Development and Validation of a Risk Assessment Nomogram for Hearing Loss Among Community-Dwelling Older Adults in China

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Backgrounds: Hearing loss is a prevalent issue among older adults, impacting quality of life and social participation[1]. Developing a predictive model enables early identification of high-risk individuals, supporting targeted prevention and intervention strategies to address this growing public health concern[2].

Aim: The purpose of this study was to develop and validate an individualized nomogram for predicting the risk of hearing loss among community-dwelling older adults in China.

Method: We utilized data from 20,044 community-dwelling older adults who underwent health check-ups in Beijing's Dongcheng District between 2 February 2020 and 30 October 2023. Among these, 14,030 individuals were randomly assigned to the training set, while 6,014 were allocated to the validation set. Stepwise logistic regression was employed to select important variables for inclusion in the model. Model performance was evaluated using the area under the receiver operating characteristic (ROC) curve (AUC), calibration curve, and decision curve analysis (DCA). The final logistic regression model was visualized in nomogram.

Results: A total of 1,236 (6.2%) patients developed hearing loss. The final logistic regression model and nomogram consisted of nine factors: age, exercise frequency, physical function, Ability of Daily Living, dietary habits, smoking, hypertension, cognitive function, and body mass index (see figure 1). The model had high AUC

values (training set: AUC=0.828, 95% confidence interval [CI]=0.812~840; validation set: AUC=0.803, 95% CI=0.788~0.834, respectively). The calibration curves, which compared the predicted hearing loss probability and observed event rate, revealed the accurate performance of the nomogram model. DCA demonstrated that the nomogram was clinically beneficial.

Conclusion: The most important risk factors for hearing loss in elderly were age, and exercise frequency. The nomogram developed in this study could be a promising and convenient tool to predict hearing loss risk, but further external validation is needed.

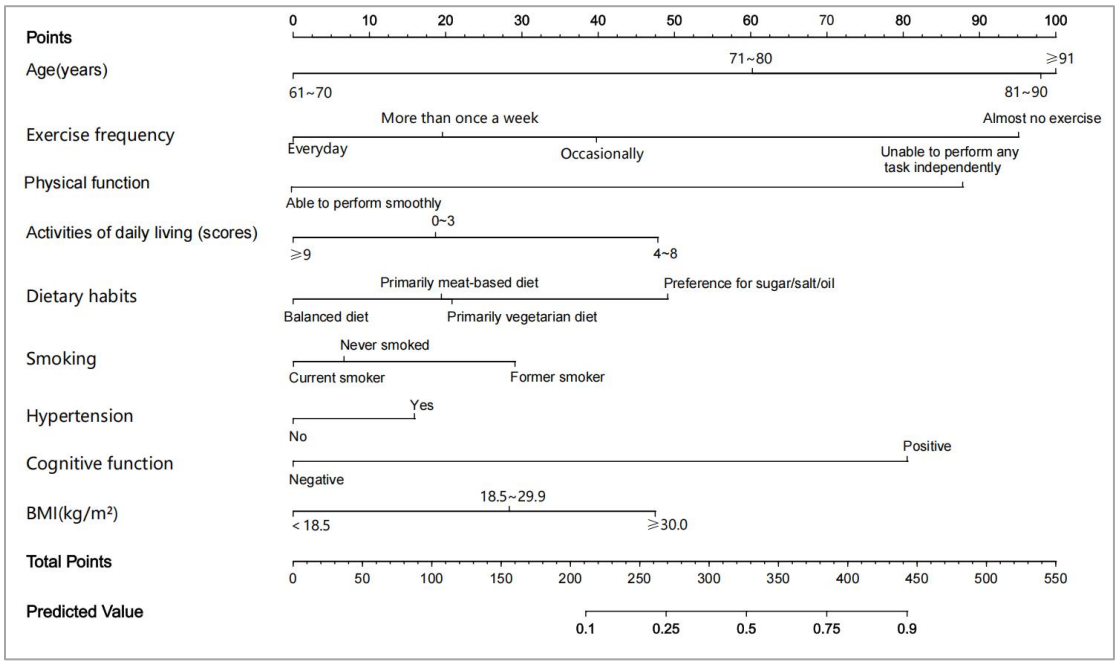

Figure 1 The nomogram to predict the probability of hearing loss in community-dwelling older adults. BMI: body mass index

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