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## Feature Article

## Hospital-acquired functional decline in older patients cared for in acute medical wards and predictors: Findings from a multicentre longitudinal study



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## ABSTRACT

Describing the trajectories of hospital-associated functional decline in older patients admitted to acute medical units and identifying predictors at the individual, nursing, and hospital levels, were the aims of the study. A longitudinal survey among 12 acute medical units in which 1464 patients were consecutively enrolled and evaluated using the Barthel Index (BI), was performed. Functional decline was defined as a decrease in the BI of at least 5 points from admission to discharge. In all, 17.1% participants ( $n = 251$ ) demonstrated functional decline. In accordance with multiple logistic regression analysis, 28.8% ( $R^2$ ) of the variance in the functional decline was explained by: confusion/disorientation (RR = 4.684; 95% CI = 3.144–6.978), admission from nursing homes (RR = 2.464; 95% CI = 1.642–3.697), daily care expressed in minutes offered by nursing aides (RR = 1.535; 95% CI = 1.275–1.849), higher workforce skill-mix (RR = 2.221; 95% CI = 1.763–2.797), bladder catheter insertion (RR = 1.599; 95% CI = 1.128–2.268), and higher BI score at admission (RR = 1.019; 95% CI = 1.014–1.024). Increasing the amount of

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Medical units  
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Longitudinal study

care delivered by competent nurses—having a bachelors degree—providing and supervising direct-care activities, may reduce the occurrence of functional decline in older patients admitted to medical units.  
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## Introduction

Medical illness affects functional status<sup>1,2</sup> and different functional trajectories have been documented in unstable, acute, sub-acute and chronic conditions.<sup>3–5</sup> In accordance with the literature, from 40% to 65% of patients suffering from acute medical conditions showed significant decline in the few days before hospitalization.<sup>1,6,7</sup> Around 35%–40% of older adults reported hospital-acquired functional decline at discharge,<sup>1,3,4,7</sup> and this rate increased to 50% in individuals aged  $\geq 85$ .<sup>1</sup> Functional recovery was reported as slower, and less than 30% was documented as returning to baseline status within 12 months after hospital discharge.<sup>3</sup> However, from admission to discharge, functional status improved in 20%–25%<sup>1,6</sup> of patients, was stable in 60%–90%,<sup>1,6,8</sup> and declined in approximately 10%.<sup>6</sup>

Available studies have explored functional decline with regard to consequences on patients, families caregivers and health care systems.<sup>2,9</sup> Patients discharged with acquired functional dependence reported decreased self-esteem<sup>10</sup>; a need for more home support, and an increased likelihood of nursing home (NH) admission or service utilization when no family caregivers were available, thus increasing social costs.<sup>9–11</sup> Patients also demonstrated an increased likelihood of hospital readmission<sup>12</sup> and death.<sup>3,13</sup>

To date, research has traditionally focused on individual risk factors of hospital-acquired functional decline, such as age, lower baseline functional status, poor functional reserve, severity of illness, co-morbidities, and cognitive impairment.<sup>7,14</sup> Multiple medications,<sup>15</sup> malnutrition<sup>15,16</sup> and depression<sup>17</sup> have also been shown to increase the risk of hospital-acquired functional decline. The complex interaction among the above-mentioned individual factors with the process of hospitalization, the characteristics of the hospital environment and the support received by nurses to promote independence,<sup>4,18</sup> may also influence the occurrence of functional decline.

The role of in-hospital nursing care has received much recent attention<sup>4,19</sup>: potentially modifiable risk factors such as limited mobility, suboptimal continence care and poor nutrition, accounted for immediate and one-month post-hospitalization functional decline. Nursing interventions stimulating functional independence can reduce the risk of hospital-acquired functional decline.<sup>18,20</sup> Instead, performing the tasks for the patient or limiting his/her activity, may increase the risk of acquired functional dependence at discharge as compared to patients stimulated to perform activities.<sup>18,20</sup> Moreover, restrictive care processes including bed rest and the use of constraints may increase the development of irreversible functional decline.<sup>21</sup> However, although patient functional status has been found to be responsive to nursing care,<sup>18,20</sup> which conditions of nursing care increase hospital-acquired functional decline has never been tested empirically together with other patient- and hospital-related factors. Therefore, describing hospital-acquired functional decline in older patients cared for in acute medical wards, and identifying predictors at the individual, nursing, and hospital levels, were the aims of the study. The hypothesis established was the following: in addition to individual factors already acknowledged in the literature, nursing and hospital care factors may affect the occurrence of hospital-acquired functional decline in patients admitted to acute medical units. Identifying modifiable functional decline predictors at the nursing and hospital levels, can

inform preventive interventions and target action for high-risk groups of functional decline.<sup>22</sup>

## Methods

### Study design and setting

A longitudinal pragmatic study design involving 12 Italian acute medical units<sup>23</sup> composed of on average 38 beds located in 12 northern Italian National Health System (NHS) hospitals with medium/high specialization, was performed from 2012 to 2013.

The findings are reported here in conformance with the Strengthening the Reporting of Observational Studies in Epidemiology recommendations.<sup>24</sup> The Ethical Committee of the Coordinating Centre approved the research protocol (authorization available to the authors).

### Participants

Patients admitted to the selected acute medical units in the study period were eligible. Patients were included in the study if they were: a)  $\geq 65$  years, b) admitted from their own homes or from NHs; c) as a scheduled or urgent case; d) remaining at least 24 h in the medical unit, and e) willing to participate in the study. Patients were excluded if they were admitted to the medical unit from other hospitals or hospital units, if they remained  $\leq 24$  h in the medical unit, and if they were not willing to participate.

When the clinical and/or the cognitive conditions were not appropriate for express written informed consent, the reference caregiver as the family member responsible for the patient was involved.

### End-point and instruments

The hospital-acquired functional status decline was the end-point of the study. Functional status was measured using the Barthel Index (BI), a 10-item tool measuring functional independence in feeding, bathing, personal toileting, dressing and undressing, bowel and bladder control, getting on and off the toilet, moving from chair to bed and returning, walking on level surfaces, and ascending/descending stairs. The total BI score ranges from 0 to 100: the higher the score, the greater the degree of independence.<sup>25,26</sup>

In accordance with available studies,<sup>6</sup> functional decline was defined as a decrease in the BI score of at least five points from admission to discharge. Functional recovery was defined as an increase in the BI score of at least five points from admission to discharge,<sup>6</sup> while functional stability was defined as the permanence of the same BI score at discharge.

Individual, nursing and hospital level variables were collected using different instruments<sup>25–30</sup> and through different sources, as reported in Table 1.

### Validity

Preliminarily, homogeneity across the medical units in the professional profile of the Registered Nurses (RNs) and Nursing Aides (NAs) as well as their level of responsibilities and tasks performed in daily practice was assessed.<sup>23</sup> Then, two RN researchers collected data in each unit, at the patient, nursing, and hospital level. They

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