



A nurse-led case management program on home exercise training for hemodialysis patients: A randomized controlled trial



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ABSTRACT

Background: Patients on maintenance hemodialysis suffer from diminished physical health. Directly supervised exercise programs have been shown to be effective at improving physical function and optimizing well-being. However, nurses seldom include an exercise intervention in the care plan for hemodialysis patients.

Objectives: The purpose of this study was to examine the effects of a 12-week nurse-led case management program on home exercise training for hemodialysis patients.

Design: The study was a randomized, two-parallel group trial.

Settings: Hemodialysis units in two tertiary hospitals in Nanjing, mainland China.

Participants: One hundred and thirteen adult patients who have been in stable condition while on dialysis treatment for more than 3 months were recruited and randomly assigned to either the study group ($n = 57$) or the control group ($n = 56$).

Methods: Both groups underwent a brief weekly in-center exercise training session before their dialysis sessions for the first 6 weeks. The study group received additional nurse case management weekly for the first 6 weeks and biweekly for the following 6 weeks. The intervention was to facilitate patients in performing regular exercise at home. Outcome measures, including gait speed, 10-repetition sit-to-stand performance, and quality of life were collected at baseline, and at 6 and 12 weeks into the program.

Results: The results revealed that patients in the study group demonstrated greater increases in normal gait speed [$F_{(1,111)} = 4.42, p = 0.038$] than the control group. For the study group, a mean increase of 12.02 (± 3.03) centimeters/second from baseline to week 12 was found. With regard to the fast gait speed, there was a marginally significant between-group effect [$F_{(1,111)} = 3.93, p = 0.050$]. The study group showed a mean improvement of 11.08 (± 3.32) cm/s, from baseline to week 12. Patients from both groups showed improvements in their 10-repetition sit-to-stand performance. The between-group differences approached significance [$F_{(1,111)} = 3.92, p = 0.050$], with the study group showed greater improvement than the control group. The time taken by the patients in the study group to complete the 10-STS test increased by 5.75 (± 3.88) s from baseline to week 12. Significant improvements in quality of life across three time points were found only in the study group.

Conclusions: Home exercise using a nurse-led case management approach is practical and effective in improving the physical function and self-perceived health of stable hemodialysis patients.

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What is already known about the topic?

- Direct supervised exercise training programs have been shown to be effective at improving the physical function and quality of life of dialysis patients.
- Healthcare providers in dialysis centers rarely encourage patients to be active, and the majority of patients undergoing hemodialysis treatment are leading sedentary lives.
- Nurses are well positioned to help patients engage in exercise, due to their prolonged and sustained contacts with patients.

What this paper adds

- Home exercise with a nurse-led case management approach is safe and effective at improving the physical function and perceived well-being of hemodialysis patients.
- Trained clinical nurses are capable of delivering home exercise for stable dialysis patients.
- The nurse-led home exercise program can easily be incorporated into daily clinical practice.

1. Introduction

Patients on maintenance hemodialysis, regardless of age, suffer from impaired physical function (Kaysen et al., 2011; Matsuzawa et al., 2014; Painter and Roshanravan, 2013), which subsequently results in unemployment (van Manen et al., 2001), dependence in activities of daily living, disability (Altintepe et al., 2006), and an increased risk of hospitalization and mortality (Peng et al., 2010). Being physically inactive has been recognized as an important contributor to deterioration in the physical functioning of the dialysis population (Painter et al., 1999). Both diminished physical function and reduced daily physical activity have been associated with adverse clinical outcomes in observational studies of patients on hemodialysis treatment (Johansen et al., 2013; Matsuzawa et al., 2012; Tentori et al., 2010).

Systematic reviews and meta-analyses have shown that exercise, as a subcategory of physical activity, is effective at improving the physical function, depression, and health-related quality of life (HRQOL) of patients on hemodialysis (Cheema and Singh, 2005; Heiwe and Jacobson, 2011; Ouzouni et al., 2009; Segura-Orti et al., 2009). Meanwhile, K/DOQI clinical practice guidelines state that “all dialysis patients should be counseled and regularly encouraged by nephrologists and dialysis staff to increase their level of physical activity” (K/DOQI Workgroup, 2005).

Unfortunately, the various observational studies have consistently shown that the majority of dialysis patients lead sedentary lives (Avesani et al., 2012; Kim et al., 2014; Longenecker et al., 2002; O'Hare et al., 2003). Moreover, exercise programs are not commonly implemented in most hemodialysis facilities (Painter et al., 2014). Both clinical investigations and qualitative interviews revealed a range of barriers to participating in exercise and implementing exercise programs. From the perspective of patients, a lack of exercise-related knowledge, a fear of

injuries, experiencing symptoms of debilitation, a low capacity for exercise, and a lack of motivation are some common barriers to engaging in exercise (Delgado and Johansen, 2012; Heiwe and Tollin, 2012; Kontos et al., 2007; Painter et al., 2004). From the perspective of dialysis facilities, resource restrictions are the major concern, such as a lack of professionals to supervise exercise programs, the limited involvement of health care providers, and a lack of financial support (Bennett et al., 2010). The lack of exercise equipment is another barrier to implementing exercise programs in clinical practice (Kontos et al., 2007).

Nurse case management is described as the strategies and process of providing health care to high-risk populations, including those in acute care, long-term care, and community settings (Lamb, 1992). A systematic review and meta-analysis showed that nurse case management using complex interventions can preserve the physical function and independence of elderly people living in the community (Beswick et al., 2008). Through the multidisciplinary coordination of care, individualized exercise programs, counseling, and continuous monitoring, case management offers opportunities to provide interventions to overcome the obstacles that patients face to participating in exercise. The meta-analyses and reviews, which include studies of different chronic disease groups, have demonstrated the effects of nurse case management on improving functionality, quality of life, treatment adherence, self-care ability, and patient satisfaction; as well as on decreasing service use and costs (Latour et al., 2007; Sutherland and Hayter, 2009; Welch et al., 2010). In the chronic kidney disease population, the results from previous randomized controlled trials support the argument that nurse case management is effective at improving clinical and patient outcomes, such as fewer hospitalizations (Dixon et al., 2011; Steele et al., 2007) and improvements in quality of life and patient satisfaction (Chow and Wong, 2010; Li et al., 2014; Wong et al., 2010). The self-efficacy levels and self-management capacities of patients were found to have increased after they received support from a nurse-led multidisciplinary team (Su et al., 2009; Wong et al., 2010).

To address the resource challenges faced by dialysis facilities, home exercise, with its fewer resource requirements, is a possible alternative. It is recommended as a way to easily incorporate physical activity into an individual's daily life (Delgado and Johansen, 2012; Kontos et al., 2007). Exercising at home gives patients on dialysis the flexibility to adjust exercise schedules to accommodate their fatigue levels (Horigan, 2012). Preliminary studies have revealed that home and center-based exercise led to equal gains in clinical and patient outcomes, but that home exercise was more likely to be sustained (Dalal et al., 2010; Malagoni et al., 2008).

Exercise should not be regarded as the exclusive domain of physiotherapists. The whole nephrology team should advise, encourage, and help patients to engage in physical activity, and regard these activities as an integral part of the patient care plan (Smith and Burton, 2012). Nurses have the obligation to help patients reach their full life potential, and are more likely than physicians to discuss patient outcomes with both patients and family

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