain, and it wets the joints and hyperkinetic organs. The gastric source of balgham also is abnormal, and the stomach tries to expel it. Normal sauda is for nourishment, e.g., for bones, and for maintaining the strength, consistency, and density of the organs and blood; the remaining part is stored in the spleen to create the appetite sensation (cardia irritation). The gastric source of sauda also is abnormal, and the stomach attempts to expel it. Most nausea and vomiting etiologies can change in quantity/ in the quality of the humors in the stomach/body. Nausea and vomiting may be induced by the stomach as a participating organ, and they also can be induced by didan (some types of parasitic worms), maldigestion, ghoulanj (colic), and unpleasant events, foods, smells, imaginations, and sights (11, 12, 16).

4.3. Symptoms and signs of diseases that induce nausea and vomiting

In ITM, symptoms and signs are obtained from an active interview, past medical history, clinical and paraclinical examinations (observation, palpation, percussion, auscultation, touching, studying all of the body's excretions and

checking the patient's pulse and other) (11, 17). Table 1 lists the symptoms and signs in two categories, i.e., 1) those related to gastrointestinal (GI) factors and 2) those related to the non-GI factors.

4.4. *Physiopathology*

The stomach and especially the cardia are rich in nerve fibers [A'sabani] (10). In tahavo'a (retching), the cardia work to rid the body of substances in the quickest way because of a) noxious quality of normal agents, b) the stomach is a participating organ, c) infected (non-instinctive heat effect) humors, or bad agents were poured into or imbibed into the stomach or presence of bad damp in cardia as seen in pregnancy or not rotten dampness that can cause flabbiness in cardia or viscous and thick dampness, d) food spoilage [Causes of food spoilage are: 1) quantity excess, 2) abnormal quality (bitter, salty, sour, spicy taste), and 3) improper feeding method (i.e., subtle after thick foods). These are harmful and the stomach tries to repel them.]; and e) abundant materials, if there are no other reasons. In Gathayan (nausea), eating with simultaneous presence of materials in the stomach may facilitate or stimulate vomiting. If there is a lack of materials, quality deficiency, or potent prehensibility (retentive power or *ghovva' masekeh*), Gathayan may remain and does not change to tahavo'a (retching). In gastric weakness, Gathayan may occur in an empty stomach without vomiting, irrespective of whether noxious humor was imbibed. Noxious humor cannot affect a strong stomach or the cardia, thus Gathayan would not occur. However, a weak stomach or cardia can be affected by noxious humor; they may gradually become weaker and not be able to repulse material or there may be inadequate material for this to occur. When a person with a weak stomach consumes food or drinks liquids, the stomach can repulse the material in two ways, i.e., 1) a little noxious humor may be located in bottom of the stomach, and, after the person eats food, it comes up and can be expelled and 2) the content of the stomach is increased, which distends the stomach, resulting in the expulsion of the contents. Warm temperament, heat, and sucking up of cardia can induce Gathayan and taghallob-al-nafs, as can taking a meal on a weak stomach. A weak stomach cannot bear receiving additional material, and it is likely to be repulsed. Gastric weakness is a type of stomach dystemperament.

Many conditions can cause stomach dystemperament, such as dysentery (hemorrhagic)/severe diarrhea, severe pain, sadness, and long periods with no intake of food. These conditions can lead to gastric weakness, Rooh atrophy and vomiting [Rooh (spirit) is a smart physical system composed of steam aroused from good and fine part of genteel normal blood and there are three types, i.e., 1) vital spirit in the heart, 2) natural spirit in the liver, and 3) nafsani spirit in the brain (A physical structure that is involved in nervous system functions and mental-psychological phenomenon) (18, 19)]. Sometimes the steam arises from foods, drugs, humors, and warm swellings in the stomach or internal viscera that can hurt or irritate the stomach and induce vomiting, even with slight touching.

Blood or balgham in the stomach can cause nausea and vomiting when the stomach is empty and blood vessels cannot feed the stomach. In the case of severe starvation of the stomach, it consumes the blood and balgham before acquiring the appropriate gastric temperament, resulting in gastric dystemperament, which leads to nausea and vomiting. Sauda/bloody vomiting are the worst types of vomiting, because the disease originates from other organs and involves the stomach. The safra type results from excess heat, and it induces the most severe vomiting. The phlegmatic type of vomiting results from excess cold. When, periodic excessive nausea and vomiting occur, the origin is far from the stomach. Frequent nausea with infrequent vomiting indicates inappropriate humors in the stomach. Continuous nausea and vomiting indicate that the disease originated in the stomach. Bloody vomiting (Gha'y-al-dam or Hematemesis) occurs from cutting or tearing the esophagus and the lining of the stomach (with pain between the shoulders), hemorrhoids in the stomach, the shedding of blood from the epistaxis, some liver and/or spleen diseases (without pain), leech in the pharynx/esophagus, and others (15-17, 20-22).

4.5. *Treatment*

The cornerstone for all ITM therapeutic protocols is modification of the patient's lifestyle. Then, to the extent possible, therapy must start with foods, and, in the next step, prescription drugs can be initiated, beginning with the lowest reasonable dosage. After a certain period, using different drugs is highly advised. Specific exercises, relaxation, bathing, and, if needed, manipulations [i.e., phlebotomy (Fa'sd), hijamat (wet/dry cupping), massages, bandaging the extremities, Ka'yy (traditional cauterization), therapeutic enema, and others] also are advised, all of which are, of course, case-related (11, 17). These rules must be followed for the treatment of nausea and vomiting.

4.6. *The use of ITM concepts for nausea and vomiting in new problems*

Nausea and vomiting can be matched with ITM practical implications to evaluate and identify complementary/alternative therapies. For example, in CINV, free radicals are produced after the chemotherapy

drugs are administered, and this can lead to the localized exocytotic release of serotonin from the enterochromaffin cells, resulting in inducing nausea and vomiting (23). Free radicals are short-lived, highly-toxic entities that can cause significant cell toxicity. They react immediately and strongly with all available biological targets. Free radicals are known to have a significant role in processes that result in tissue damage and the death of cells (24). And so, the properties of safra humor are Latif [the quality or state of being small as possible under instinctive heat (25)], very warm, delicate, very short-lived, and against the body's nature (26, 27). Free radicals may be assumed to be a kind of safra. Proper management of safra and the dystemperament of the cardia/stomach may help in controlling of CINV. Also various medicinal herbs may be useful, including *Bunium persicum* and *Rhus coriaria* (20, 22), *Citrus sinensis* (27), *Zingiber zerumbet* (28) and *Mentha pulegium* (29).

5. Conclusions

Almost all diseases, such as nausea and vomiting, directly or indirectly result from irregular distribution of four humors and their corresponding organs' temperaments. Dystemperament of an organ reflects abnormality in the temperament's alteration that can lead to the organ's dysfunction. Diagnoses in ITM are based on clinical examinations and active observation. A highlight of the ITM therapeutic approach is attention to lifestyle, followed by drugs and manipulations. Extensive research will be necessary to explain nausea and vomiting in ITM. The first step is to update the ancient terms and concepts. The analogy between ITM and conventional medicine may be helpful in opening new aspects for research and providing a better understanding of various diseases.

Acknowledgments:

This study was supported by a grant from MUMS. We thank the library staff at ITM and Complementary Medicine School of MUMS and also Dr. Majid Anushirvani (Assistant Professor, School of Iranian Traditional and Complementary Medicine, MUMS, Mashhad, Iran) for his valuable comment about "Nafsani spirit".

Conflict of Interest:

There is no conflict of interest to be declared.

Authors' contributions:

All authors contributed to this project and article equally. All authors read and approved the final manuscript.

References

- 1) Talley NJ, DeVault KR, Fleischer DE. *Practical Gastroenterology and Hepatology: Esophagus and Stomach*. Singapore: John Wiley & Sons; 2010: 205. doi: 10.1002/9781444327311
- 2) Longo D, Fauci A, Kasper D, Hauser S, Jameson J, Loscalzo J. *Harrison's principles of internal medicine*. 1. 18 ed. New York: McGraw Hill Professional; 2011: e2.
- 3) Fazljou SMB, Togha M, Ghabili K, Alizadeh M, Keshavarz M. In commemorating one thousandth anniversary of the Avicenna's canon of medicine: Gastric headache, a forgotten clinical entity from the medieval Persia. *Acta Medica Iranica*. 2013; 51(5):279-83. PubMed PMID: 23737308
- 4) Zargaran A, Mehdizadeh A, Zarshenas MM, Mohagheghzadeh A. Avicenna (980-1037 AD). *Journal of neurology*. 2012 Feb; 259(2):389-90. PubMed PMID: 21887514.
- 5) Dalfardi B, Yarmohammadi H. The heart under the lens of Avicenna. *International journal of cardiology*. 2014 Apr 15; 173(1):e1-2. doi: 10.1016/j.ijcard.2014.02.030
- 6) Nazem jahan, MA, Nayyer A'zam (persian). Tehran: Alma'ee;2010:309
- 7) Tack J, Talley NJ, Camilleri M, Holtmann G, Hu P, Malagelada JR, et al. Functional gastroduodenal disorders. *Gastroenterology*. 2006 Apr; 130(5):1466-79. PubMed PMID: 16678560. doi: 10.1053/j.gastro.2005.11.059
- 8) Hesketh PJ, Gralla RJ, du Bois A, Tonato M. Methodology of antiemetic trials: response assessment, evaluation of new agents and definition of chemotherapy emetogenicity. *Supportive care in cancer: official journal of the Multinational Association of Supportive Care in Cancer*. 1998 May; 6(3):221-7. PubMed PMID: 9629873.
- 9) Kamali MA, Mazaheri M, Borhani M. Nausea and vomiting from the perspective of modern and iranian traditional medicine(persian). *Journal of Islamic and Iranian Traditional Medicine*. 2012; 6(2):148-54.
- 10) Mokabberinejad R, Jafari Dehkordi E, Sohrabvand F, Nazem I. Hyperemesis gravidarum and review of it's causes and treatments in Iranian Traditional Medicine(persian). *Medical History*. 2013; 14(5):33-48.
- 11) Avicenna. *Canon of Medicine (Arabic)*. 1. Beirut: Dar ehya toras al-arabi; 2005: 21-285.
- 12) Shah arzani MA. *Mofarreh-al gholoob (persian)*. 1. Tehran: Alma'ee; 2012: 3-54,127.
- 13) McGinnis J. *Great medieval thinkers-Avicenna*. New york: Oxford University Press; 2010: 236.

- 14) Jorjani SI. zakhireh Kharazmshahi (persian). 1. 1 ed. Qom: Ehya'e tibbe tabiee:10,184
- 15) Jorjani SI. zakhireh Kharazmshahi (persian). 2. 1 ed. Qom: Ehya'e tibbe tabiee: 552-4.
- 16) Shah arzani MA. Tibb-e Akbari (persian). 1. Qom: Jalaloddin; 2007: 584-5,645-50.
- 17) Ahwazi AiA. Kamel-al-Sanaeh (arabic). 2. 1 ed. Qom: Jalaoddin; 2008:10-444.
- 18) Aghili Khorasani MH. Gharabadin e kabir (persian). 1. Qom: Noor e vahy; 2011:5.
- 19) Ahwazi AiA. Kamel-al-Sanaeh (arabic). 1. 1 ed. Qom: Jalaoddin; 2008:p. 37-128.
- 20) Rhazes. Al-Havi in medicine (arabic). 2, 3. Beirut: Dar-ehya al-toras al-arabi; 2001:75,252,65.
- 21) A'azam khan Chashti M. The Grater Exir (persian). 2. 1 ed. Tehran: Research Institute for Islamic and Complementary Medicine (RICM); 2008: 22-515.
- 22) Avicenna. Canon of Medicine (arabic). 3. Beirut: Dar ehya toras al-arabi; 2005:147-57,307.
- 23) Aapro M, Jordan K, Feyer P. Prevention of Nausea and Vomiting in Cancer Patients. londnn: Springer; 2013:1-55. PMCID: PMC3538015. doi: 10.1007/978-1-907673-58-0
- 24) Gadoth N, Hilmar Gobel H. Oxidative Stress and Free Radical Damage in Neurology. New York: Springer; 2011. ISBN: 978-1-60327-513-2. doi: 10.1007/978-1-60327-514-9
- 25) Alikhan MS. Makhazenot ta'lim(persian). New delhi: Farooghi; 1905:111, 55.
- 26) Shah arzani MA. Tibb-e Akbari (persian). 2. Qom: Jalaloddin; 2007:1006-8.
- 27) Aghili khorasani MH. Kholasa't ol Hikma'(persian). 1, 3. 2 ed. Qom: Ismaelian; 2005: 60-142.
- 28) Shah arzani MA. Mjarrabat Akbari (persian). 2 ed. Tehran: Chowgan; 2011:138.
- 29) Avicenna. Canon of Medicine (arabic). 2. Beirut: Dar ehya toras al-arabi; 2005: 88