The psychometric properties and application of the FRAIL scale and Fried frailty phenotype questionnaire in Japanese community/dwelling older adults

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論 文 名　：　The psychometric properties and application of the FRAIL scale and Fried frailty phenotype questionnaire in Japanese community-dwelling older adults (地域在住高齢者におけるフレイルスケールおよびフリードのフレイル質問紙の特性とその応用)

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論　文　内　容　の　要　旨

Population aging is accelerating worldwide, which put forward the concept of frailty become one of the hot issues in geriatrics now. Frailty is defined as a medical syndrome characterized by diminished strength, endurance, and reduced physiologic function and increases an individual's risk of increased dependency and/or death. At present, lots of frailty instruments based on different purposes and models have been developed, however, many of them still have not been robustly validated and their prognostic ability was rarely determined. Despite the reliability and validity of several instruments such as the Fried frailty phenotype (FFP) and frailty index have been well-validated, they are not easily implemented in settings such as a busy clinic or large-scale epidemiological study, as the former requires objectively measured and population reference values and the latter requires information derived from the Comprehensive Geriatric Assessment. As a simpler alternative, a 5-item FRAIL scale is a brief hybrid measure and has been gradually verified by many countries. Moreover, it is notable that the FRAIL scale is comparable to more complex measurements such as the FFP in predicting mortality and disability. However, the FRAIL scale has not been validated in Japan for now. Therefore, the doctoral study first developed a Japanese FRAIL scale (FRAIL-J) and a modified version based on the FRAIL-J named the Fried Frailty Phenotype Questionnaire (FFPQ) and evaluated the reliability and validity of both questionnaires, and further tried to explore an effective application of both questionnaires in Japanese community-dwelling older adults.

In the first study, we developed a FRAIL-J and an FFPQ and evaluated the reliability and validity of both questionnaires. Overall, the results of this study showed that both questionnaires had low internal consistency, good test-retest reliability, acceptable construct validity, satisfactory diagnostic accuracy, and concurrent validity. In addition, a 2-point cut-off of both questionnaires or a 3-point cut-off of the FFPQ can be used as the first step for frailty screening in Japanese community-dwelling older adults.

The second study demonstrated that the sedentary behavior (SB) patterns, light physical activity (LPA) moderate-to-vigorous physical activity (MVPA) in bouts of < 10 min (sporadic MVPA) were not associated with pre-frailty or frailty defined by both questionnaires. Higher levels of total MVPA time and steps were not associated with pre-frailty but associated with frailty defined by both questionnaires. In addition, a significant association between MVPA in bouts of ≥ 10 min (bouted MVPA) and frailty defined by the FRAIL-J was observed. Moreover, the 43.25 or 51.63 min/day of total MVPA, 9.13 min/day of bouted MVPA, and 3841 or 3702 steps/day of daily step were suggested as the optimal cut-off

value to discriminate between frailty and non-frailty for the FRAIL-J and FFPQ, respectively. The main findings in this study provide evidence concerning how objective physical activity patterns are associated with frailty which might inform future feasible approaches to managing frailty in older Japanese adults.

In the third study, we found that a 6-month multi-component exercise intervention program had an improved effect on frailty status defined by both FFP and FFPQ. Moreover, a fair agreement of the intervention effect was found between the two instruments indicated the potential ability of the FFPQ in assessing the effect of a frailty intervention. However, the item of ambulation and loss of weight in the FFPQ might not be appropriate in evaluating the effect of an exercise intervention. These findings suggest that the implementation of the FFPQ as an assessment instrument is feasible in a large-scale setting or a resource-limited setting when the FFP cannot be evaluated.

To sum up, this doctoral thesis reveals that the FRAIL-J and FFPQ not only simple and self-reported but also have satisfactory reliability and validity make it can be used in a large-scale setting or a resource-limited setting at a frequent interval in Japanese community-dwelling older adults. In view of the findings of studies 1 and 2, despite the FRAIL-J and FFPQ had similar reliability, validity, and causing/protecting factors, comparatively speaking, the FFPQ was more close to the FFP (instead of illness using inactivity) and more flexible (2 or 3 points as the cut-off). In addition, as professional and structural deficiencies in the health care system may make older adults not easy to know whether they have had several diseases, the FFPQ without illness item could be adopted easier by areas having professional and structural deficiencies in the health care system. Moreover, as for the ability to assess the effect of an exercise intervention on frailty, the item of illness in the FRAIL-J is also inappropriate because a past illness cannot be reversed. Therefore, in study 3, only the FFPQ was selected to evaluate whether it could be used as an instrument to assess the effect of a physical activity intervention on frailty. The heartening findings showed that a fair agreement of the intervention effect was found between the FFP and FFPQ indicated the potential ability of the FFPQ in assessing the effect of a frailty exercise intervention.