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A Multimedia Fall Prevention Program for Physical Therapy Interventions in At-Risk Seniors

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Purpose: The Multimedia Fall Prevention program (MFP) is a foundation for rehabilitation of older adults at risk for future falls. It can serve as an integral component in the Physical Therapy plan of care, directed at addressing specific deficits; but can also stand alone as an educational tool. MFP helps direct conscious attention in order to potentiate changes by the patient and heighten understanding during a focused intervention. Balance, bed mobility, transfer, ADL and gait training; including the use of assistive devices, can be enhanced by increased comprehension of the task at hand. Therapists can design treatment sessions based on patient recognition of new problems to be solved. Home and community safety issues can be addressed by providing multimedia experiences as a bridge between the clinic and real life. MFP permits the discovery of the inherent difficulties that occur in a person's daily life, encouraging solutions that meet their unique needs for safe mobility.

Target Audience: MFP has been extensively tested with more than 400 older adults ranging in age from 60 to 98 whose status varied from independent to dependent for some ADL and IADLs. Volunteers ranged from independent community dwellers to semi-dependent residents in long-term care settings. Among the participants have been those undergoing outpatient rehabilitation, visually, hearing, and cognitively impaired, walker dependent and partially wheelchair reliant; the appropriate candidate must be marginally ambulatory. Single subject trials have been conducted with individuals upon discharge from sub-acute care and permanent residents of Assisted Living facilities. The sole criterion for successful participation is that the individual admits they have fallen or regularly loses their balance without falling.

Program Design: MFP is a comprehensive treatment approach that utilizes Situated Cognition principles to address the needs of at-risk Seniors. These principles are summarized as follows:

- Individuals are self-directed by their personal goals and should be encouraged to align their goals with that of the program.
- 'Tuning' is the education of attention, focusing the learner on detection of aspects of their environment that have functional value.
- Learning is an interaction between the individual and the instruction. The goal-directed participant must use their unique capabilities to function within a physical and social environment, completing a perception-action cycle.

The MFP Program has three components that incorporate these principles. The Interview identifies the individual's lifestyle and environment; it stimulates understanding of their own fall history and establishment of goals. The interactive Multimedia sessions allow the therapist to focus the individual's attention on key fall risks. Finally the Evaluation session can be used to determine which environmental aspects the individual can detect, driving further cycles of perception-action.

Development Process: A series of exploratory studies have been completed, evaluating each step in the development of MFP and included:

♦A Pilot study evaluating the feasibility and efficacy of a Standard protocol including 10 Vignettes as compared to usual fall prevention education approaches, which demonstrated significant behavioral and learning outcomes.

♦Examination of massed and distributed practice schedules, which demonstrated no significant differences between these regimens. The Multimedia Vignettes remained the most influential component of the Intervention.

♦ Development of new Vignettes appropriate for a broader spectrum of participants permitted selection of Multimedia appropriate to the individual's lifestyle and environment. Customization of the training protocol by the MFP software resulted in significant learning gains, even with respect to a Standard set of 10 Vignettes.

♦ Longitudinal examination of intervention outcomes with MFP included Participants randomly assigned to Usual Fall Prevention, Multimedia Standard and Multimedia Custom groups and followed for up to one year. Half of those who completed Multimedia sessions were also randomly assigned to receive an additional Multimedia Practice session. The addition of Multimedia sessions to Usual fall prevention education demonstrated significant and lasting efficacy. Differences were evident after only three months of follow-up.

Benefits: Participants who experienced Multimedia sessions (n=176) as compared to Usual (n=116) fall prevention recognized significantly more fall-risks in 10 novel scenes ($p=.001$). A Cox Proportional Hazards model of those who completed three months to one year of follow-up showed that participants were much less likely to have two falls after MFP than those who only had UFP (risk ratio=.42, $p=.0254$). Furthermore, compared to Seniors who only completed fall history interviews and weekly postcards reporting falls, those who also had MFP were significantly ($p<.0001$) less likely to subsequently experience two falls.

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