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Older Adult Compliance with Physiotherapy-Prescribed Home Exercise for Balance: A Systematic Review

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Abstract

Purpose: Impaired balance is a significant cause of falls among community-dwelling older adults. The purpose of this systematic review was to examine current evidence on the compliance of men and women over 60 years of age with home exercise programs for balance prescribed by a physiotherapist, and to explore the relationship between compliance and patient outcomes.

Method: Electronic databases were searched (PubMed, Scopus, CINAHL) between December 2012-January 2013. Strict a priori inclusion criteria were used to identify eligible articles, which were scored using a modified Downs and Black checklist by two independent reviewers.

Results: Four articles met inclusion criteria. The results of these studies revealed self-reported compliance rates between 50% and 97%; however, compliance appeared to vary depending on the level of clinician supervision and type of compliance measure. Two studies showed no functional gains in balance, and two showed significant improvements in balance.

Conclusion: Based on the small number of eligible studies, compliance with home-based exercises prescribed for balance training among older adults varies, with increased compliance appearing to be associated with increased clinician supervision. Further research is required to determine the efficacy of physiotherapist-prescribed home exercise programs for functional balance outcomes.

Keywords: Patient compliance; Physical therapists; Postural balance; Aged

Introduction

Approximately 30% of community-dwelling adults over 65 years of age fall each year, and rates of falls and fall-related injuries increase with age [1]. Falls can result in severe health consequences, including traumatic brain injuries, fractures, injuries to internal organs, and death, as well as minor injuries such as bruising, abrasions, lacerations, strains, and sprains [1,2]. Moreover, falls can lead to a loss of confidence and independence, deconditioning due to fear-related avoidance, and a reduction in quality of life [1]. In the United States, it is predicted that by 2020, the annual direct and indirect costs of fall injuries will be $54.9 billion [2] Causes of falls include impaired balance, decreased strength, dizziness, medications, poor vision, and impaired cognition [3]. Home exercise programs that contain balance and strength training exercises have been shown to reduce the number of falls, and subsequently the number of fractures that occur as a result of falls [4].

Role of Physiotherapy

To prevent falls, individuals must understand the risks associated with inactivity and the importance of remaining physically active throughout the lifespan. Effort must be made to prevent the consequences of inactivity and reduce the incidence of falls. Fall prevention interventions may be comprised of education, consultation, health promotion, and prevention services [5]. Physiotherapists often prescribe personalized therapeutic exercises to improve range of motion, strength, and overall function, and can play a significant role in advocacy for fall prevention in the community.

Compliance to Home Exercise Programs

It is the responsibility of patients to be an active participant in their own care. Randomized controlled trials (RCTs) are level 1 evidence, and therefore are significant sources of information with respect to the determination of intervention effectiveness and to inform evidence-based practices. If patients are not compliant with the experimental protocol, it is difficult to confidently establish the effectiveness of the intervention. In pharmaceutical interventions, compliance rates with prescribed care are low, with approximately 50% of patients being consistently reported as noncompliant with their drug regimens [6]. However, little is known regarding compliance to home exercise programs prescribed by physiotherapists.

Purpose

To better understand the role of physiotherapists in exercise prescription and the value of home exercise programs for fall prevention, the purpose of this systematic review was to explore compliance and patient outcomes among RCTs involving balance and

physical mobility home exercises for community-dwelling older adults.

Method

Search strategy

Three electronic databases (PubMed, CINAHL, and Scopus) were searched between December 2012 and January 2013. In consultation with experts for literature as well as a content area, an a priori search strategy was determined using keywords, limiters, inclusion, and exclusion criteria, from which strict a priori criteria were applied to search results and identify eligible articles in each database (Appendix A). Published literature available in English was included in this review. Abstracts were screened for evidence that the study was a RCT, delivered through a physiotherapy setting, incorporated a home exercise program prescribed by a physiotherapist, conducted among an adult population, and involved a measure of compliance. Titles and abstracts were screened independently by two reviewers (KJ, MT) and a third reviewer (EK) resolved discrepancies to achieve consensus. The full texts of the screened articles were then reviewed and screened for the following additional criteria: community-dwelling adults over 60 years of age; study populations free of pathologies that could confound determination of physical function and balance (i.e. acute medical, neurological, or orthopedic conditions).

Quality assessment tool

Included articles were assessed using the modified Downs and Black Quality Assessment Tool [7]. This tool consists of 27 items in a checklist format with questions in the following subheadings: reporting, external validity, internal validity (bias and confounding), and power. The checklist generates a score ranging from zero through 28, with a higher score indicating higher methodological quality. Score ranges obtained from the Downs and Black checklist was grouped into four quality levels: excellent (26–28), good (20–25), fair (15–19), and poor (≤ 14).

Results

The initial database searches yielded 184 articles. After the removal of duplicates, 133 articles remained. Upon reviewing the titles and abstracts of these articles, the researchers agreed on 34 articles for full text analysis. The full texts of these articles were assessed, and four [8-11] met the inclusion criteria (Figure 1). Quality assessment scores for each article are available in Appendix B. Table 1 summarizes results from included articles.

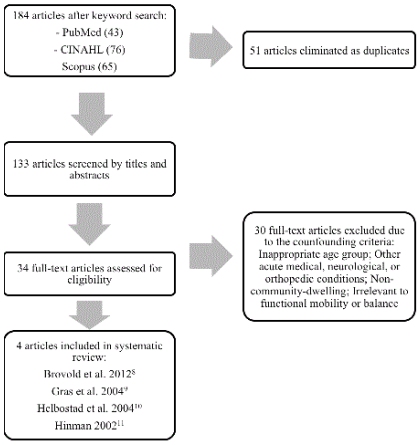

Figure 1: Search Process

	Brovold et al. [8]	Gras et al. [9]	Helbostad et al. [10]	Hinman [11]
Population	n=108 (61 female) 79 (± 6.5) years	n=35 (34 female) 76 (± 5.7) years	n=77 (62 female) 81 (± 4.5) years	n=88 (55 female) 72 years
Intervention Group (IG)	HEP (n=53)	Hip HEP (n=16)	HEP + twice weekly group training (n=39)	Computerized balance training (n=28)
Comparator Group (CG)	Daily activities (n=55)	Ankle HEP (n=19)	HEP + 3 group meetings (n=38)	HEP (n=30) Control (n=30)
Time Period	3-weeks in GDH 12-weeks HEP	8-week HEP	12-week HEP 1 year follow-up	4-week HEP
Compliance Measure	Self-report log	Self-report log	Attendance at group sessions	Calendar log and telephone questionnaire
Compliance	IG: 77% CG: 67%	IG: 50% CG: 58%	IG: 88% CG: 83%	IG: 97% CG: 92%
Results	IG: ↑ HRQL, IG and CG: ↑ balance confidence, BBS, TUG, STS, TWT at 3 months	IG and CG: ↔ ROM, strength, balance, gait	IG and CG: ↑ walking speed, figure of eight, TUG, max step length, timed pick-up, STS; ↔ first fall, fall rate	IG and CG: ↔ balance, self-efficacy, walking time, reaction time

Abbreviations: IG: Intervention Group; CG: Comparator Group; HEP: Home Exercise Program; GDH: Geriatric Day Hospital; ↑, significant change; ↔, no significant change; HRQL: Health-related Quality of Life; BBS: Berg Balance Scale; TUG: Timed Up and Go; STS: Sit-to-stand; TWT: Timed Walking Test; ROM: Range of Motion

Table 1: Summary of Results

Discussion

The purpose of this systematic review was to explore compliance of older adults in completing physiotherapy home exercise programs, and to better understand its relationship with patient outcomes. Four articles of the initial 184 articles generated through the database search met inclusion criteria. Articles were included if participants were over 60 years of age, community-dwelling, and not identified as having other acute medical, neurological, or orthopedic conditions. Additionally, studies were required to involve a home exercise program for balance training prescribed by a physiotherapist, as well as a measure of compliance. The four articles were assessed for quality using the modified Downs and Black checklist. Two studies [8,10] were categorized as "excellent," and two studies [9,11] were categorized as "good."

The four studies reported participant drop out based on weather, world events (e.g. "9/11"), injury, and lack of motivation. Additionally, it has been suggested in the literature that other factors influencing compliance may include method of instruction, intensity of supervision, number of exercises, length of exercise bout, as well as participant attitudes, beliefs, memory and cognition [1,6,12-16]. Because exercise compliance is influenced by so many elements, it is difficult to explain the findings in the four studies reviewed as they all used different methods of prescription and exercise parameters. Moreover, due to the heterogeneity of the studies included in this review, a definitive relationship between compliance and the functional outcome measures used was not found. For example, Hinman [11] reported compliance levels in excess of 90%, and found no significant changes in balance or functional abilities. In contrast, Helbostad et al. [10] described compliance levels near 60%, and improvements were noted in balance-specific outcome measures. Because compliance does not appear to explain the outcomes found, other possible factors may be responsible. Gras et al. [9] suggested that the interventions used in their study were not sufficient in either duration or intensity. Another potential factor limiting ability to draw conclusions from the literature included in the current systematic review is the relevance of the specific exercises prescribed. For example, Gras et al. [9] designed home exercise programs based on strength and range of motion [9]. In contrast, the two studies that found significant changes in outcomes used balance-specific exercises and longer intervention periods, which were perhaps specific and of a long enough duration for functional changes to occur [8,10]. Moreover, their results may stem from the appropriate use of tasks specific to the outcomes being measured, or participant value of the prescribed exercises relative to their personal health goals (i.e. prescribed tasks more closely related to functional goals) [12].

Compliance levels reported in the included studies were measured using attendance or self-report tools such as calendars, exercise logs, and telephone calls. Other studies have evaluated compliance by examining the correctness of exercise techniques, from which it was suggested that if participants had been compliant, they would perform exercises properly [13]. Due to the small sample size in the current review, definitive conclusions regarding older-adult compliance with physiotherapist-prescribed home exercise programs cannot be drawn. Further research is warranted. Specifically, valid and reliable tools should be explored to measure compliance objectively as the studies included in this review were based on participants' self-reports. Additionally, the impact of compliance may be isolated in future studies by analyzing the data separately for compliers and non-compliers [14-16].

Limitations

The present study is limited by the small sample of literature eligible for inclusion. Moreover, included studies employed a broad range of outcome measures. The heterogeneous nature of this data limits the ability to draw conclusions about the effect of physiotherapist-prescribed exercise programming for balance among community dwelling older men and women.

Conclusion

Physiotherapy is a profession based on evidence-informed practice. It is essential for clinicians to stay current in order to maximize patient outcomes. Exercise prescription is a substantial portion of physiotherapy practice; therefore, it is critical to understand the value achieved for patients. Results from the current systematic review indicate that many factors contribute to compliance, that it is critical to prescribe suitable exercises for an appropriate length of time and that self-reports of compliance may have no direct relationship with treatment outcomes. More high quality research (i.e level 1 evidence) is needed to increase knowledge about patient compliance with home exercise programming prescribed by physiotherapists.

Key Messages

Physiotherapists can be substantial advocates for fall prevention training and education. Yet there is a shortage of information about individual compliance with physiotherapist-prescribed home exercise programs for balance training and fall prevention. The present study systematically reviewed the literature reporting compliance with home exercise training programs prescribed by physiotherapists. Results demonstrate that compliance rates are highly variable, and that more research is needed to determine the efficacy of and compliance with physiotherapist-prescribed home exercise programs for fall prevention.

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