A Step to Prevent Falls in the Elderly: A Literature Review

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This paper reviews the current literature to identify the way an orientation and mobility (O&M) instructor could effectively predict and/or reduce falls in the Australian-based elderly population with vision impairment. Common causes of falls associated with elderly people with vision impairment are discussed as are the shortcomings of falls prevention programs. Three assessment tools used to predict an individual's risk of falling for the first time have been reviewed. Of the three, the QuickScreen tool could be readily used by an O&M instructor working with clients in their home that appears to be an efficient and cost effective resource providing the base for a successful falls prevention program.

Introduction

Falling in the elderly has negative consequences, both emotionally and physically, and is identified as an important health issue worldwide (Al-Aama, 2011; Swift, 2001; Tiedemann et al., 2012). In Australia, during 2006-2007, 27% of individuals from New South Wales (NSW) who were over 65 years had at least one fall contributing to $AU558.5 million in NSW health care costs (NSW Department of Health 2010). Where 84.5% of costs were a result of hospital admittance, 9% went to educating the emergency staff, and 6.5% went to costs associated with avoiding being admitted to hospital. Fifty per cent of individuals who developed a hip fracture injury as a result of falling did not return to the same level of mobility they had pre-fall (Cook et al., 2011; Swift, 2001). The reviewed literature on falls indicates that there are many factors that contribute to falling (Ganz, Alkema, & Wu, 2008). Vision impairment impedes an individual's ability to identify hazards, or objects for support. Thus, individuals who have vision impairment are more likely to fall than those who do not (La Grow et al., 2006).

Much of the research indicates the need to involve agencies (who work with the elderly) beyond the healthcare system for support and surveillance to facilitate falls prevention (Close, 2012; Feder et al., 2000; Swift, 2001). However, none of the literature examined the benefit that these agencies play in falls prevention. This paper reviews the current literature to identify the way an Orientation and Mobility (O&M) instructor could predict and/or reduce falls in the Australian based elderly population with vision impairment. This report focuses on current falls prevention policies, risk factors, multifaceted screening, and assessment tools available for community use.

Sources of Information

The literature was identified through databases from The University of Newcastle, The University of Wollongong, and Google Scholar. Falls prevention articles solely targeting dementia, stroke, depression, or Parkinson's disease were excluded from this review as these focused on falls in relation to their associated disease and not age. As many O&M instructors provide a service to the elderly who are vision impaired or blind in the community, articles that focused on age related falls and vision impairment in the community and hospitals were reviewed.

Falls Prevention

Swift (2001) highlighted that there was no consistent approach to falls prevention amongst public and private healthcare professionals. This creates a variety of approaches in identifying risk factors of falls prevention that could potentially lead to individuals, who have a higher risk of falling, not being identified before they fall. This piecemeal approach creates a system which responds to falls crisis instead of delivering an effective falls prevention program. Initial assessments are usually done after an individual falls, or when an individual has a history of two or more falls (Al-Aam, 2011). As falls are expensive and having just one fall increases the risk of falling again, assessing individuals after they fall is an unsustainable approach (Scanaill et al., 2011). As Close (2012) stated "there is still a large number of older people in Australia at risk of falls who are not being appropriately assessed or offered interventions to minimise risk" (p. 24). Thus, it is vital that agencies use assessments to identify risk factors that increase an individual's risk of falling for early detection and improved intervention (Rubenstein, 2006; Scanaill et al., 2011).

Swift (2001) identified the need for the development and implementation of a standardised referral pathway which could be used by all healthcare professionals. The current New South Wales (NSW) Department of Health (2011) policy, the 'Prevention of falls and harm from falls among older people (2011-2015)' is a sound example of the implementation of a standardised referral pathway. One aspect of this policy is to "identify opportunities to promote best practice in falls prevention within external organisations" (NSW Department of Health, 2011, p. 2). However, this policy is only mandatory to the NSW public health sector. Moller (2003) emphasised that if falls prevention programs are not implemented, then the expense of treating falls will increase to a point where it will be difficult to fund prevention programs. A falls prevention baseline survey conducted by the Centre for Health Advancement and Centre for Epidemiology and Research (2010) indicated that only 30% of individuals who had fallen within the previous 12 months were aware of their local council falls prevention activities, which was the same for those who had not fallen. This finding might indicate that a fall does not prompt a referral to local councils falls prevention activities. Thus, there seems to be a significant shortfall in referral to relevant services. The gap in the referral process is a concern especially when clients who are referred to appropriate services, experience a decrease in their number of falls (Feder et al., 2000).

Risk Factors of Falling

To identify the solutions to falls prevention it is necessary to identify factors that increase a person's risk of falling. Risk factors are typically categorised to be either intrinsic or extrinsic, with intrinsic risk factors likely to exacerbate the effects of extrinsic factors (Fabre et al., 2010; La Grow et al., 2006; NSW Department of Health, 2011). It is acknowledged throughout the reviewed literature that the most successful assessments are those that are multidimensional and incorporate both extrinsic and intrinsic factors when designing interventions (Feder et al., 2000; Swift, 2001).

Extrinsic risk factors

Extrinsic factors or environmental factors which can increase an individual's risk of falling include unfamiliar residential settings, environmental hazards, crowded areas, unstable or loose footwear, infelicitous glasses, activities of daily living, and extended stays in hospitals (Australian Commission on Safety and Quality in Health Care, 2009; Gillespie et al., 2009; La Grow et al., 2006; NSW Department of Health, 2010). Hazards incorporate environmental conditions and objects with the potential to unbalance an individual and induce falling. For example, loose cords, rugs, stairs, uneven pavements, and furniture (Fabre et al., 2010; La Grow et al., 2006).

A majority of the literature revealed that removing potential hazards from the home environment reduced the amount of hazard related falls and reoccurring falls (Steinman et al., 2011). It is important to note that removing hazards from within and around the home environment changes the familiar environment into an unfamiliar environment. For elderly people a change in the surroundings increases the risk of falling and could account for some studies showing increased risk of falling (Steinman et al., 2009; Steinman et al., 2011). Managing hazards in the home and having vision corrected through glasses or surgery are only slightly effective to reduce falls (Day et al., 2002). However, when all preventative techniques are combined with hazard reduction, there appears to be significant reduction in falls (Day et al., 2002).

As individuals age their chance of needing near and distant vision lenses increases (Haran et al., 2010). For convenience individuals are often prescribed with or choose to wear a single pair of multifocal or bifocal glasses (Haran et al., 2010). However, for those who wear bi or multifocal lenses, their use appears to increase an individual's risk of falling (Haran et al., 2010; Lord et al., 2010). It seems that bifocal and multifocal lenses increase an individual's risk of falling by reducing the distance acuity of the lower visual field further impeding on a person's ability to judge the depth of objects and identify objects with low contrast (Haran et al., 2010). Moreover, optical defects in glasses can displace the position of objects that often contribute to a fall (Haran et al., 2010).

Intrinsic risk factors

Some intrinsic factors which influence an individual's risk of falling include: the level of mobility, female sex, increased age, a fear of falling, previous falls, reduced balance, reduced muscle strength, impaired gait, having more than four medications or a specific type, impaired mental alertness, vision impairment, or other sensory

problems (Australian Commission on Safety and Quality in Health Care, 2009; Gillespie et al., 2009; NSW Department of Health, 2010; Scanaill et al., 2011). Women are more likely to endure a fall than men ostensibly because women have a reduced physical fitness and reduced health (Pereira, Baptista, & Infante, 2013; Watson, Clapperton, & Mitchell, 2011). Women are also more likely to require medical attention after a fall with medical expenses for women 2.2 times higher than men (Watson, Clapperton, & Mitchell, 2011). Introducing new, removing, or changing medications can also increase an individual's risk of falling (Al-Aam, 2011). Hence, it is important to understand the side effects and combination effects of medication.

Falls that do not result in injuries often lead to a fear of falling, further reducing an individual's exercise, independence, self-confidence, and desire to leave their home (Schleicher et al., 2012; Swift, 2001; Waldron et al., 2012). Reduced physical activity is a key risk factor which needs to be addressed in falls prevention programs to reduce such side effects as reduced muscle strength which appears to be correlated with an increased risk of falling (Schleicher et al., 2012).

An individual with vision impairment may misidentify a potential hazard and either over or under correct their movement resulting in a fall (La Grow et al., 2006). La Grow et al., (2006) reported that 57% of falls were induced by a hazard with a majority (78%) of falls occurring in or around the home. This finding emphasises the need for O&M instructors to be part of falls prevention screening, assessment, and education programs.

Fall prevention screening and assessment tools

There is a variety of screening tools available that identify the severity of a single falls risk factor, for example 'Timed Up and Go', 'Sit to Stand', and 'Alternate Step' (Australian Commission on Safety and Quality in Health Care, 2009). However, these screening tools require the individual to have symptoms that make the person more likely to fall. Thus, the individual is more likely to have a fall or develop a fear of falling before the tool is used. A report by Bell and Stirling (2006) stated that intrinsic and extrinsic risk factors could be hidden and only avail themselves through multifactorial screening if they are to be identified before a fall. Falls are a result of one or more contributing factors and are not random events. An individual's risk of falling can be calculated using a multifaceted assessment tool (Bell & Stirling, 2006; Sherrington, Whitney, Lord, Herbert, Cumming, & Close, 2008; Tiedemann, Sherrington, Close, & Lord, 2011). The Australian Commission on Safety and Quality in Health Care (2009) recommended the use of three tools namely 'FallScreen', 'Falls Risk' for Older People - community version (FROP-Com), and 'QuickScreen' as they have shown to be valid and reliable in community care settings within Australia. A description of each assessment tool follows.

FallScreen is a validated assessment tool that provides quantitative data about an individual's postural stability (Australian Commission on Safety and Quality in Health Care, 2009). FallScreen has a short version, costing AU$4000, and a longer version costing AU$8000 (Neuroscience Research Australia, n.d.). The short version takes 15-20

minutes to assess an individual's peripheral sensation, lower limb strength, vision, reaction time, and body sway (Australian Commission on Safety and Quality in Health Care, 2009), but is an expensive tool relative to other tools available for use by para health professionals.

The FROP-Com is a valid and reliable falls risk screening assessment that takes 10-15 minutes to conduct 26 questions covering 13 risk factors (Russell et al., 2009). A high risk of falling is indicated by a score of 18 or more (Australian Commission on Safety and Quality in Health Care, 2009). There is no particular equipment required and it is free to download (National Aging Research Institute, 2009). However, the outcome of this test relies on an individual's ability to recall information accurately and answer truthfully.

The QuickScreen is an evidence-based multifactorial risk assessment tool that indicates which sensorimotor systems are impaired. QuickScreen measures lower limb strength, peripheral sensation, balance, coordination, previous falls, medication, and vision (Australian Commission on Safety and Quality in Health Care, 2009; Bell & Stirling, 2006; Tiedemann et al., 2012). This tool takes an average of 10 minutes to conduct and has been implemented by healthcare professionals worldwide (Tiedemann et al., 2012). The QuickScreen tool measures an individual's probability of falling to *P* values of 0.07- 0.49 %, based on the number of risk factors present (Close, 2012). QuickScreen costs AU$310 and uses minimal equipment, making it a portable assessment tool (Neuroscience Research Australia, n.d.). Results of the QuickScreen test empowers the client, providing them with self-knowledge about their abilities in a controlled environment (Bell & Stirling, 2006). This test has proven statistical reliability over multiple settings (Tiedemann et al., 2012), that makes it an effective tool to use with confidence. The author recommends the QuickScreen assessment tool as the most practical for an O&M instructor to use with clients with vision impairment in their home to reduce falls risk.

Recommendations

O&M instructors from Guide Dogs NSW/ACT, Australia work with individuals who have vision impairment to promote safe and effective mobility (Guide Dogs NSW/ACT, 2011). With training in the use of 'QuickScreen' an O&M instructor could screen individuals in their home, conduct follow-ups, and monitor changes to a client's risk of falling, providing referrals to General Practitioners (GP's) as well as information on falls prevention services. A resource folder that informs individuals on the current falls prevention strategies and local services has the potential to educate those at risk of falls and potentially promote self-referral.

Some individuals accept falling as part of the aging process and do not seek help for minor falls (Gombar et al., 2011). Instructors using QuickScreen presents an opportunity to assess individuals who would not usually visit their GP after a minor fall, further promoting early intervention. Predicting an individual's risk of falling and referring for appropriate intervention reduces the client's risk of falling and ultimately increases their safety in the home and whilst travelling. GPs are time poor (Bell & Stirling, 2006; Close, 2012) and having a validated risk assessment available

provides the GP with more time to discuss and implement intervention strategies with the client. Increasing referral services to organisations in low vision and blindness promotes those organisations as valuable multi-faceted vision support services.

O&M instructors could use the Quick Screen tool to predict an individual's risk of falling prior to a fall when working with clients in their home. The use of an O&M instructor in this area would be an efficient and cost effective resource to promote and implement successful falls prevention.

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