# Practice Reports

## Visual Impairment and Falls: Outcomes of Two Fall Risk Assessments after a Four-Week Fall Prevention Program

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The role of vision impairment (that is, blindness and low vision) related to the risk of falling has been well documented. Reduced visual acuity, as well as poor contrast sensitivity, field restriction, and loss of depth perception are established contributors to falls (Lamoureux et al., 2010). People with vision impairments fall as much as two to three times more often than those without impaired vision (Duquette, 2013; La Grow, Robertson, Campbell, Clarke, & Kerse, 2006). Many studies have examined the relationship between aging and falls, and fall assessments have been developed to determine fall risk for older adults. Other than vision rehabilitation services, there is no standard fall risk intervention for people with vision impairments, despite the higher rates of falls and the fear of falling within this population.

A review of over 200 studies concerning vision impairment and falls, published between 1980 and 2000, concluded that no intervention "studies were identified that developed and evaluated interventions to reduce the risk of injury" (Legood, Scuffham, & Cryer, 2002, p. 159). A 2008 publication suggested that there is a lack of strong enough evidence that any screening is helpful to identify fall risk (Gates, Smith, Fisher, & Lamb, 2008). A search of the 2015 Centers for Disease Control and Prevention (CDC) *Compendium of Effective Fall Interventions* produced limited results regarding visual impairment (Stevens & Burns, 2015).

Most studies stress the importance of vision screening and acknowledge the relationship between falls and visual impairments; however, the publication of actual interventions that reduce falls for those with vision impairments is limited. The few studies that effectively show successful results in reducing falls combined a home screening, or home-safety program, and an exercise routine adapted for visual impairment (Campbell et al., 2005; La Grow et al., 2006; Steinman, Nguyen, Pynoos, & Leland, 2011). In addition, orientation and mobility (O&M) training, as part of a comprehensive vision rehabilitation program, resulted in diminished falls (Kuyk et al., 2004).

### Fall risk assessments used by the Western Blind Rehabilitation Center

The Western Blind Rehabilitation Center (WBRC), part of the Department of Veterans Affairs Palo Alto Health Care System, provides comprehensive vision services to veterans while they are in residence at the facility. Fall prevention is a priority at WBRC, and the O&M department has been conducting the Timed Up and Go (TUG) fall assessment since 2012. However, WBRC felt it important to identify more effective fall interventions, beyond assessment and traditional O&M training.

A Matter of Balance (MOB) is a nationally recognized, evidence-based fall prevention program that has been adapted for people with vision impairments through a project funded by the National Eye Institute. Developed by the Roybal Center at Boston University, MOB addresses the fear of falling with a group of adults over 60 years of age, and it increases physical activity; assertiveness; skill building; goal setting; and cognitive restructuring, or turning negative thoughts into positive thoughts (Peterson, 2003). The MOB master trainer program is facilitated through the agency MaineHealth (2018).

 

The MOB program is conducted over eight two-hour sessions that are led by a trained facilitator following the MOB curriculum. During the sessions, participants are taught how to view falls as controllable, to set goals for increasing activity, to make changes to reduce fall risks, and to learn exercises to increase strength and balance.

WBRC adapted MOB into one if its inpatient specialty programs offered to veterans with visual impairments. MOB addresses some of the unique needs of this population, including fear of falling and assertiveness training. In addition to the curriculum and exercises, veterans enrolled at WBRC receive training in O&M and activities of daily living, as well as a host of other tools and technologies related to accessibility and health. WBRC is the first program in the Department of Veterans Affairs to adopt MOB, and it is the first MOB program to be comprised entirely of people with visual impairments in an inpatient setting.

Over the first year of implementation, O&M specialists provided two fall risk assessments before and after the MOB program: TUG and the Tinetti Performance-Oriented Mobility Assessment (POMA). TUG is a timed assessment in which three trials are averaged to obtain a score. The assessment evaluates the amount of time it takes for an individual to start from a seated position, stand up, walk 10 feet, and then return to a seated position. Participants who take longer than 13.5 seconds to complete these tasks are considered to be at a higher risk for falls (Podsiadlo & Richardson, 1991). TUG has not been standardized for individuals with vision impairments.

POMA is a balance and gait assessment that also has not been standardized for people with visual impairments. An individual is scored, on a scale from 0 to 2, on various tasks such as rising from a seated position, turning around with eyes closed, being gently nudged on the sternum, standing balance, walking, and turning around in a circle. POMA considers those with a total score of less than 19 to have a high fall risk. Those in the 19 to 24 range are considered to have a medium fall risk, and those in the 25 to 28 range to have a low fall risk (Tinetti, 1986).

***Table 1***
**MOB group eye conditions.**

| Eye condition | Percentage | Sample size |
|---|---|---|
| Macular degeneration | 25 | $n = 6$ |
| Glaucoma | 25 | $n = 6$ |
| Diabetic retinopathy | 17 | $n = 4$ |
| Retinitis pigmentosa | 8 | $n = 2$ |
| Stargardt's disease | 8 | $n = 2$ |
| Stroke | 4 | $n = 1$ |
| Optic neuropathy | 4 | $n = 1$ |
| Retinal vein occlusion | 4 | $n = 1$ |
| Optic atrophy | 4 | $n = 1$ |

## Subjects

There were 24 MOB participants who were able to complete both pre- and post-TUG and POMA assessments while at WBRC. The average age of the participants was 80 years, and the group was predominately male (88%, $n = 21$; female, 12%, $n = 3$). Eye conditions of the group varied and included the conditions listed in Table 1.

## Results

### *TUG*

MOB participants ($N = 24$) showed an average decrease of 2.15 seconds on TUG. Twelve-and-a-half percent ($n = 3$) of the participants scored below the fall risk range (13.5 seconds) on the post-test, while 25% ($n = 6$) of the participants scored below the fall risk range on the pre-assessment and maintained a level below risk on the post-test. The remaining 62.5% ($n = 15$) stayed within the fall risk range of over 13.5 seconds.

 

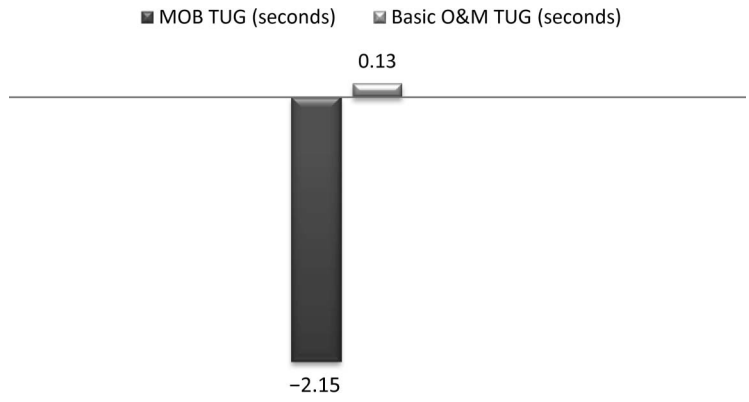


*Figure 1.* The change in pre- and post-TUG data.

Since TUG is not standardized for people with visual impairments, comparison data was compiled from veterans who received only traditional O&M training, without any MOB interventions, and who completed a pre- and post-TUG between the years 2014 and 2017. These results did not show as substantial a change as the MOB group.

TUG comparison of patients participating in traditional O&M ($N = 24$) showed an average increase of 0.13 seconds. O&M participants demonstrated an average increase in time to complete TUG of 0.13 seconds later than in pre-training measures, whereas the MOB group completed TUG over 2 seconds sooner than did those receiving traditional O&M training. See Figure 1 for the change in pre- and post-TUG data.

An important factor was the exercise program, which was incorporated into MOB session 3 and maintained throughout the program. The exercises are simple and are easily adapted for most disabilities, and most can be done while seated. MOB participants, while at WBRC, often receive additional O&M training, including the use of support canes, rollators (walkers), wheelchairs, and scooters. Also notable was the finding that those utilizing rollators took more time to complete TUG; however, when used appropriately, they might be considered less of a fall risk despite a higher score.

### *POMA*

POMA has three scores: balance, gait, and a total score. The average POMA (pre- to post-training) changes for MOB participants on the total POMA score demonstrated a gain of 1.5 points ($n = 24$). This number represents a small increase in the total POMA score. Average POMA balance changes showed a 0.75-point gain, and average POMA gait changes also showed a .75-point gain.

For post-training POMA score totals, 21% ($n = 5$) scored in the high fall risk range (less than 19 points); 42% ($n = 10$) were in the medium range (19–24 points); and 37% ($n = 9$) were in the low risk range (25–28 points). Among participants, 13% ($n = 3$) moved from the medium to low risk range and 17 percent ($n = 4$) moved from high to medium risk, while 70% ($n = 17$) stayed within their risk range from pre-training to post-training. See Table 2 for POMA average changes.

There was an insufficient sample size in the WBRC database to allow POMA scores to be compared with the data for traditional O&M

***Table 2***
**Pre- and post-POMA average changes.**

| Balance | Gait | POMA total |
|---|---|---|
| .75 | .75 | 1.5 |

 

training. However, based on the TUG findings for the O&M comparison, it is unlikely that there would be a greater improvement on POMA, since the assessment uses a scoring rating system between 0 and 2. Two considerations for POMA include a higher score equating to a lower fall risk and the use of assistive devices resulting in a lower score on some tasks.

## Conclusion

Although this data provides interesting results regarding the effectiveness of the MOB program and its impact on TUG and POMA outcomes, it does not resolve the issue of the absence of fall risk assessments for people with visual impairments. However, it did resolve the WBRC's interest in identifying an effective fall risk intervention based on the data. The results also highlight the need for additional research on falls, fall risk, and effective interventions to reduce falls among individuals who are visually impaired.

In addition to the objective outcomes, MOB participants have provided subjective feedback, including high praise and satisfaction with the MOB exercises, curriculum, and the discussion that occurs within sessions. Two participants who started the MOB program in wheelchairs were able to develop enough strength to resume limited walking using a four-wheel walker after four weeks of participation.

Other subjective feedback comes from the MOB coaches who led the sessions. They reported an increase in the participants' use of recommended devices such as the long cane, support cane, or four-wheel walker. Although these devices may be accompanied by a stigma from the patient's perspective, the MOB program's use of cognitive restructuring, or turning negative thoughts into positive ones, has helped resolve some of these perceived stigmas. The individual often sets a personal goal for consistent device use to prevent falls during the program. Furthermore, consistent and safe use of assistive devices is reinforced not only by the O&M specialist and MOB coach, but also by the other MOB participants, who encourage each other to use their tools.

MOB will continue to be offered to veterans with visual impairments at WBRC, and the data will be revisited as a larger sample size is accumulated. In the meantime, we encourage those with visual impairments to seek MOB programs and O&M training within their communities and to take that first step in reducing the risk of falling.

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## Using the JAWS Screen Reader and the Focus Braille Display to Read Foreign Language Books Downloaded from the Bookshare Accessible Online Library

*Gaylen Kapperman, Stacy M. Kelly, and Elizabeth Koster*

McColl (2005) and Orsini-Jones (2009) explained that more research and development is needed to enhance the language-learning experiences of students who are visually impaired (that is, those who are blind or have low vision). The methods commonly used nowadays are not sufficient for foreign language learning (McColl, 2005; Orsini-Jones, 2009). Furthermore, there are several challenges involved in the study of foreign languages by students who are visually impaired (Kapperman & Sticken, 2003). One of the most pressing of these challenges is that teachers of students with visual impairments provide braille copies of all instructional materials in the foreign language (Koenig & Holbrook, 2000). If the teacher is not familiar with the foreign language the student is studying, it becomes even more difficult to provide the required workbooks, textbooks, and other materials to be transcribed into the foreign language (Koenig & Holbrook, 2000). Likewise, those teachers who are unfamiliar with the foreign language may not know how to pronounce the special accented letters when providing instruction to their students regarding the braille symbols used to represent these letters (Koenig & Holbrook, 2000).

In 2003, Kapperman and Sticken described a strategy for students who are visually impaired to learn foreign languages independently using a portable braille notetaking device that was popular at the time called the Braille Lite. However, there were shortcomings to this strategy. The Braille Lite was unable to speak the foreign language properly. More specifically, it was noted in the

 