Development of a Hospital Frailty Risk Score for Community-dwelling Older Adults Using Data from Electronic Hospital Records in South Korea

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Extended Abstract

South Korea is is witnessing population aging at an unprecedented rate [1]; however, a lack of consensus regarding a frailty assessment method hinders effective medical practice [2]. As such, the present study aimed to develop a hospital frailty risk score (HFRS) using diagnostic codes from the International Classification of Disease, 10th Revision (ICD 10) and healthcare utilization data collected from community-dwelling older adults.

This secondary data analysis used information compiled in the Korean Frailty and Aging Cohort Study (KFACS) and National Health Insurance Database (NHID). KFACS (2016–2019) data were collected from community-dwelling older adults. Data from 2761 of 2977 individuals who participated in the first survey (2016–2017) without any missing sociodemographic data were selected. Frailty was determined based on the modified version of the Fried Frailty phenotype (CHS) [3] and Korean Frailty Index for Primary Care (KFI-PC) [4] scores reported in the KFACS data. HFRS was calculated based on ICD-10 codes included in NHIDs (1–5 codes per claim) for 24 months from January 1 of the year in which the first survey was conducted. And the area under the ROC curve (AUC) and cut-off where the base area of the Receiver Operating Characteristic (ROC) curve of HFRS is maximized were calculated. For calculation, HFRS followed Gilbert's prediction method [5]. To validate the AUCs and cut-offs, these values were again computed for medical expenditures, number of emergency department (ED) visits, and inpatient days based on the computed cut-offs to convert them to binary variables for logistic regression.

Ten AUC values were calculated based on the definition of frailty presented by the CHS and KFI-PC and number of diagnostic codes considered in the NHID. The AUC value was the highest when five diagnostic codes were included (CHS, cut-off 7.5; AUC, 0.5; KFI-PC, cut-off 7.1; AUC, 0.65). At the greatest AUC and cut-off, the cut-off and AUC for medical expenditures were 743,274 Korean won (KRW) and 0.70, respectively, using the CHS, and 658,816 KRW and 0.70, respectively, using the KFI-PC. For number of ED visits, the cut-off and AUC values were 1 and 0.57, respectively, using the CHS and 1 and 0.50, respectively, using the KFI-PC. The cut-off and AUC values for inpatient days were 1 and 0.64, respectively, using the CHS, and 1 and 0.63, respectively, using the KFI-PC. Based on the CHS, the odds ratio for medical expenditures in the frailty group (versus [vs] the non-frailty group) was 3.84 (95% confidence interval [CI] 3.26–4.53), and that for inpatient days was 2.85 (95% CI 2.42–3.35). Based on the KFI-PC, the odds ratio for medical expenditures was 3.67 (95% CI 3.12–4.31) in the frailty group (vs non-frailty group), and that for the number of ED visits and inpatient days was 2.31 (95% CI 1.90–2.81) and 2.84 (95% CI 2.42–3.33), respectively.

South Korea has a national health insurance system; as such, an HFRS could be a cost-effective diagnostic metric for frailty in the country because frailty can be diagnosed based on established ICD-10 codes documented during the utilization of healthcare resources.

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