Yoga as an Effective Method of Fall Prevention for Seniors

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Abstract

Falls among the senior population are recognized as a public health concern in Canada and around the world. In this paper it is argued that yoga provides an effective method of fall prevention for seniors. This argument is supported by the published literature which has indicated that yoga decreases the risk of falls both directly, through improved strength, balance and flexibility; and indirectly, through a decreased need for medications that contribute to fall risk. Senior participation in yoga can reduce fall risk, maintain independence and reduce healthcare costs associated with injury and disability.
Yoga as an Effective Method of Fall Prevention for Seniors

Falls among people over 65 years of age (hereafter known as seniors) constitute a serious public health issue and are a major contributor to injury, disability and death worldwide (Lach, 2010; World Health Organization [WHO], 2007). Each year, up to 35% of the world’s fastest-growing age group experience a potentially life-altering fall (WHO). The National Center for Injury Prevention (NCIP, 2008) asserts that the only way to successfully curb this disturbing trend is through physical exercise. Yoga is a particular form of physical exercise which has recently received attention among researchers for its potential to reduce the risk of falls among seniors (DiBenedetto et al., 2005; Hakim, Kotroba, Cours, Teel, & Leininger, 2010; Ross & Thomas, 2010). Yoga is an ancient exercise discipline that incorporates the mind, body and spirit to strengthen muscles, increase balance and flexibility, and promote overall well-being (DiBenedetto et al.; Ross & Thomas). Falls among seniors can be prevented through the introduction of yoga exercise into a fall-prevention program for seniors.

Background

According to WHO (2007), the world’s population of seniors is expected to double over the next four decades. Within Canada, one in four Canadians will be over the age of 65 by the year 2040 (Human Resources and Skills Development Canada, n.d.; Statistics Canada, 2009). In the Atlantic Provinces, the proportion of seniors is already well above the national average and will nearly double over the next twenty years (Canadian Institute for Health Information (CIHI), 2010; Statistics Canada). The burgeoning senior population means that an increasing number of people are at risk of experiencing a fall. As we age, various factors, including biological processes, dramatically increase our risk of falling. A fall, defined by the WHO as “inadvertently coming to rest on the ground, floor or other lower level . . .” (p.1), may be the consequence of
weakness due to inactivity that results in gait and balance disturbances (Basante et al., 2001; Schmid, Puymbroeck, & Koceja, 2010; Whitney, 1999).

In North America, one in three seniors experience a fall each year (Centre for Disease Control [CDC], 2007; Public Health Agency of Canada [PHAC], 2005). In the United States, this translated into more than 2.1 million falls among seniors, 18,000 fall-related deaths and more than $19 billion in healthcare costs (CDC). The Canadian perspective is just as dire and according to PHAC, falls not only account for the majority of injury-related hospital admissions for seniors, but result in disability, loss of independence and decreased quality of life. Clearly, immediate action is needed to prevent falls among this vulnerable population. While existing fall prevention programs are aimed at staff education and are designed to address the environmental factors related to falls (Ciulla, 2002; Lach, 2010), more must to be done to tackle the underlying factors that contribute to fall among seniors. Such factors include gait disturbances, loss of muscle strength, decreased flexibility and loss of balance. Falls among seniors are preventable and interventions aimed at increased physical exercise can significantly decrease major risk factors for falls (CDC, 2010; Health Canada, 2006; PHAC). Physical exercise contributes to overall good health and can effectively target risk factors that contribute to falls, such as weakness from inactivity, gait disturbances and balance loss (Basante et al., 2001; Howe, Rochester, Jackson, Banks, & Blair, 2008; Schmid et al., 2010; Whitney, 1999). In addition, research has shown that participation in physical activity can reduce the need for medications known to inadvertently increase fall risk, such as antihypertensives, antidepressants, and opioid analgesics (Basante et al.; PHAC). Particularly effective in fall prevention for seniors are physical exercises that focus on improving strength, balance and flexibility, such as yoga.
Benefits of Yoga

Yoga is an ancient discipline that incorporates physical movement (asanas), breathing (pranayama) techniques and meditation to increase strength, balance and flexibility, and to promote overall well-being (DiBenedetto et al., 2005; Ross & Thomas, 2010). Yoga is not only cost-effective – it requires only a soft mat and comfortable clothing for practice – it is also highly adaptable to individual fitness levels. A certified yoga instructor can provide instruction on how to safely and effectively modify postures to better suit the individual’s physical needs while still ensuring the individual receives the benefits of the yoga exercises (Chen & Tseng, 2008). The benefits of yoga are multifaceted and target a number of the same factors that make seniors vulnerable to experiencing falls, thus making yoga an effective fall prevention method.

Gait, Balance and Flexibility

Disturbed gait and decreased balance are known risk factors for falls among seniors (CIHI, 2010; PHAC, 2005). As people age, decreased flexibility results in diminished hip extension (Schmid et al., 2010) and increased pelvic tilt, that results in gait and balance impairments (DiBenedetto et al., 2005; Hakim et al., 2010; Schmid et al.). A number of researchers have indicated that yoga may be able to decrease seniors’ fall risk, in part, due to an increase in flexibility (Chen & Tseng, 2008; Schmid et al.). DiBenedetto et al. found that yoga had a positive influence on influenced a number of factors related to falls (DiBenedetto et al.). Results indicated that seniors who had participated in an eight week yoga program had increased hip extension, increased stride length, and decreased anterior pelvic tilt. In another study, Schmid et al, examined the effect of a12-week yoga intervention and reported seniors had improved balance and increased flexibility. Chen and Tseng also found increased range of motion and balance among their senior yoga program participants. The evidence to date suggests
that yoga lessens seniors’ fall risk through improved muscle strength, gait, balance and flexibility. While the researchers noted the need for larger, randomized control studies to confirm their findings, the consistency of results across the different studies is promising.

**Physical Activity and Muscle Strength**

Muscle weakness is another factor that contributes to increased risk of falls for the senior population (CIHI, 2010; Basante et al., 2001). Participation in physical exercise declines with increasing morbidity and the resulting muscle weakness further multiplies fall risk (Liu-Ambrose et al., 2005; Schmid et al., 2010). Yoga has been shown to directly strengthen muscles that maintain balance, including abdominal and leg muscles (Schmid et al.). Chen & Tseng (2008) found that senior women who participated in yoga had increased strength, improved leg muscle endurance, and significant improvements in balance. While a causal relationship between increased strength and decreased falls cannot be inferred from the non-randomized studies, both the PHAC (2005) and the WHO (2007) recognize the benefits of strength training for seniors in the reduction of falls. Considering decreased activity results in muscle weakness that contributes to fall risk, it seems logical that the increased physical exercise and improved strength related to participation in yoga could reduce seniors’ risk of falls.

**Medication**

Medication use is a known risk of fall for seniors (Basante et al., 2001; PHAC, 2005; WHO, 2007). With increased age, chronic illness often necessitates use of medications to treat such problems as hypertension, arthritis pain and depression. Although antihypertensive medications reduce blood pressure, they may also cause the unwanted side effect of orthostatic hypotension and place the senior at an increased risk of falls. In fact, many antidepressant medications may also cause orthostatic hypotension and have also been linked with higher fall
risk (Basante et al.). Seniors often suffer from arthritis pain and difficulty sleeping and may take multiple medications which could potentiate medication interactions and further increase fall risk (Chen et al., 2009; Ross & Thomas, 2010). In addition, seniors’ ability to metabolize these medications is lessened due to both natural aging and disease processes. Decreased metabolism combined with polypharmacy can amplify the possibility of unwanted side effects (WHO), and further exacerbate senior’s vulnerability to experiencing falls (CIHI, 2010).

DiBenedetto et al. (2005) argue that yoga offers a natural solution for seniors by decreasing the need for some medications and lessening the chance of unwanted side effects and potential medication interactions. In a study of senior women who had completed a four-week yoga program, Chen and Tseng (2008) supported DiBenedetto et al.’s argument in their finding that participants had significantly reduced blood pressure and body fat percentage. In a review of the literature, Ross and Thomas (2010) concluded that yoga was an effective weight-reduction method that also improved cardiovascular function and insulin resistance.

In addition to increased physical well-being and decreased need for medication use among seniors, yoga also offers positive effects on psychological well-being which may further mediate fall risk through decreased use of psychoactive medications. A number of researchers indicated that yoga decreased stress, improved mood, and alleviated depression and anxiety (Chen et al., 2009; Chen & Tseng, 2008; Ross & Thomas, 2010). Chen et al. used a cluster randomized trial to test the effects of yoga participation among 128 seniors in Taiwan and reported that seniors were more relaxed and had fewer depressive symptoms. In a literature review, Ross & Thomas noted that yoga effectively decreased stress and improved psychological well-being through mediating effects on certain neurotransmitters.
**Decreased Healthcare Costs**

The PHAC (2005) reported that falls account for 65% of injuries in the Canadian senior population. Of injury-related hospital admissions among seniors, the majority are due to falls. In Atlantic Canada, hip fractures are implicated in 43% of falls among seniors. Hip fractures result in the need for surgical procedures and average hospital stays of two weeks. Up to 19% of seniors hospitalized as a result of a fall are unable to return home and require placement in a long-term care facility (CIHI, 2010). Yoga may offer a solution to deal with the enormous cost related to falls among seniors. Falls among seniors are preventable (Health Canada, 2006; PHAC) and the weight of current evidence strongly suggests that yoga can reduce the risk of falls among seniors (DiBenedetto et al., 2005; Hakim et al., 2010; Lui-Ambrose et al., 2005; Schmid et al., 2010). As an intervention to prevent falls among seniors, yoga can potentially save the healthcare system a great deal of money. Fewer falls result in less hospital stays, surgeries and long-term care placement with major implications for the healthcare system.

**Conclusion**

Yoga, as part of a comprehensive fall prevention program may effectively reduce falls and increase the quality of life experienced by seniors. Factors that increase fall risk among seniors, such as gait and balance impairments, may be improved due to the increased flexibility achieved with participation in yoga. The increase in physical activity through yoga exercise can strengthen muscle and further decrease the risk of falls. Yoga improves both physical and psychological well-being and decreases the need for certain medications and lowers the senior’s chances of adverse affects from these medications. The decreased fall rate among the senior population helps prolong independence and decreases the need for placement in long-term care.
facilities. In addition, fewer hospital admissions due to fall-related injuries can decrease the cost burden on the Canadian healthcare system. Addition of a yoga exercise to a fall prevention program will benefit seniors and all Canadians.
References


