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Predicting discharge destination after stroke: A systematic review

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ABSTRACT

Different factors have been studied and proven to significantly influence discharge destination of acute stroke patients after hospitalization. Few reviews have been published combining the results of these studies. Therefore we aim to present an overview of the studies conducted regarding these predicting factors. Through conducting a systematic review we aimed to study the different predictive factors influencing discharge destination of acute stroke patients after hospitalization. Nineteen articles were selected in accordance with the research question and inclusion criteria. The factors found were, according to their significance in the articles, subcategorized in age, gender, functional status, cognitive status, race and ethnicity, co morbidities, education, stroke characteristics, social and living situation. The main factors significantly associated with other than home discharge were functional dependence/comorbidities, neurocognitive dysfunction and previous living circumstances/marital status. A medium or large infarct is associated with institutionalization. The stroke volume is not associated with home discharge. The effect of other factors remain controversial and results differ between studies. These include: age, gender, race, affected hemisphere and availability of a caregiver not living at home. Factors such as education, hospital complications, geographic location and FIM progression during hospitalization have not been studied sufficiently.

Contents

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1. Introduction

In Belgium 52 patients suffer a stroke every day [1]. The annual incidence of stroke in Belgium is 185/100,000 inhabitants. In Europe stroke is responsible for 10% of all causes of death in men and for 15% in women. The amount of Disability Adjusted Life Years (DALY) lost in Europe because of stroke is 10.793.000 years, which is 7% of DALY's lost by disease [2]. Moreover approximately 30% of patients will remain disabled after stroke and will be largely dependent upon family and health professionals for support. As much as 80% will need help in daily activities [3]. This also implies an important social economic impact, directly (related to acute hospitalization, revalidation and medical complications) but also indirectly (related to a decrease in productivity) [4]. The estimated direct cost in the acute setting can be as high as €44 600 per patient [5]. In industrialized countries 2–4% of the national health care budget is used for the treatment of stroke patients. After the acute hospitalization phase patients either return to their home with or without additional help, are transferred to an inpatient rehabilitation facility (IRF) or will be admitted to a skilled nursing facility (SNF). Because of the high costs for rehabilitation, it is necessary to prioritize which patients are most suited for admittance to an IRF and which patients would be better taken care of at home or in a SNF. To analyze this, a large number of studies have been performed to predict which social, personal, clinical, hospital-based and environmental factors determine the discharge destination of stroke patients after acute hospitalization. These studies are all cohort or cross-sectional studies, with absence of published systematic reviews combining these results. With this review we present an overview of the studies conducted with respect to these predicting factors.

2. Material and methods

We aimed to review the different factors predicting the discharge destination after hospitalization for acute stroke. The studies that were included in this review were selected through a search of the following electronic databases: PubMed, Web of Science and the Cochrane Library up to 13/07/2015. Search details used were: "stroke" [MeSH Terms] and ("patient discharge" [All Fields] OR "discharge course" [All Field] or "discharge location" [All Fields] or "discharge destination" [All Fields]) and ("loattrfull text" [sb] and "2005/07/13" [PDat]: "2015/07/13" [PDat] and "humans" [MeSH Terms] and (Dutch [lang] or English [lang])). The inclusion criteria used yielded 548 articles which prompted us to narrow our search to systematic reviews, meta-analyses, clinical studies and guidelines.

To determine which factors described in the included studies are significant to the research question, calculated *P*-values and 95% confidence intervals (CI) are used. Factors described without *P*-value or 95% CI are excluded from this review. A *P*-value <0.05 or 95% CI ≥1.00 are statistically significant toward the determined research question and therefore are included as significant factors. Factors with a *P*-value >0.05 or 95% CI <1.00 are not significant in determine the discharge destination.

3. Results

3.1. Data

A total of 548 articles were analyzed. After reading the title and abstract 31 articles were selected according to the research question. On full article review 19 studies met the inclusion criteria. There were 8 studies with a prospective design, 8 studies with a retrospective design and another 3 studies had a cross-sectional study design. The study populations ranged from 54 to 187 188. Two studies included patients with ischemic stroke, 12 studies with both hemorrhagic and ischemic stroke types and in 5 studies the inclusion criteria regarding the type of stroke were not clearly stated. Discharge destination was investigated as home vs. IRF or SNF in 15 studies, as IRF vs. SNF in 0 study and as both in 4 studies. The results are summarized in Tables 1 and 2.

3.2. Demographic factors

3.2.1. Age

The effect of age on the discharge destination is controversial. A retrospective study in the US showed that a younger age was a factor for being discharged to home ($n = 185\,997$, $p < 0.0001$, 95% CI 1.54–1.59) [6]. Patients discharged to IRF were significantly younger than the patients discharged to a SNF ($n = 739$, $p < 0.001$, 95% CI = 0.94–0.98) [7]. Some smaller sized studies concluded that age was not a significant factor for discharge destination ($n = 47$, $p = 0.423$) [8], ($n = 210$, 95% CI = 0.99–1.07) [9], ($n = 60$) [10].

3.2.2. Gender

In larger studies, female sex was found to be a factor for discharge to an institution ($n = 185\,997$, $p < 0.0001$, 95% CI = 1.10–1.16) [6], ($n = 739$, $p = 0.002$) [7], but not in differentiating between IRF and SNF ($n = 375$, $p = 0.12$, 95% CI = 0.41–1.10) [7]. However most studies conclude that gender is not a significant factor in discharge destination.

3.2.3. Ethnic background

Black, white and Hispanic race were all equally discharged home without health care service or IRF, however in comparison to white patients, black patients were discharged home with health care more and to a SNF less often. Hispanic patients had no significant difference in discharge to a SNF, but were more likely to be discharged home with health care service ($n = 63\,679$, $p < 0.001$) [19]. Another US study contradicts these results by concluding that in comparison with white patients, black patients were discharged to IRF and SNF more often ($n = 185\,997$, $p < 0.0001$, 95% CI = 1.28–1.40). The black race was also a significant factor for being discharged to a SNF instead of an IRF ($n = 41\,386$, $p < 0.0001$, 95% CI = 1.10–1.32) [6].

3.2.4. Marital status

An Australian study found a significant correlation between marital status and home discharge for patients with an FIM score of ≤75 and ≤40 ($n = 70$, 95% CI = 1.65–22.40 resp. $n = 158$, 95% CI = 2.11–9.53) [22]. Other authors concluded the same significant correlation towards home discharge ($n = 241$, $p < 0.001$) [14], ($n = 193$, $p = 0.0274$) [16], ($n = 5577$, $p < 0.0001$) [15]. Living at home with a partner or family member is associated with a better chance to be discharged home ($n = 268$, $p < 0.01$, 95% CI = 2.05–8.06) [11], however the amount of sons or daughters living at home was no significant factor ($n = 163$, $p = 0.4956$) [16], ($n = 158$, $p = 0.34$) [3].

3.2.5. Geographic factors and previous living situation

There was no significant association between metropolitan or rural residents and the discharge destination ($n = 185\,997$, $p = 0.89$, 95% CI = 0.91–1.09) [6]. Patients living in extended care facilities