

Role of complementary and alternative medicine in geriatric care: A mini review

Mohammad Jamshed Siddiqui, Chan Sze Min¹, Rohit Kumar Verma², Shazia Qasim Jamshed³

Department of Pharmaceutical Chemistry, Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan Campus, Pahang, Malaysia, ¹Strathclyde Institute of Pharmacy and Biomedical Sciences, Faculty of Science, University of Strathclyde, United Kingdom,

²Department of Pharmacy Practice, School of Pharmacy, International Medical University, Bukit Jalil Campus, Kuala Lumpur, ³Department of Pharmacy Practice, Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan Campus, Pahang, Malaysia

Received: 29-08-2013

Revised: 28-10-2013

Published: 10-06-2014

ABSTRACT

Since time immemorial homo sapiens are subjected to both health and diseases states and seek treatment for succor and assuagement in compromised health states. Since last two decades the progressive rise in the alternative form of treatment cannot be ignored and population seems to be dissatisfied with the conventional treatment modalities and therefore, resort to other forms of treatment, mainly complementary and alternative medicine (CAM). The use of CAM is predominantly more popular in older adults and therefore, numerous research studies and clinical trials have been carried out to investigate the effectiveness of CAM in the management of both communicable and non-communicable disease. In this current mini review, we attempt to encompass the use of CAM in chronic non-communicable diseases that are most likely seen in geriatrics. The current review focuses not only on the reassurance of good health practices, emphasizing on the holistic development and strengthening the body's defense mechanisms, but also attempts to construct a pattern of self-care and patient empowerment in geriatrics. The issues of safety with CAM use cannot be sidelined and consultation with a health care professional is always advocated to the patient. Likewise, responsibility of the health care professional is to inform the patient about the safety and efficacy issues. In order to substantiate the efficacy and safety of CAMs, evidence-based studies and practices with consolidated standards should be planned and executed.

Key words: Complementary and alternative medicine, geriatric, non-communicable diseases

INTRODUCTION

The use of complementary and alternative medicine (CAM) is increasing rapidly, exceeding prevalence of 53% among those aged 50 years and above in a joint survey by American Association of Retired People (AARP) and National Center for Complementary and Alternative Medicine (NCCAM).^[1] Due to natural ageing processes, elderly populations are more susceptible to chronic health conditions. CAM has caught the attention of many older adults and their caregivers as CAM often offers gentler and safer approaches to addressing common health conditions suffered

by elderly.^[2] A survey on community-dwelling older adults in Minnesota indicated that 62.7% of the respondents had used at least one CAM modalities.^[3] Nearly 88% of older Americans were reported to be using CAM in an analysis of Health and Retirement Study.^[4] With the ageing of the Baby-Boom population and increased life expectancy, the prevalence of CAM usage among the older population is somewhat expected to be increased.^[5] CAM, as defined by NCCAM, is a group of diverse medical and health care systems, practices and products that are not generally considered part of conventional medicine. CAM includes such products and practices as herbal or dietary.^[1] Older adults use CAM for various reasons, including lower costs, the search for more effective therapies, improving the quality of life and for pain relief.^[5] Although pharmacologic treatments are used either for symptomatic relief or to slow the progress of the disease, these are not without adverse side-effects and are sometimes even hard to tolerate. Many older adults have turn to CAM therapies for treating their conditions, as they believe that CAM therapies are generally more "natural" and safer than conventional medicine and provide greater relief of symptoms and CAM being consistent with their beliefs and philosophical orientation toward health and illness as well.^[6,7] CAM plays a substantial role in the health promotion, treatment and prevention of diseases and frailties in elderly people, which

Address for correspondence:

Dr. Shazia Qasim Jamshed, Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan Campus, 25200 Kuantan, Pahang, Malaysia. E-mail: pharmacist1992@live.com

Access this article online

Quick Response Code:



Website:

www.phcogrev.com

DOI:

10.4103/0973-7847.134230

encompasses the wholesome approach of handling ageing and its effect as well.

OSTEOARTHRITIS

Elderly population who constantly battle with their musculoskeletal conditions, such as joint pain and osteoarthritis seek CAM therapies to improve their conditions. Osteoarthritis is the most common form of arthritis and is one of the leading causes of impaired mobility in elderly patients; affecting 80% of people aged 65 years or older.^[8,9] The joint most commonly affected is the knee.^[9] There are strong evidences that some CAM modalities are effective in treating osteoarthritis, namely glucosamine sulfate and acupuncture, the latter being a classical Chinese practice of inserting needles into specific points of the body to the body's flow of energy to balance the endocrine system.^[10] Several studies that compared standard care plus acupuncture with standard care alone manifested that patients with knee osteoarthritis receiving treatments supplemented with acupuncture seemed to experience clinical improvements in pain relief and mobility.^[5,9] Similar results were shown in a randomized controlled trial (RCT) comparing true acupuncture and sham acupuncture therapies.^[11] One study also found that pain reduction in the acupuncture group is significantly greater than the drug treatment (diclofenac) group.^[10] Hence, acupuncture can be considered a viable adjunctive therapy for symptoms of knee osteoarthritis.

Besides that Little *et al.* published a review article on the use of CAM in musculoskeletal condition and strongly suggested that the nutritional supplements glucosamine and S-adenosyl methionine are effective for greatly reducing pain in osteoarthritis patient.^[12] A systematic review of glucosamine therapy for osteoarthritis by the Cochrane Collaboration reported that 1500 mg daily of glucosamine will likely be helpful for reducing pain and improving physical function.^[12] The herbal therapy, which appears to be effective as treatment for osteoarthritis, is avocado-soybean unsaponifiables (ASU). ASU was found to be significantly better than placebo groups for pain relief and improving physical function, thus providing long-term symptomatic relief, particularly for people with chronic but stable osteoarthritis of the hip. Use of ASU daily also helps reduce the intake of non-steroidal anti-inflammatory drugs.^[12] Cameron and Chrusasik in 2013 published a review in which they analyzed seven RCTs of herbal interventions used topically for musculoskeletal complaints, mainly osteoarthritis.^[13] In terms of effectiveness of therapies, the quality and quantity of included trials are unsatisfactory. The analysis reported Arnica gel to have same efficacy as any gel with a non-steroidal anti-inflammatory constituent but offer no better adverse event profile.^[13] Likewise Comfrey extract gel offers improvement in pain in contrast to Capsicum extract gel which do not offer any betterment in pain.^[13] An ongoing trial in Korea will contribute to traditional evidence of the effectiveness and safety of Moxibustion (oriental therapy which uses thermal stimulation by burning herbs at specific spots on skin) in knee osteoarthritis.^[14]

HYPERTENSION AND CARDIOVASCULAR DISEASE

The elderly, one of the fastest-growing segments of the world population, have the highest prevalence of hypertension.^[15] It is a major risk factor for CVD, which remains one of the leading causes of death among older adults aged 65 years or older.^[16] Tsai *et al.* in their study have reported that blood pressure (BP) self-regulation with biofeedback, coupled with slow and deep breathing exercises, exerts a specific immediate-term treatment effect on BP, lowering systolic blood pressure (SBP) and mean arterial pressure significantly in individuals with mild hypertension.^[17] A meta-analysis conducted by Nakao *et al.* showed that biofeedback intervention resulted in greater reduction in SBP and diastolic blood pressure (DBP) compared to non-intervention controls in essential hypertension; but only combination of biofeedback and other relaxation techniques is found to be more superior than sham or non-specific behavioral intervention controls in decreasing SBP and DBP.^[18] However, a recent review yielded contradictory results, noting the inconsistent effectiveness of biofeedback on essential hypertension.^[19]

Another method in effectively reducing BP is transcendental meditation (TM). In a review of effectiveness of TM on treatment and prevention of CVD, TM significantly reduces the SBP and DBP by 13 mmHg and 8 mmHg respectively. This approach is also helpful in reducing CVD risks such as psychosocial stress and hypertension, as well as slowing or reversing the pathophysiological changes underlying CVD.^[20] Regarding the mortality reductions in people initially introduced to TM to reduce their hypertension, the results in all-cause, cardiovascular and cancer-related are particularly striking, with reduction rates of 23%, 30% and 49% respectively.^[21] Moreover, there is encouraging evidence which shows that ancient Chinese healing art, qigong, combined with movement exercises, meditation and controlled breathing, may lower BP significantly.^[22]

STROKE

Stroke is a major cause of death and permanent disability in the geriatric population. Despite advancement in stroke treatment and rehabilitation, many patients only achieved partial recovery. Of all the alternative approaches available that would further improve outcome, acupuncture is one that has been most subjected to scientific scrutiny. Several reviews, including that of National Institutes of Health Consensus Statement on Acupuncture, concluded that there was no conclusive evidence on the beneficial effect of acupuncture on post-stroke recovery.^[1] A study by Wu *et al.* conducted a meta-analysis that demonstrated that acupuncture may be helpful in promoting a more rapid and effective recovery after stroke.^[23]

In addition, acupuncture may improve balance function in stroke patients by producing an immediate enhancement of cerebral neuronal activities, as well as increasing muscle strength of knee

extensors in paralyzed and non-paralyzed limbs and of hip flexors in paralyzed limbs.^[24] Improvements in sensory stimulation and consolidation and coordination of motor function after stroke were also demonstrated with acupuncture.

Traditional Chinese medicine may also be helpful in post-stroke recovery. Gong and Sucher published a review on the effectiveness of individually tailored combinations of Chinese-grown herbs, citing clinical research on over 100 different Chinese herbal medicines, some of which possess anti-inflammatory, anti-thrombotic and neuroprotective effects.^[25] One such example is Danqi Piantang Jiaonang, internationally known as Neuroaid.^[26] Previous clinical trials have shown that Neuroaid may be beneficial in post-stroke rehabilitation due to enhancement of patients' recovery from their neurological disability and improvement in functional outcome.^[26] A group of Singaporean researchers investigated the efficacy of Neuroaid on motor recovery in ischemic stroke patients and observed a strong tendency of a better recovery in posterior circulation infarction and severe stroke patients receiving Neuroaid.^[26]

LATE-LIFE COGNITIVE DISORDERS

Age-related neurodegenerative diseases, such as Alzheimer's disease (AD), which leads to cognitive dysfunction, can dramatically challenge an older adult's independence and lifestyle. Management of cognitive and behavioral symptoms of dementia is a growing concern as AD is the most prevalent and devastating disorder in the growing population of the elderly.^[27] *Ginkgo biloba* (Gb) and omega-3 fatty acids are among some of the nutritional supplements said to be helpful in ameliorating both the cognitive (memory loss, cognitive decline and confusion) and behavioral (depression and anxiety) problems due to cerebral insufficiency, which are early symptoms of dementia of either the degenerative or the multiple infarction type.^[10]

Many studies on Gb have yielded contradictory results. In 1992, Kleijnen and Knipschild reported in their review that Gb reduces the symptoms of dementia and cerebral insufficiency to an extent that was clinically relevant.^[28] A recent RCT found that a once-daily dose of Gb extract EGb 761[®] was safe and effective in alleviating behavioral and neuropsychiatric symptoms in patients with mild to moderate dementia and improving the well-being of their caregivers.^[29] According to a Cochrane systematic review, previous clinical trials have confirmed the clinical efficacy of Gb in patients with multi-infarct dementia or multi-type dementia or Alzheimer's dementia, although recent updates have concluded that the evidence was inconsistent and unreliable.^[30,31] Of the studies that reported positive outcomes, the improvements are minor and last at most for only 6 months.^[10] In addition, the ginkgo evaluation of memory study, which is a trial on the prevention of AD, showed that Gb at 120 mg twice a day was not effective in reducing the overall incidence rate of dementia and AD in elderly individual with normal cognition or those with mild cognitive impairment.^[32]

There have been growing interests in the role of dietary fatty acids in age-related cognitive impairment of both degenerative and vascular origins.^[10] Available observational and epidemiological studies showed that intake of polyunsaturated fatty acids (PUFA), such as omega-3 PUFA (primarily from fish and plant sources) and monounsaturated fatty acids (MUFA) may be protective against cognitive decline and dementia, as opposed to saturated fatty acids (SFA) that have negative effects on cognitive function.^[33-35] In the Italian Longitudinal Study on Ageing (ILSA), elevated intake of MUFA and PUFA were significantly associated with improved cognitive performance, as well as a reduced risk of age-related cognitive decline.^[34,35] High MUFA and PUFA: SFA ratios were associated with less cognitive decline^[36] and reduced risks in AD in the Chicago Health and Ageing Project. The Cardiovascular Risk Factors, Ageing, Dementia Study reported on the beneficial effects of PUFA and PUFA: SFA ratios after 21 years of follow-up, showing that better semantic memory was demonstrated with high intake of PUFA at midlife.^[36] The results of a study conducted by the Mayo Clinic of Ageing were consistent with that of ILSA, in which high PUFA and MUFA intake may be protective against the development of magnetic resonance imaging among elderly persons.^[37] These findings suggested the potential role of fatty acids intake in maintaining adequate cognitive functioning and in preventing or delaying dementia, including their possible effects on cognitive and depressive symptoms of patients with very mild AD.^[34,38]

LATE-LIFE DEPRESSION, ANXIETY AND SLEEP DISTURBANCE

Mood disturbances are the most frequently occurring psychiatric syndromes in seniors besides cognitive impairment, negatively impacting health and quality of life.^[10] Older adults with disturbed sleep are more susceptible to medical-related morbidity and mortality, as well as psychological consequences such as depression, fatigue and poor quality of life.

There is strong evidence supporting the use of herbal product *Hypericum perforatum* (St. John's Wort [SJW]) for depression, as commonly observed in patients with neurodegenerative diseases, including AD, Parkinson's disease and post-stroke. Not only found to be more effective than placebo in placebo-controlled studies, SJW improved depressive symptoms in mild-to-moderate depression as well.^[10]

Furthermore, mind-body interventions such as T'ai Chi Chun (TCC) exercise, yoga and qigong are shown to provide an immediate source of relaxation and mental quiescence, which are beneficial to depression, anxiety and stress-related disorders, including insomnia, in older adults.^[10,39] Evidence highlights that TCC exercise has positive health benefits; physical, psychosocial and therapeutic, among older adults, such as reduced stress, anxiety, depression and mood disturbance and increased self-esteem.^[10] Furthermore, improvements in sleep quality, latency duration, disturbances and dysfunction were reported in a RCT with adults

older than 60 years experiencing sleep complaints.^[6] Thus, TCC is recommended as a strategy to promote successful cognitive and emotional ageing, as it not only consists of a physical component, but also sociocultural and meditative components that are believed to contribute to overall well-being in the elderly.^[10]

Acupuncture also supports to adjust functions such as sleep patterns and emotional changes, as well as heart rate, body temperature and respiration, exerting positive subjective and objective effect on mood and well-being. Meditation positively influences a broad spectrum of physical and psychological symptoms, including reduced anxiety, pain and depression, enhanced mood and self-esteem and decreased stress. Massage therapy can also be used to treat trauma-related depression and stress, plus easing depression and anxiety in dementia and AD and improves sleep in sleep disorders. Significant improvements for anxiety, depression, vitality and general health and positive well-being subscales of the general well-being schedule and for perceived stress are observed in massage participants compared with guided relaxation in a research by Sharp *et al.*^[40]

REDUCING THE RISK OF CHRONIC DISEASE THROUGH FRUIT AND VEGETABLE INTAKE

Fruit and vegetables are colorful packages rich in a myriad of nutrients and food compounds beneficial to health. Epidemiologic evidence has shown that increasing consumption of fruit and vegetables can reduce the risk of chronic diseases common in seniors, including chronic heart disease (CHD), stroke and cancer. Polyphenols, one of the major classes of bioactive compounds found in fruit and vegetables, have been shown to protect against chronic disease, such as CHD. Polyphenols (red wine, fruit or vegetable) reduce the effect of dietary fat on the development of atherosclerosis when consumed with high fat foods. Major polyphenol subgroups, namely flavonoids, flavonols, phenolic acids, anthocyanidins and tannins, known for their antioxidant, antithrombotic and anti-inflammatory activities, are associated with a reduced risk of death due to all causes and CHD. Two recent meta-analyses of cohort studies found that increasing intake of fruit and vegetables was inversely associated with occurrence of stroke and CHD, thereby supporting the Dietary Guidelines for Americans that consuming more than 5 servings of fruit and vegetables daily is beneficial for cardiovascular health. Numerous studies also reported that plant food intake, especially fruit was inversely related to elevated BP, which may reduce the CVD risk and hence the incidence and mortality of CHD. A plant-based diet significantly reduced the low-density lipoprotein-cholesterol in hypercholesterolemic patients. In addition, significant and inverse relations between fruit and vegetables intake and cancer of the esophagus, lung, stomach and colorectum were demonstrated in major case-control studies. While vegetable intake is shown to be protective for breast cancer, fruit intake significantly reduces the risk for bladder and lung cancer. Therefore, fruit and vegetable consumption is beneficial in improving the public's health, especially the elderly.^[41]

PAIN MANAGEMENT IN THE ELDERLY

Most people use CAM to treat musculoskeletal conditions and chronic or recurrent pain conditions, specifically back pain, joint pain and arthritis.^[6] The complexities of chronic pain management in the elderly are of growing importance with the ageing of Baby-Boomers. The elderly are more prone to suffer from chronic pain, which affects about 25-50% of community-dwelling seniors, interfering with their ability to function normally.^[42] Several CAM therapies, including manipulative and body-based practices (chiropractic and massage therapy) and mind-body medicine, are useful in managing pain in older adults. In the 1998 guidelines of chronic pain management in older adults developed by the American Geriatric Society panel, chiropractic care are recommended as non-pharmacologic therapy for pain management with few adverse effects. Geriatric patients receiving long-term chiropractic care in addition to conventional medical services had fewer hospitalizations and used fewer medications than patients receiving medical care only.^[43] Chiropractic and massage are the most common CAM modalities used by individuals suffering from low back pain and 60% of respondents in an analysis perceived benefit from these CAM therapies.^[44] Research findings from the Touch Research Institutes reported that massage can reduce back pain, ease depression and anxiety in dementia and AD and improve sleep in sleep disorders and enhance immune system functioning.^[45] Several Cochrane reviews suggested that acupuncture was effective for neck disorders, tension-type headaches low back pain and peripheral joint osteoarthritis, but not other types of pain.^[46] Other forms of mind-body medicine, i.e. TCC exercise, yoga and meditation, may also have a positive influence on chronic pain in older adults. Studies looking at the effect of TCC on elderly knee osteoarthritis patients showed significant decrease in joint pains, stiffness and improvement in physical functioning.^[47] Furthermore, after a behavioral pain program that included relaxation and simple yoga exercises, chronic pain patients showed a reduction in pain. The effects of meditation, especially relaxation response and mindfulness techniques on self-regulation of chronic pain may be beneficial too, as improvements in ratings of pain, mood disturbances and related medical symptoms were statistically significant.^[5,48] Music therapy might also be valuable in relieving pain, especially in older persons, through influencing both the immune system and the ability to control physiologic healing processes by exerting a beneficial effect through strengthening the right hemisphere of the brain.^[5]

PROMOTING BONE HEALTH AND RETARDING BONE LOSS IN THE ELDERLY

Osteoporosis is a degenerative bone disease that leads to bone fragility, predisposing to fractures in both elderly men and women, resulting in reduced daily activities, lowered quality of life and increased mortality of patients. Women are 4 times more likely to develop osteoporosis due to a postmenopausal decrease in estrogen level in conjunction with generally lighter and thinner bones, associated with a rapid decrease in bone mineral density (BMD). Epidemiological

evidence has shown that tea consumption, especially green tea, is associated with the prevention of age-related bone loss in older adults. There is also a positive relation between tea-drinking and BMD. Green tea contains bioactive components, such as catechins or tea polyphenols, which may benefit bone health by maintaining higher BMD and reducing the risk of fracture. Muraki *et al.* in their study have reported that osteoporosis patients with the habit of drinking green tea had significantly higher BMD at the lumbar spine than non-drinkers.^[49] Green tea polyphenols (GTP) are shown to mitigate ageing-induced, ageing-plus-estrogen-deficiency-induced bone loss and chronic-inflammation-induced bone loss in animal models, possibly through the antioxidant and anti-inflammatory actions of GTP.^[50] Moreover, small increases in BMD of the spine and other areas in postmenopausal women were demonstrated with vitamin D plus calcium supplementation.^[51] In a prospective study, a programmed TCC exercise intervention is beneficial for retarding bone loss in weight-bearing bones in early postmenopausal women.^[52] Another research supported this finding by reporting that early postmenopausal women who did regular TCC exercise long-term have a significantly slower decrease in BMD in weight-bearing bones than non-exercising control subjects after a 12-month follow-up.^[53]

BENEFITS OF INTEGRATING CAM INTO GERIATRIC CARE

The benefits of incorporating CAM into geriatric care enhance communication between patient and their caregivers, increasing therapeutic options and promoting patient empowerment. In the AARP/NCCAM survey report, only a third of the respondents aged 50 and older discussed CAM with their healthcare providers, which may result in decreased quality of care.^[1] Thus, there is a need for health care professionals, i.e., doctors or pharmacists to understand and respect a patient's beliefs and values and to communicate and coordinate care with other members of the patient's health care team, such as acupuncturists and chiropractors, thereby enhancing continuity and quality of care. In addition, CAM therapies increase therapeutic approaches, offering healing strategies not available in conventional medical repertoire. Many alternative therapies adhere to a holistic model of health and healing, emphasizing self-care and empowerment, as well as enhancing wellness by addressing the underlying causes of illness, including emotional, environmental and spiritual factors. Some CAM therapies such as TCC and qigong promote socialization with other individuals, which are particularly important, as many elderly have lost their spouse or friends; they are therefore at an increased risk of feeling isolated or depressed. Most CAM therapies promote self-reliance and self-esteem, particularly important to older people during the loss of physical independence.^[6]

RISK AND CHALLENGES OF INTEGRATION OF CAM

Although they are beneficial in many aspects, CAM therapies are not without their risks to older adults. For instance, the

improper use of herbal medicines can create a host of problems in the elderly compared with young people. A majority of the geriatric population has this misconception that herbal remedies are safe because they are obtained from natural sources. Some herbal remedies can lead to serious adverse effect due to the presence of unknown toxic compounds, whereas others might interact with conventional medicines. The elderly are mostly unaware of the adverse effects of herbs or herb-drug or herb-herb interactions. Example includes the higher risk of seniors of developing serotonin syndrome when taking the herbal antidepressant SJW, in which symptoms similar to an infection can lead to mistreatment. Likewise, some "hands-on" techniques pose a unique risk to the elderly. Such is the case with chiropractic therapies, where older bones are more brittle and can fracture under stress. When massaging older adults, special care is needed to avoid injury due to tissue fragility and reduced muscle mass.^[2]

CONCLUSION

In general, CAM therapies are beneficial to the geriatric population, mainly in managing chronic conditions, relieving pain and improving the quality of life. Especially important in geriatric care, CAM not only encourages good health practices that emphasize on a holistic model of care in strengthening the body's defense and healing abilities, but self-care and patient empowerment as well. However, it is not without risk and thus geriatric patients should consult their physicians when intending to use CAM; in addition to their conventional treatment to minimize the risk of interaction. Professionals should assist older adults to choose CAM therapies wisely and appropriately. Although of certain scientific merits, use of CAM in older adults to treating health condition is a growing concern among healthcare professionals, as studies on the safety and clinical efficacies of CAM interventions often yield contradictory results, which is mainly due to small sample size and methodological flaws. Therefore, better designed trials are required to substantiate the role of CAM therapies in clinical settings of geriatric care.

LIMITATIONS

Quite a few of the limitations were encountered during this review. The availability of a large body of literature in different languages (other than English) restricts to include few relevant studies. Moreover, constraint access to a couple of full text articles was another contributory factor in this regard.

REFERENCES

1. NCCAM. Complementary and Alternative Medicine: What People Aged 50 and Older Discuss with their Health Care Providers. AARP and NCCAM Survey Report: U.S. National Institute of Health: Department of Health and Human Services, National Institute of Health; 2011.
2. Eliopoulos C. Integration of complementary and alternative therapies in geriatric care. *Medscape Nurse* Aug 1, 2006 to

- Available from: <http://www.medscape.com/viewarticle/542207> [Last date accessed on 2013 Dec 31].
3. Cheung CK, Wyman JF, Halcon LL. Use of complementary and alternative therapies in community-dwelling older adults. *J Altern Complement Med* 2007;13:997-1006.
 4. Ness J, Cirillo DJ, Weir DR, Nisly NL, Wallace RB. Use of complementary medicine in older Americans: Results from the health and retirement study. *Gerontologist* 2005;45:516-24.
 5. Gaylord S, Crotty N. Enhancing function with complementary therapies in geriatric rehabilitation. *Top Geriatr Rehabil* 2002;18:63-80.
 6. Anderson EZ. Complementary therapies and older adults. *Top Geriatr Rehabil* 2009;25:320-8.
 7. Mitha S, Nagarajan V, Babar MG, Siddiqui MJ, Jamshed SQ. Reasons of using complementary and alternative medicines (CAM) among elderly Malaysians of Kuala Lumpur and Selangor states: An exploratory study. *J Young Pharm* 2013;5:50-3.
 8. Selfe TK, Taylor AG. Acupuncture and osteoarthritis of the knee: A review of randomized, controlled trials. *Fam Community Health* 2008;31:247-54.
 9. Maa SH, Sun MF, Wu CC. The effectiveness of acupuncture on pain and mobility in patients with osteoarthritis of the knee: A pilot study. *J Nurs Res* 2008;16:140-8.
 10. Lavretsky H. Complementary and alternative medicine use for treatment and prevention of late-life mood and cognitive disorders. *Aging health* 2009;5:61-78.
 11. Berman BM, Lao L, Langenberg P, Lee WL, Gilpin AM, Hochberg MC. Effectiveness of acupuncture as adjunctive therapy in osteoarthritis of the knee: A randomized, controlled trial. *Ann Intern Med* 2004;141:901-10.
 12. Little CV, Parsons T, Logan S. Herbal therapy for treating osteoarthritis. *Cochrane Database Syst Rev* 2001;(1):CD002947.
 13. Cameron M, Chrubasik S. Topical herbal therapies for treating osteoarthritis. *Cochrane Database Syst Rev* 2013;5:CD010538.
 14. Lee S, Kim KH, Kim TH, Kim JE, Kim JH, Kang JW, et al. Moxibustion for treating knee osteoarthritis: Study protocol of a multicentre randomised controlled trial. *BMC Complement Altern Med* 2013;13:59.
 15. Oparil S. Hypertension in the elderly: Optimizing management in the real world. *Medscape Cardiol* 2006;10 (1): Available at <http://www.medscape.org/viewarticle/527792> [Last date accessed on 2013 Dec 31].
 16. Gorina Y, Hoyert D, Lentzner H, Goulding M. Trends in causes of death among older persons in the United States. *Aging Trends* 2005;6:1-12.
 17. Tsai PS, Chang NC, Chang WY, Lee PH, Wang MY. Blood pressure biofeedback exerts intermediate-term effects on blood pressure and pressure reactivity in individuals with mild hypertension: A randomized controlled study. *J Altern Complement Med* 2007;13:547-54.
 18. Nakao M, Yano E, Nomura S, Kuboki T. Blood pressure-lowering effects of biofeedback treatment in hypertension: A meta-analysis of randomized controlled trials. *Hypertens Res* 2003;26:37-46.
 19. Greenhalgh J, Dickson R, Dundar Y. Biofeedback for hypertension: A systematic review. *J Hypertens* 2010;28:644-52.
 20. Walton KG, Schneider RH, Nidich SI, Salerno JW, Nordstrom CK, Bairey Merz CN. Psychosocial stress and cardiovascular disease Part 2: Effectiveness of the transcendental meditation program in treatment and prevention. *Behav Med* 2002;28:106-23.
 21. Oberg EB. Mind-body techniques to reduce hypertension's chronic effects. *Integr Med A Clin J* 2009;8:52-5.
 22. Kemp CA. Qigong as a therapeutic intervention with older adults. *J Holist Nurs* 2004;22:351-73.
 23. Wu P, Mills E, Moher D, Seely D. Acupuncture in poststroke rehabilitation: A systematic review and meta-analysis of randomized trials. *Stroke* 2010;41:e171-9.
 24. Liu SY, Hsieh CL, Wei TS, Liu PT, Chang YJ, Li TC. Acupuncture stimulation improves balance function in stroke patients: A single-blinded controlled, randomized study. *Am J Chin Med* 2009;37:483-94.
 25. Gong X, Sucher NJ. Stroke therapy in traditional Chinese medicine (TCM): Prospects for drug discovery and development. *Trends Pharmacol Sci* 1999;20:191-6.
 26. Kong KH, Wee SK, Ng CY, Chua K, Chan KF, Venketasubramanian N, et al. A double-blind, placebo-controlled, randomized phase II pilot study to investigate the potential efficacy of the traditional Chinese medicine Neuroaid (MLC 601) in enhancing recovery after stroke (TIERS). *Cerebrovasc Dis* 2009;28:514-21.
 27. Diamond B, Johnson S, Torsney K, Morodan J, Prokop B, Davidek D, et al. Complementary and alternative medicines in the treatment of dementia: An evidence-based review. *Drugs Aging* 2003;20:981-98.
 28. Kleijnen J, Knipschild P. *Ginkgo biloba* for cerebral insufficiency. *Br J Clin Pharmacol* 1992;34:352-8.
 29. Bachinskaya N, Hoerr R, Ihl R. Alleviating neuropsychiatric symptoms in dementia: The effects of *Ginkgo biloba* extract EGb 761. Findings from a randomized controlled trial. *Neuropsychiatr Dis Treat* 2011;7:209-15.
 30. Birks J, Evans JG. *Ginkgo biloba* for cognitive impairment and dementia. *Cochrane Database Syst Rev* 2009;(1):CD003120.
 31. Birks J, Grimley Evans J. *Ginkgo biloba* for cognitive impairment and dementia. *Cochrane Database Syst Rev* 2009;1:CD003120.
 32. DeKosky ST, Williamson JD, Fitzpatrick AL, Kronmal RA, Ives DG, Saxton JA, et al. *Ginkgo biloba* for prevention of dementia: A randomized controlled trial. *JAMA* 2008;300:2253-62.
 33. Lim WS, Gammack JK, Van Niekerk J, Dangour AD. Omega 3 fatty acid for the prevention of dementia. *Cochrane Database Syst Rev* 2006;(1):CD005379.
 34. Solfrizzi V, D'Introno A, Colacicco AM, Capurso C, Del Parigi A, Capurso S, et al. Dietary fatty acids intake: Possible role in cognitive decline and dementia. *Exp Gerontol* 2005;40:257-70.
 35. Solfrizzi V, Capurso C, D'Introno A, Colacicco AM, Frisardi V, Santamato A, et al. Dietary fatty acids, age-related cognitive decline, and mild cognitive impairment. *J Nutr Health Aging* 2008;12:382-6.
 36. Eskelinen MH, Ngandu T, Helkala EL, Tuomilehto J, Nissinen A, Soininen H, et al. Fat intake at midlife and cognitive impairment later in life: A population-based CAIDE study. *Int J Geriatr Psychiatry* 2008;23:741-7.
 37. Roberts RO, Cerhan JR, Geda YE, Knopman DS, Cha RH, Christianson TJ, et al. Polyunsaturated fatty acids and reduced odds of MCI: The Mayo Clinic Study of Aging. *J Alzheimers Dis* 2010;21:853-65.
 38. Solfrizzi V, D'Introno A, Colacicco AM, Capurso C, Palasciano R, Capurso S, et al. Unsaturated fatty acids intake and all-causes mortality: A 8.5-year follow-up of the Italian Longitudinal Study on Aging. *Exp Gerontol* 2005;40:335-43.
 39. Wang C, Bannuru R, Ramel J, Kupelnick B, Scott T, Schmid CH. Tai Chi on psychological well-being: Systematic review and meta-analysis. *BMC Complement Altern Med* 2010;10:23.
 40. Sharpe PA, Williams HG, Granner ML, Hussey JR. A randomised study of the effects of massage therapy compared to guided relaxation on well-being and stress perception among older adults. *Complement Ther Med* 2007;15:157-63.
 41. Steffen LM. Five or more servings of fruit and vegetables each day for better health! In: Ross WR, editor. *Complementary and Alternative Therapies and the Aging Population*.

- Ch. 21. San Diego: Academic Press; 2009. p. 417-31.
42. Gloth FM 3rd. Pain management in older adults: Prevention and treatment. *J Am Geriatr Soc* 2001;49:188-99.
 43. ACA. *Chiropractic and Geriatrics: Care for the Aging*. Washington: American Chiropractic Association. Paper Presented at: *Chiropractic and Geriatrics: Care for the Aging*. Washington DC; 2004.
 44. Kanodia AK, Legedza AT, Davis RB, Eisenberg DM, Phillips RS. Perceived benefit of complementary and alternative medicine (CAM) for back pain: A national survey. *J Am Board Fam Med* 2010;23:354-62.
 45. Kennedy RL, Khoo EY. 69-Health, functional, and therapeutic implications of obesity in aging. In: Conn PM, editor. *Handbook of Models for Human Aging*. Burlington: Academic Press; 2006. p. 829-39.
 46. Lee MS, Ernst E. Acupuncture for pain: An overview of Cochrane reviews. *Chin J Integr Med* 2011;17:187-9.
 47. Audette JF, Bailey A, editors. *Tai chi in pain medicine*. In: *Integrative Pain Medicine*. Totowa, New Jersey: Humana Press; 2008.
 48. Wootton J. Meditation and chronic pain. In: Audette JF, Bailey A, editors. *Integrative Pain Medicine: The Science and Practice of Complementary and Alternative Medicine in Pain Management*. Humana Press: New Jersey, USA: Humana Press; 2008.
 49. Muraki S, Yamamoto S, Ishibashi H, Oka H, Yoshimura N, Kawaguchi H, *et al.* Diet and lifestyle associated with increased bone mineral density: Cross-sectional study of Japanese elderly women at an osteoporosis outpatient clinic. *J Orthop Sci* 2007;12:317-20.
 50. Shen CL, Yeh JK, Cao JJ, Wang JS. Green tea and bone metabolism. *Nutr Res* 2009;29:437-56.
 51. Chung M, Balk EM, Brendel M, Ip S, Lau J, Lee J, *et al.* Vitamin D and calcium: A systematic review of health outcomes. *Evid Rep Technol Assess (Full Rep)* 2009;183:1-420.
 52. Chan K, Qin L, Lau M, Woo J, Au S, Choy W, *et al.* A randomized, prospective study of the effects of Tai Chi Chun exercise on bone mineral density in postmenopausal women. *Arch Phys Med Rehabil* 2004;85:717-22.
 53. Qin L, Au S, Choy W, Leung P, Neff M, Lee K, *et al.* Regular Tai Chi Chuan exercise may retard bone loss in postmenopausal women: A case-control study. *Arch Phys Med Rehabil* 2002;83:1355-9.

How to cite this Article: Siddiqui MJ, Min CS, Verma RK, Jamshed SQ. Role of complementary and alternative medicine in geriatric care: A mini review. *Phcog Rev* 2014;8:81-7.

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