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Predictors of Hospital Admissions Based on Routinely Collected Everyday Observations in a Community Care Setting

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Abstract. The aim of this study was to identify predictors for hospital admissions in community-dwelling adults based on routinely collected community data. Univariate logistic regression analyses were performed to assess each variable's ability to predict preventable and all cause hospital admissions.

Keywords. Prediction, primary health care, elderly, home care, hospital admission

1. Introduction

Population ageing challenges the existing healthcare systems as the older population are at higher risk of chronic diseases that require long-term care (1), and more frequent hospital admissions (2). Consequently, avoiding unnecessary hospital admissions have become a priority, as both the primary- and secondary healthcare sector cannot keep up with the rising demand (3). The Triage Changing Table has been recommended by The Danish Health Authority for early detection of acute events and prevention of preventable hospital admissions based on home care providers' everyday observations of clients' health states (4,5). No studies have examined the association between data obtained from the Triage Changing Table Database and hospital admissions. The aim of the present study was to identify predictors for preventable and all cause hospital admissions in community-dwelling adults based on everyday health state observations.

2. Methods

First paragraph. Data was retrospectively collected from The Patient Administrative System used in the North Denmark Region, which includes information about hospital admissions, and The Triaged Changing Table Database. 4,410 subjects aged 65 or above residing in Aalborg Municipality, Denmark, were included in the study. The outcomes were preventable and all cause, acute hospital admissions defined as an unplanned overnight stay in hospital. Prior to each acute hospital admission, we defined a prevention, event, and control period with length of three, 14, and 14 days, respectively. A total of 279 and 261 features were constructed from the Triage Changing Table variables for the

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preventable and all cause hospital admission analyses, respectively. Univariate logistic regression analyses were performed to assess each variable's ability to predict the outcome. Five-fold cross-validation was applied to reduce the risk of overfitting and increase generalizability to new data.

3. Results

A total of 68 control and event period pairs from 53 subjects was included in the all cause hospital admission analysis. 19 control and event period pairs from 18 subjects were included in the preventable hospital admission analysis. The most discriminative predictor variable for all cause hospital admissions was the difference in total sum of item codes between the first and last registration in each period (OR = 1.20; 95% CI = 0.94, 1.55; p = .14; AUC±STD = .60 ± .12). For the preventable hospital admissions, the most discriminative predictor variable was the number of Triage Changing Table registrations (OR = 1.05; 95% CI = 0.92, 1.19; p = .48; AUC±STD = .65 ± .16). No predictors showed statistically significant associations with the outcome.

4. Discussion

This study used only routinely collected data extracted from administrative databases in a community care setting, which compared to self-reported data tends to have greater predictive performance (6). The reported AUCs indicate some discriminative potential, however, no variables had statistically significant association to the outcome, which may be due to the relatively low sample sizes. The current data segmentation strategy limited the number of subjects and control/event periods. A less restrictive segmentation approach will likely increase the number of event and control periods.

In conclusion this study has demonstrated that data collected using the Triage Changing Table may be useful in predicting impending hospital admissions. However, further research is needed to evaluate the true predictive potential of this tool.

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