

ORIGINAL ARTICLE

## Rehabilitation in Home Care Is Associated With Functional Improvement and Preferred Discharge

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### Abstract

**Objective:** To investigate the impact of physiotherapy (PT) and occupational therapy (OT) services on long-stay home care patients with musculoskeletal disorders.

**Design:** Observational study.

**Setting:** Home care programs.

**Participants:** All long-stay home care patients between 2003 and 2008 (N=99,764) with musculoskeletal disorders who received a baseline Resident Assessment Instrument for Home Care assessment, 1 follow-up assessment, and had discharge or death records.

**Interventions:** PT and OT.

**Main Outcome Measures:** The effects of PT and OT services on transitions in functional state, discharge from home care with service plans complete, institutionalization, and death were assessed via multistate Markov models.

**Results:** Home care patients with deficiencies in instrumental activities of daily living and/or activities of daily living at baseline and who received home-based rehabilitation had significantly increased odds of showing functional improvements by their next assessment (for a state 3 to state 2 transition: odds ratio [OR]=1.17; 95% confidence interval [CI], 1.10–1.26;  $P<.0001$ ; for a state 2 to state 1 transition: OR=1.36; 95% CI, 1.14–1.61;  $P=.0005$ ). Receipt of PT/OT also significantly reduced the odds of mortality and institutionalization in this group.

**Conclusions:** With increasing numbers of older adults with chronic conditions and limited funding for health care services, it is essential to provide the right services at the right time in a cost-effective manner. Long-stay home care patients who receive rehabilitation at home have improved outcomes and lower utilization of costly health services. Our findings suggest that investment in PT and OT services for relatively short periods may provide savings to the health care system over the longer term.

Archives of Physical Medicine and Rehabilitation 2013;94:1038-47

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Home care is currently the fastest growing portion of the health system in Canada.<sup>1</sup> With increased pressure for a more economical system—including early discharge, and reduction of alternate level of care beds and emergency department wait times—heightened morbidity is required for institutional admission, and patients with more complex medical problems are being managed within the

community.<sup>2</sup> Shamian et al<sup>3</sup> suggested that a comprehensive approach to home and community care is essential to sustain this shift. The cost-effectiveness of home care has been a matter of controversy for many years,<sup>4-6</sup> although a major Canadian study<sup>7</sup> concluded that home care is a cost-effective alternative to residential care. Despite the recognized benefits of home care, it continues to be insufficiently funded to meet the needs of the Canadian population. Specifically, recent strains on the home care system have resulted in inadequate and rationed services, inequitable access to care, staffing shortages, and privatization of services.<sup>2</sup>

A primary goal of providing rehabilitation services within the home is to allow individuals to maintain or improve their physical functioning, quality of life, and overall independence while

Presented to the Ontario Home Care Association, May 26, 2011, Mississauga, ON; and at the Canadian interRAI Conference, October 5, 2011, Toronto, ON, Canada.

Supported by an operating grant from the Canadian Institutes of Health Research (grant no. 114354).

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit on the authors or on any organization with which the authors are associated.

remaining in the community longer.<sup>8</sup> With changing population demographics, community rehabilitation is a potential strategy for effective management of the aging population. In addition to direct patient benefits such as functional ability and mortality,<sup>9,10</sup> it also has the potential to lead to system improvements including more appropriate resource use and avoidance of institutional placements.<sup>11-16</sup> Despite these benefits, community-based rehabilitation is often not adequately funded.<sup>17</sup> Recent cuts to home-based rehabilitation services—such as the 9% and 24% drop in home visits for physiotherapists and occupational therapists, respectively—have created concerns that there are inadequate resources to sustain increasing demands on rehabilitation services, which may lead to compromised patient care.<sup>17</sup>

A number of systematic reviews<sup>18-22</sup> have been completed recently that suggest home-based rehabilitation is as good or better than inpatient rehabilitation for postacute rehabilitation in a variety of populations including neurologic, cardiac, stroke, mental health, and musculoskeletal (MSK) patients. Specifically, Stolee et al<sup>22</sup> systematically reviewed 12 controlled studies comparing home-based and inpatient rehabilitation (outpatient rehabilitation was excluded) for older patients with MSK disorders and found that compared with the inpatient group, patients who received rehabilitation in the home had equal or larger gains in function, cognition, quality of life, and patient satisfaction, as well as decreased mortality and health service use. However, they also found that many of the studies recruited a selective group of postacute patients for their intervention who may have been most likely to benefit from rehabilitation, and that the literature lacked the definitive empirical evidence needed to understand the effect of home-based rehabilitation services on older adults with multimorbidity who were unlikely to meet the criteria for inpatient rehabilitation or who may have indications for physiotherapy (PT) or occupational therapy (OT) services without a recent hospitalization.

To fill this critical knowledge gap, the current study investigated the effect of home-based rehabilitation services (PT and/or OT [PT/OT]) on the functional ability and discharge disposition for patients with MSK disorders. We used the Resident Assessment Instrument for Home Care (RAI-HC)<sup>23</sup> data, which offered high quality and comprehensive patient records.<sup>24</sup> A multistate Markov model was used to investigate the transitions from patients' baseline status or functional "state" at the start of a course of PT/OT treatment at home and their "state" at its completion. This model process provided a useful framework for modeling changes in health status over time, and the comprehensive nature of the RAI-HC assessment provided multiple factors for use in risk adjustment including baseline physical

function, activity level, falls, cognitive function, mood, and instability/frailty.

## Methods

### Source of data

The RAI-HC is one of a suite of standardized assessment tools developed by the international interRAI consortium.<sup>23,25-27</sup> It is mandated in Ontario and other jurisdictions to collect census-type data on home care patients expected to be on service for more than 60 days. The aim of the instrument is to inform and guide comprehensive care and service planning in community-based settings. It contains more than 300 items measuring cognition, mood and behavior, informal support services, physical functioning, and other patient characteristics. The RAI-HC includes multiple embedded scales such as the Activities of Daily Living (ADL) Hierarchy Scale<sup>28</sup>; Instrumental Activities of Daily Living (IADL) Scale<sup>23</sup>; Changes in Health, End-Stage Disease, and Signs and Symptoms Scale (CHESS)<sup>29</sup>; Depression Rating Scale (DRS)<sup>30</sup>; and Cognitive Performance Scale (CPS).<sup>31</sup>

The RAI-HC data used for this analysis contain all assessments done in the province of Ontario from January 2003 until September 2008. To construct the appropriate dataset we combined 3 Ontario home care and related data-holding sources: RAI-HC assessments, admission and discharge records, and service records. Linked patients (ie, patients whose information was contained on all 3 data sources) were included if they had (1) an RAI-HC baseline assessment coded for at least 1 MSK condition (specifically hip fracture, other fractures, osteoporosis, and arthritis); (2) at least 1 consecutive follow-up assessment within the same admission episode; and (3) a date of discharge or death. Table 1 includes additional information regarding the number of patients and the number of assessments included in the final dataset. Assessment times were measured from the time of start of home care (in days). The baseline assessment was defined as occurring within 3 months of admission to home care. As mandated by interRAI, follow-up assessments are completed every 6 months or earlier in the event of major clinical changes. We restricted attention to persons with an MSK diagnosis listed as the primary or an associated condition. MSK disorders are the primary cause of chronic pain and physical disability in the general population<sup>32</sup> and a common target for rehabilitation services in home care. The MSK designation refers to a group of conditions that can affect the bones, joints, muscles, or extra-articular soft tissue.<sup>33</sup> The RAI-HC requires assessors to check for the presence or absence of the following MSK conditions: hip fracture, other fractures, osteoporosis, and arthritis.

During the study period, some patients had multiple admissions to the home care system; these were treated as separate episodes. Within the period of January 2003 to September 2008, 90,012 (90.2%) individuals had 1 enrollment to home care, 8,852 (8.9%) had 2 engagements with home care, 830 (0.8%) had 3 engagements with home care, and 79 (<0.1%) had 4 or more engagements.

The total sample included 99,764 long-stay home care patients with MSK disorders who received PT/OT services and had 2 or more consecutive RAI-HC assessments completed within at least 1 engagement with home care, representing approximately one third of home care patients who received RAI-HC assessments. In Ontario, long-stay home care patients are those expected to have

#### List of abbreviations:

<b>ADL</b>	activities of daily living
<b>CHESS</b>	Changes in Health, End-Stage Disease, and Signs and Symptoms Scale
<b>CI</b>	confidence interval
<b>CPS</b>	Cognitive Performance Scale
<b>DRS</b>	Depression Rating Scale
<b>HR</b>	hazard ratio
<b>IADL</b>	instrumental activities of daily living
<b>MSK</b>	musculoskeletal
<b>OR</b>	odds ratio
<b>OT</b>	occupational therapy
<b>PT</b>	physiotherapy
<b>RAI-HC</b>	Resident Assessment Instrument for Home Care

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