An Algorithm for Frailty Assessment Using the Omaha System

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Introduction

Frailty is characterized as a clinical syndrome of reduction in physiological functioning and is associated with higher risks of fall, disability, institutionalization, and mortality.¹ An algorithm is needed to identify individuals with different levels of frailty for tailoring interventions to optimize outcomes. This study aimed to develop and test a frailty assessment algorithm using a standardized terminology, the Omaha System.

Methods

An Omaha System Frailty Index (OSFI) algorithm was developed for frailty assessment. The first author initially mapped each frailty criterion suggested in the Physical Frailty Phenotype² to a clinical terminology, the Omaha System Problem Classification Scheme³ signs/symptoms. The mapping was finalized through iterative discussions and revisions within the research team. Ten Omaha System signs/symptoms from four problems were mapped to the frailty criteria to construct the OSFI. Then, the OSFI was tested using an existing de-identified community-based care dataset generated during routine documentation using the Omaha System. Cases aged 65 or over were divided into five frailty groups based on the sum of their OSFI items. Data visualization was used to identify patterns and generate hypotheses regarding the associations between cases’ outcomes and frailty. Analysis of variance (ANOVA) was used to test the hypotheses. Cases’ outcomes were operationalized using the Omaha System Problem Rating Scale for Outcomes³ which consists of three five-point Likert-type ordinal scales measuring the concepts of Knowledge, Behavior, and Status (KBS). This study was deemed exempt from review by the University Institutional Review Board.

Results

There were 5,782 cases with an average age of 80.3 ± 8.6 years, 58.9% female, and 63.9% white. Sample distribution was 25.1%, 16.4%, 19.0%, 18.1%, 21.4% of cases in frailty 0, 1, 2, 3, 4+ groups, respectively. Visualizing the data revealed 2 patterns leading to 2 supported hypotheses regarding associations between frailty and final KBS scores (Figure 1). In general, higher frailty was associated with lower final Behavior and Status scores (Behavior: F(4, 5778) = 16.08, p < .001; and Status: F(4, 5778) = 7.18, p < .001).

Discussion

The results showed that the OSFI likely identified individuals with higher frailty who were at risk of lower outcomes. There is potential to use the OSFI to identify older adults with differing levels of frailty. Further prospective study is needed to understand if personalized intervention strategies by levels of frailty aid in optimizing outcomes and to adapt and test the algorithm using other terminologies and datasets.

References