

Geriatric management in medieval Persian medicine

Morteza Emami^{1,2,3}, Omid Sadeghpour^{1,4}, Mohammad M. Zarshenas^{5,6}

¹Departments of Traditional Medicine, School of Traditional Medicine, Mashhad University of Medical Sciences, Mashhad, ²Research Institute for Islamic and Complementary Medicine, Tehran University of Medical Sciences and Health Services, Tehran, ³Research Center for Traditional Medicine and History of Medicine, Shiraz University of Medical Sciences, Shiraz, ⁴Departments of Traditional Medicine, School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, ⁵Department of Traditional Pharmacy, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, ⁶Research Office for History of Persian Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

ABSTRACT

In Iran, a large group of patients are elderly people and they intend to have natural remedies as treatment. These remedies are rooted in historical of Persian and humoral medicine with a backbone of more than 1000 years. The current study was conducted to draw together medieval pharmacological information related to geriatric medicine from some of the most often manuscripts of traditional Persian medicine. Moreover, we investigated the efficacy of medicinal plants through a search of the PubMed, Scopus and Google Scholar databases. In the medieval Persian documents, digestible and a small amount of food such as chicken broth, honey, fig and plum at frequent intervals as well as body massage and morning unctioing are highly recommended. In the field of pharmacotherapy, 35 herbs related to 25 families were identified. Plants were classified as tonic, anti-aging, appetizer, memory and mood enhancer, topical analgesic and laxative as well as health improvement agents. Other than historical elucidation, this paper presents medical and pharmacological approaches that medieval Persian practitioners applied to deal with geriatric complications.

Key Words: Geriatric medicine, herbal therapy, medieval persia

INTRODUCTION

Geriatric medicine or clinical gerontology, as a branch of medical sciences specifically deals with health problems as well as care and treatment of older people.^[1] Becoming a prominent issue, this branch aims to improve function, overcome environmental problems and keep older adults healthy in normal activities.^[2] Since the population of older adults is increasing even two to three fold during the first century of this millennium,^[3] attempts to improve the aspects of geriatric medicine is enhanced.

Geriatric patients are defined as a group of patients over 65 years, but frail with multiple comorbidities and various functional impairments.^[4] Excessive decline in body mass, reduction in walking performance and presence of exhaustion as well as fatigue are associated with the aging process in geriatric patients.^[5] In addition to these conditions, geriatric persons also suffer from different chronic diseases that affect their life.^[6]

As a natural and universal process, aging is accompanied with many biological changes.^[7] These changes encompass progressive decrease in physiological functions and increase in disabilities. This gradual decline affected by dietary, environment, life-style and genetic factors.^[7] Accordingly various medications need to be considered for this period of age and also older adults are the major user group of medications.^[8] However, it should be noted that the medical approach can hardly help the elderly people alone and additionally other aspects of management are needed to be considered.^[9] Therefore, complementary and integrative medical and pharmacological approaches can be beneficial in the improvement of geriatric medicine.

Various traditional and complementary systems of medicine such as Unani, Indian, Chinese and Persian have been contributed to the promotion of medical sciences.^[10] Many documents containing information on

Address for Correspondence: Dr. Mohammad M. Zarshenas, Department of Traditional Pharmacy, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.
E-mail: zarm@sums.ac.ir

Access this article online

Quick Response Code:



Website:

www.jmidlifehealth.org

DOI:

10.4103/0976-7800.122237

geriatric medicine can be found from these systems of medicine.^[7] Medical manuscripts authored by medieval Persian practitioners, which are not only a summation of other traditional medical systems information, but also a collection of their own experiences^[11] involve beneficial findings about geriatric medicine.

In this regard, present paper attempted to draw together medieval pharmacological information and those recommended treatments related to geriatric medicine from some of the most often manuscripts of traditional Persian medicine (TPM).

METHODS

The employed study method of the present paper was based on the investigation of the remaining manuscripts of Persian medicine during 10th-18th century AD. Therefore, pharmacological information related to geriatric medicine was collected by searching through six important pharmacopeias of Persian medicine.

These manuscripts are *Liber Continents* by Rhazes (9th and 10th centuries), *Alabnieh an haghhaegh-ol-advieh* by Aboo mansour Heravi (11th century), *The Canon of medicine* by Avicenna (10th and 11th centuries), *Ikhtiyarat-e-Badiyee* by Zein al-Din Attar Ansari Shirazi (14th century), *Tohfat ol Moemenin* by Mohammad Tonkaboni (17th century) and *Makhzan- ol-Advieh* by Aghili-Shirazi (18th century).^[12-17] In addition, some medical textbooks of medieval Persian medicine were also studied to derive traditional important facts for older adults.

Other books such as “matching the old medicinal plant names with scientific terminology,”^[18] “dictionary of medicinal plants,”^[19] “dictionary of Iranian plant names,”^[20] “popular medicinal plants of Iran,”^[21] “Pharmacographia indica”^[22] and “Indian medicinal plants”^[23] were studied for nomenclature of medicinal plants.

RESULTS AND DISCUSSION

In Persian medical manuscripts chapter related to geriatric medicine is generally mentioned under a subject namely “Tadbeer-e-mashayekh” or elderly devise. There, the physiology of senescence is meticulously discussed in terms of principal fundamentals such as temperament, humors, spirits, faculties or forces and functions.^[24]

Early Persian physicians classified the growth and development stages into four main steps. First step is defined as growth period or pediatric stage. Second is the youth period and midlife stage is considered as the third stage. Accordingly, the last step is introduced as

the old stage with is starting at the age of 60. Due to the fundamentals of humoral medicine, it was believed that people in the old ages have a cold and dry temperament and it bounds to change easily by extrinsic and intrinsic affecting factors.^[7,25]

Taken as a whole, Persian practitioners believed that older adults should have light, easily digestible and a small amount of food at frequent intervals in their regimen.^[26] As constipation is more common and usual in the elderly,^[27] it was said that the bowels should be kept soft by the administration of mild laxative food or fruits such as chicken broth, honey, fig, plum and etc., Vegetables such as carrot and cabbage as well as fruits such as grapes and citrus have been also introduced beneficial. Furthermore, boiled milk was defined as a proper meal for old people especially if it is associated with honey.^[25] In contrast fruits, food and additives such as eggplant, beef and vinegar should be used in low amounts. Body massage, morning unctioing with popular oils such as olive, almond, lily and sesame oil as well as light exercise were highly recommended in Persian manuscripts.^[13,26] These approaches are likely useful in disorders such as vertigo, constipation and insomnia.^[7] In addition to these facts, Persian scholars have recommended adequate sleep during the day and night for older adults.^[13,25]

Persian medieval scholars have recommended medicinal herbs in addition to routine dietary of an old patient. According to their recommendations, plants related to geriatric medicine are classified into tonic, anti-aging, appetizer, memory and mood enhancer, topical analgesic and laxative as well as health improvement agents.^[12,25,26] A total of 35 mentioned herbs regarding to twenty five plant families are derived from selected pharmacopeias of traditional medicine. The family Rosaceae is the one which involves most cited medicinal plants related to geriatric medicine. Applicable herbs of Asteraceae, Lamiaceae and Fabaceae are cited subsequently [Table 1].

It should be noted that a tremendous part related to geriatric medicine deals with preventive approaches. Therefore, a large group of medications and supplements for the geriatric stage may be represented as anti-aging agents as well as health enhancers.^[8]

According to the Persian pharmaceutical manuscripts, cited medicinal plants are mostly mentioned to have anti-aging, health improvement and tonic effectiveness [Figure 1]. Although the anti-aging activity of anti-oxidant agents are not well-accepted, but it is remarked that agents having antioxidant or immunomodulatory effects can be considered as anti-aging supplement.^[28-30] Therefore, it seems that herbs, which were traditionally administered as anti-aging

Table 1: Herbal geriatric remedies used in medieval Persia

Family	Scientific name	Traditional name	Part used	Application for elders	Reference (s) ^a
Acoraceae	<i>Acorus calamus</i> L.	<i>Vaj</i>	Root	Health improver	[5,6]
Amaryllidaceae	<i>Allium sativum</i> L.	<i>Soom</i>	Root	Anti-aging	[1,2,4-6]
Anacardiaceae	<i>Mangifera indica</i> L.	<i>Anbaj</i>	Fruit	General tonic	[2,4-6]
Apiaceae	<i>Bunium persicum</i> (Boiss.) B. Fedtsch.	<i>Kommoon</i>	Seed	Health improver	[5,6]
Arecaceae	<i>Cocos nucifera</i> L.	<i>Narjeel</i>	Fruit	Anti-aging, general tonic	[2-6]
Asteraceae	<i>Tanacetum parthenium</i> (L.) Sch. Bip.	<i>Aghhovon</i>	Flower	Sleep improver	[5,6]
	<i>Matricaria chamomilla</i> L.	<i>Baboonaj</i>	Aerial part	Sleep improver	[6]
	<i>Carthamus tinctorius</i> L.	<i>Ghortom</i>	Seed	Health improver	[5,6]
Boraginaceae	<i>Myosotis scorpioides</i> L.	<i>Azanolfar</i>	Aerial part	Health improver	[6]
	<i>Echium amoenum</i> Fisch. and Mey.	<i>Lesan-al-sour</i>	Flower	General tonic	[4-6]
Combretaceae	<i>Terminalia chebula</i> Retz.	<i>Ahlilaj</i>	Fruit	Memory enhancer	[5,6]
Cucurbitaceae	<i>Bryonia dioica</i> Jacq.	<i>Foshagh</i>	Fruit, leaf	Anti-aging	[3,5,6]
Cuscutaceae	<i>Cuscuta epithymum</i> L.	<i>Aftimoon</i>	Aerial part	Health improver	[5,6]
Fabaceae	<i>Lupinus termis</i> L.	<i>Termes</i>	Seed	Laxative	[2,5,6]
	<i>Abrus precatorius</i> L.	<i>Ain-ol-deek</i>	Seed	Anti-aging	[5,6]
	<i>Cicer arietinum</i> L.	<i>Hemmas</i>	Seed	Appetizer, general tonic	[2,3,5,6]
Juglandaceae	<i>Juglans regia</i> L.	<i>Jowz</i>	Fruit	Memory enhancer	[1-6]
Lamiaceae	<i>Dracocephalum kotschyi</i> Boiss	<i>Zarringiah</i>	Root	General tonic	[6]
	<i>Melissa officinalis</i> L.	<i>Badrajbooye</i>	Leaf	Mood enhancer	[4-6]
	<i>Ocimum basilicum</i> L.	<i>Reyhan</i>	Leaf	Mood enhancer	[3,5,6]
Meliaceae	<i>Azadirachta indica</i> LC. Juss	<i>Azaaddrakht</i>	Flower	Health improver	[5,6]
Myristicaceae	<i>Myristica fragrans</i> Houtt.	<i>Jowzbooa</i>	Fruit	Anti-aging	[2,5,6]
Myrtaceae	<i>Myrtus communis</i> L.	<i>Moord</i>	Leaf	Health improver	[3,4-6]
Oleaceae	<i>Olea europaea</i> L.	<i>Zeytoon</i>	Fruit oil	Analgesic for chronic pain	[2,5,6]
Poaceae	<i>Saccharum officinarum</i> L.	<i>Sokkar</i>	Extract	Anti-aging	[1-6]
Polygonaceae	<i>Persicaria bistorta</i> (L.) Samp.	<i>Anjebar</i>	Aerial part	General tonic	[5,6]
	<i>Persicaria bistorta</i> (L.) Samp.	<i>Barsian</i>	Leaf	CNS tonic	[6]
Punicaceae	<i>Punica granatum</i> L.	<i>Jolnar</i>	Flower	General tonic	[3,5,6]
Rosaceae	<i>Cotoneaster nummularius</i> Fisch. And Mey.	<i>Shir Khesht</i>	Gum	Health improver	[2,4-6]
	<i>Prunus dulcis</i> (Mill.) D.A.Webb	<i>Lawz</i>	Seed oil	Analgesic for chronic pain	[1-6]
	<i>Malus domestica</i> Borkh.	<i>Toffah</i>	Fruit	Appetizer, general tonic	[2-6]
	<i>Prunus mahaleb</i> L.	<i>Hab-ol-mahlab</i>	Seed	General tonic	[5,6]
Rubiaceae	<i>Coffea arabica</i> L.	<i>Bon</i>	Seed	Mood enhancer	[3-6]
Smilacaceae	<i>Smilax china</i> L.	<i>Choob-e-chini</i>	Root	Anti-aging, general tonic	[3,5,6]
Zingiberaceae	<i>Curcuma zedoaria</i> (Christm.) Roscoe	<i>Jadwar</i>	Root	Appetizer, general tonic	[5,6]

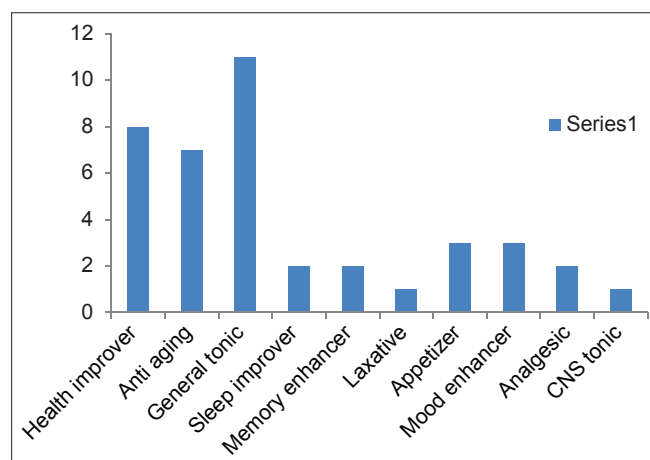
^aTraditional Persian pharmacopoeias-¹: The book of *Alabnieh an haghaegh ol advieh* by Aboo mansour Heravi (11th century), the oldest documented Persian book in the world that has 547 monographs involving simple herbal, animal and mineral medicines in alphabetical order. An original manuscript has 400 pages and is kept in Vienna museum.²: The Canon of medicine: Which is one of almost 450 treatises written by the Persian scientist and physician Avicenna. It remained a medical sciences authority up near 18th century. Eight hundred natural medicines along with comments on their application and effectiveness are gathered in the book.³: The book of *Ekhthiyarat-e-Badiyee*, a comprehensive Persian pharmacopoeia of simple and compound medicine in 1368 A.D by 'Ali ibn al-Husayn Ansari Shirazi, (1328-1403). The treatise contains two parts involving medicaments in alphabetical order in 28 chapters and description of 1005 simple medicines, which are herbal, animal and mineral drugs.⁴: *The Liber Continens (Al Hawi fil Tib)* by Muhammad ibn Zakariya Razi (865-925) - known as Rhazes in Europe-who was a Persian physician, alchemist, philosopher and scholar. The 20th and 21st books of *Liber Continens* are on materia medica and describe 898 simple medicines.⁵: The book of *Tohfat ol Moemenin*, written by Muhammad Mumin Daylami Tonkaboni, which is a comprehensive pharmacopoeia of simple and compound remedies in Persian on 2nd half of 17th century. Seven hundred and sixty three simple natural medicines have been mentioned in the book.⁶: The book of *Makhzan ol Advieh*; the largest and one of the latest Traditional Persian pharmacopoeias written by Seyyed Mohammad Hossein Aghili Khorasani Shirazi (18th A.D) and is the most important pharmacopoeia containing 28 chapters on natural medicine in alphabetical order and involving 1698 monographs. CNS: Central nervous system

medicine or remarked to be a health improver [Table 1] may have antioxidant activity [Table 2]. In addition to anti-aging properties of antioxidant agent, they are also said to have memory enhancing as well as cholinesterase inhibitor properties.^[31,32] Table 2 reports studies in line with clinical properties, which were traditionally introduced by Persian practitioners as well. In this regard, most cited

herbs exhibit antioxidant effects, which are followed by immunomodulatory and neuroprotective activity. Meanwhile, most related investigations in contemporary medicine are carried out under an animal study method. Only in two studies, evaluation was done as a human study and clinical trial. Therefore, further investigation is needed to be performed.

Table 2: Evaluation of herbs medieval properties using modern scientific methods

Plant name	Medieval effect (s)	Related effect/study method	Reference
<i>Abrus precatorius</i> L.	Anti-aging	Immunopotentiating activity/ <i>in vivo</i>	[33]
<i>Acorus calamus</i> L.	Health improver	Antioxidant/ <i>in vivo</i>	[34]
<i>Allium sativum</i> L.	Anti-aging	Antioxidant, anti-aging effect/ <i>in vitro</i>	[35,36]
<i>Azadirachta indica</i> LC. Juss	Health improver	Immunomodulatory effect/ <i>in vivo</i>	[37]
<i>Bryonia dioica</i> Jacq.	Anti-aging	Antioxidant/ <i>in vitro</i>	[38]
<i>Bunium persicum</i> (Boiss.) B. Fedtsch.	Health improver	Antioxidant/ <i>in vitro</i>	[39]
<i>Carthamus tinctorius</i> L.	Health improver	Antioxidant, neuroprotective/ <i>in vivo</i>	[40]
<i>Cicer arietinum</i> L.	Appetizer, general tonic	Growth enhancer/ <i>in vivo</i>	[41]
<i>Cocos nucifera</i> L.	Anti-aging, general tonic	Antioxidant/ <i>in vitro</i>	[42]
<i>Cuscuta epithymum</i> L.	Health improver	Claim is not proven	-
<i>Dracocephalum kotschyi</i> Boiss	General tonic	Nutritional effect/biochemical assay	[43]
<i>Echium amoenum</i> Fisch. and Mey.	General tonic	Antioxidative stress/human study	[44]
<i>Juglans regia</i> L.	Memory enhancer	Neuroprotective, antioxidant/ <i>in vitro</i>	[45,46]
<i>Lupinus termis</i> L.	Laxative	Genus as a dietary fiber/biochemical assay	[47]
<i>Mangifera indica</i> L.	General tonic	Antioxidant, immunomodulator/ <i>in vivo, in vitro</i>	[48,49]
<i>Matricaria chamomilla</i> L.	Sleep improver	Sleep enhancer/ <i>in vivo, in vitro</i>	[50,51]
<i>Melissa officinalis</i> L.	Mood enhancer	Mood modulatory effect/human study	[52]
<i>Myosotis scorpioides</i> L.	Health improver	Claim is not proven	-
<i>Ocimum basilicum</i> L.	Mood enhancer	Serotonergic antidepressant like effect/ <i>in vivo</i>	[53]
<i>Tanacetum parthenium</i> (L.) Sch. Bip.	Sleep improver	Claim is not proven	-
<i>Terminalia chebula</i> Retz.	Memory enhancer	Neuroprotective, cholinesterase inhibitor (improve cognitive processes)/ <i>in vivo, in vitro</i>	[54,55]

**Figure 1:** Pharmacological contribution of geriatric medicinal herbs reported by traditional Persian medicine

CONCLUSION

Obviously, there are many possible targets and available approaches related to TPM that might help to develop new and effective medical managements for geriatric medicine. As for other traditional systems of medicine, such information is based on centuries of experience in medieval Persia and offers detailed explanations of the skillful approaches that show the importance of this field in medieval medicine.

Beside historical elucidation, this paper presents medical and pharmacological approaches that medieval Persian

practitioners applied to deal with geriatric complications. Considering the hopeful results related to these medieval findings through scientific methods can help to carry out more comprehensive and effective investigations in the field of geriatric medicine.

ACKNOWLEDGMENT

Authors of this manuscript wish to express their thanks to Research Institute for Islamic and Complementary Medicine, Tehran University of Medical Sciences and Health Services for providing the grant of this project (Project Number: 959).

REFERENCES

- Dhar HL. Emerging geriatric challenge. *J Assoc Physicians India* 2005;53:867-72.
- Espinoza S, Walston JD. Frailty in older adults: Insights and interventions. *Cleve Clin J Med* 2005;72:1105-12.
- Jacobsen LA, Kent M, Lee M. America's aging population. *Popul Bull* 2011;66:1-20.
- Hilmer SN, McLachlan AJ, Le Couteur DG. Clinical pharmacology in the geriatric patient. *Fundam Clin Pharmacol* 2007;21:217-30.
- Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in older adults: Evidence for a phenotype. *J Gerontol A Biol Sci Med Sci* 2001;56:M146-56.
- Zekry D, Loures Valle BH, Lardi C, Graf C, Michel JP, Gold G, et al. Geriatrics index of comorbidity was the most accurate predictor of death in geriatric hospital among six comorbidity scores. *J Clin Epidemiol* 2010;63:1036-44.
- Hussain SA, Khan AB, Siddiqui MY, Latafat T, Kidwai T.

- Geriatrics and Unani medicine-A critical review. *Anc Sci Life* 2002;22:13-6.
8. McLean AJ, Le Couteur DG. Aging biology and geriatric clinical pharmacology. *Pharmacol Rev* 2004;56:163-84.
 9. Pon J, Lai M. Adapting Canadian healthcare to an aging population. *UBC Medical Journal* 2011;3:5.
 10. Ahmad S, Rehman S, Ahmad AM, Siddiqui KM, Shaikat S, Khan MS, et al. Khamiras, a natural cardiac tonic: An overview. *J Pharm Bioallied Sci* 2010;2:93-9.
 11. Khaleghi Ghadiri M, Gorji A. Natural remedies for impotence in medieval Persia. *Int J Impot Res* 2004;16:80-3.
 12. Shirazi SA. Storehouse of Medicaments (Makhzan ol advieh). Tehran: Publications and Education Islamic Revolution Press (Intisharat va Amoozesh Enghelab Islami); 1992.
 13. Rhazes, editor. The Comprehensive Book on Medicine (Al Havi or Liber Continens). Tehran: Academy of Medical Sciences; 2005.
 14. Sina A. (Avicenna). Canon of medicine (Al Qanun Fil Tibb). New Delhi: Jamia Hamdard Printing Press; 1998.
 15. Shirazi ZA. Ikhtiyarat-e-Badiyee. Rewritten by Mir MT. Tehran: Paksh Razi Press; 1992.
 16. Tonekaboni H. The Present for the Faithful (Tohfat ol momenin). Tehran: Research Center of Traditional Medicine, Shahid Beheshti University of Medical Sciences, Nashre Shahr Press; 2007.
 17. Heravi A. The book of remedies (Alabnie an Haghaeagh ol Advieh). Tehran: Tehran University Press; 1992.
 18. Ghahraman A, Okhovvat A. Matching the old medicinal plant names with scientific terminology. Tehran: Tehran University Press; 2004.
 19. Soltani A. Dictionary of Medicinal Plants. Tehran: Arjmand Press; 2004.
 20. Mozaffarian V. Dictionary of Iranian Plant Names. Tehran: Farhang Moaser Press; 2006.
 21. Amin G. Popular Medicinal Plants of Iran. Tehran: Tehran University Press; 2005.
 22. Dymook W, Warden CJ, Hooper D. *Pharmacographica Indica*. London: Kegan Paul; 1893.
 23. Khare C. *Indian Medicinal Plants*. US: Springer; 2007.
 24. Rezaeizadeh H, Alizadeh M, Naseri M, Ardakani MS. The traditional Iranian medicine point of view on health and disease. *Iran J Public Health* 2009;38:169-72.
 25. Sina A. (Avicenna). Canon of Medicine. Tehran: Soroosh Press; 1988.
 26. Jorjani S. Medical objectives and excellent researches (Al-aghraz al-tebbieh va al-mabaheh al-alayieh). Tehran: Tehran University Press; 2006.
 27. Fosnes GS, Lydersen S, Farup PG. Effectiveness of laxatives in elderly: A cross sectional study in nursing homes. *BMC Geriatr* 2011;11:76.
 28. Fusco D, Colloca G, Lo Monaco MR, Cesari M. Effects of antioxidant supplementation on the aging process. *Clin Interv Aging* 2007;2:377-87.
 29. Kamel NS, Gammack J, Cepeda O, Flaherty JH. Antioxidants and hormones as antiaging therapies: High hopes, disappointing results. *Cleve Clin J Med* 2006;73:1049-56, 1058.
 30. Ha W, Heng GB, Yu WY. Probiotics: Potential anti-aging capability. *Zhong Guo Wei Sheng Tai Xue Za Zhi* 2009;21:374-9.
 31. Pepeu G, Giovannini MG. Cholinesterase inhibitors and memory. *Chem Biol Interact* 2010;187:403-8.
 32. Ljubenkov I, Kri A, Juki M. Antioxidant and acetylcholinesterase inhibiting activity of several aqueous tea infusions *in vitro*. *Food Technol Biotechnol* 2008;46:368-75.
 33. Ramnath V, Kuttan G, Kuttan R. Immunopotentiating activity of abrin, a lectin from *Abrus precatorius* Linn. *Indian J Exp Biol* 2002;40:910-3.
 34. Manikandan S, Srikumar R, Jeya Parthasarathy N, Sheela Devi R. Protective effect of *Acorus calamus* LINN on free radical scavengers and lipid peroxidation in discrete regions of brain against noise stress exposed rat. *Biol Pharm Bull* 2005;28:2327-30.
 35. Svendsen L, Rattan SI, Clark BF. Testing garlic for possible anti-ageing effects on long-term growth characteristics, morphology and macromolecular synthesis of human fibroblasts in culture. *J Ethnopharmacol* 1994;43:125-33.
 36. Moriguchi T, Saito H, Nishiyama N. Anti-ageing effect of aged garlic extract in the inbred brain atrophy mouse model. *Clin Exp Pharmacol Physiol* 1997;24:235-42.
 37. Baral R, Chattopadhyay U. Neem (*Azadirachta indica*) leaf mediated immune activation causes prophylactic growth inhibition of murine Ehrlich carcinoma and B16 melanoma. *Int Immunopharmacol* 2004;4:355-66.
 38. Morales P, Carvalho A, Sánchez-Mata M, Cámara M, Molina M, Ferreira I. Tocopherol composition and antioxidant activity of Spanish wild vegetables. *Genet Resour Crop Evol* 2012;59:851-63.
 39. Shahsavari N, Barzegar M, Sahari MA, Naghdibadi H. Antioxidant activity and chemical characterization of essential oil of *Bunium persicum*. *Plant Foods Hum Nutr* 2008;63:183-8.
 40. Hiramatsu M, Takahashi T, Komatsu M, Kido T, Kasahara Y. Antioxidant and neuroprotective activities of Mogami-benibana (safflower, *Carthamus tinctorius* Linne). *Neurochem Res* 2009;34:795-805.
 41. Nestares T, López-Frías M, Barrionuevo M, Urbano G. Nutritional assessment of raw and processed chickpea (*Cicer arietinum* L.) protein in growing rats. *J Agric Food Chem* 1996;44:2760-5.
 42. Mantena SK, Jagadish, Badduri SR, Siripurapu KB, Unnikrishnan MK. *In vitro* evaluation of antioxidant properties of *Cocos nucifera* Linn. water. *Nahrung* 2003;47:126-31.
 43. Goli SA, Sahafi SM, Rashidi B, Rahimmalek M. Novel oilseed of *Dracocephalum kotschyi* with high n-3 to n-6 polyunsaturated fatty acid ratio. *Ind Crops Prod* 2013;43:188-93.
 44. Ranjbar A, Khorami S, Safarabadi M, Shahmoradi A, Malekiran AA, Vakilian K, et al. Antioxidant activity of Iranian *Echium amoenum* Fisch and C.A. Mey flower decoction in humans: A cross-sectional before/after clinical trial. *Evid Based Complement Alternat Med* 2006;3:469-73.
 45. Orhan IE, Suntar IP, Akkol EK. *In vitro* neuroprotective effects of the leaf and fruit extracts of *Juglans regia* L. (walnut) through enzymes linked to Alzheimer's disease and antioxidant activity. *Int J Food Sci Nutr* 2011;62:781-6.
 46. Zhang Z, Liao L, Moore J, Wu T, Wang Z. Antioxidant phenolic compounds from walnut kernels (*Juglans regia* L.). *Food Chem* 2009;113:160-5.
 47. Písařiková B, Zralý Z. Dietary fibre content in lupine (*Lupinus albus* L.) and soya (glycine max L.) seeds. *Acta Vet Brno* 2010;79:211-6.
 48. Sánchez GM, Re L, Giuliani A, Núñez-Sellés AJ, Davison GP, León-Fernández OS. Protective effects of *Mangifera indica* L. extract, mangiferin and selected antioxidants against TPA-induced biomolecules oxidation and peritoneal macrophage activation in mice. *Pharmacol Res* 2000;42:565-73.
 49. García D, Leiro J, Delgado R, Sanmartín ML, Ubeira FM. *Mangifera indica* L. extract (Vimang) and mangiferin modulate mouse humoral immune responses. *Phytother Res* 2003;17:1182-7.
 50. Shinomiya K, Inoue T, Utsu Y, Tokunaga S, Masuoka T, Ohmori A, et al. Hypnotic activities of chamomile and passiflora extracts in sleep-disturbed rats. *Biol Pharm Bull* 2005;28:808-10.
 51. Campbell EL, Chebib M, Johnston GA. The dietary flavonoids apigenin and (-)-epigallocatechin gallate enhance the positive modulation by diazepam of the activation by GABA of recombinant GABA (A) receptors. *Biochem Pharmacol* 2004;68:1631-8.
 52. Kennedy DO, Scholey AB, Tildesley NT, Perry EK, Wesnes KA. Modulation of mood and cognitive performance

- following acute administration of *Melissa officinalis* (lemon balm). Pharmacol Biochem Behav 2002;72:953-64.
53. Abdoly M, Farnam A, Fathiazad F, Khaki A, Khaki AA, Ibrahimi A, *et al.* Antidepressant-like activities of *Ocimum basilicum* (sweet Basil) in the forced swimming test of rats exposed to electromagnetic field (EMF). Afr J Pharm Pharmacol 2012;6:211-5.
54. Chang CL, Lin CS. Phytochemical composition, antioxidant activity, and neuroprotective effect of *Terminalia chebula* retzius extracts. Evid Based Complement Alternat Med 2012;2012:125247.
55. Nag G, De B. Acetylcholinesterase inhibitory activity of *Terminalia chebula*, *Terminalia bellerica* and *Embllica officinalis* and some phenolic compounds. Int J Pharm Pharm Sci 2011;13:121-4.

How to cite this article: Emami M, Sadeghpour O, Zarshenas MM. Geriatric management in medieval Persian medicine. J Mid-life Health 2013;4:210-5.

Source of Support: Nil, **Conflict of Interest:** None declared.

Author Help: Reference checking facility

The manuscript system (www.journalonweb.com) allows the authors to check and verify the accuracy and style of references. The tool checks the references with PubMed as per a predefined style. Authors are encouraged to use this facility, before submitting articles to the journal.

- The style as well as bibliographic elements should be 100% accurate, to help get the references verified from the system. Even a single spelling error or addition of issue number/month of publication will lead to an error when verifying the reference.
- Example of a correct style
Sheahan P, O'leary G, Lee G, Fitzgibbon J. Cystic cervical metastases: Incidence and diagnosis using fine needle aspiration biopsy. Otolaryngol Head Neck Surg 2002;127:294-8.
- Only the references from journals indexed in PubMed will be checked.
- Enter each reference in new line, without a serial number.
- Add up to a maximum of 15 references at a time.
- If the reference is correct for its bibliographic elements and punctuations, it will be shown as CORRECT and a link to the correct article in PubMed will be given.
- If any of the bibliographic elements are missing, incorrect or extra (such as issue number), it will be shown as INCORRECT and link to possible articles in PubMed will be given.