学 位 論 文 の 要 旨

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学 位 論 文 名　A Prospective Study of Frailty, Mortality, and Required Level of Care in Elderly Requiring Support
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論 文 内 容 の 要 旨

INTRODUCTION

The increase in the number of elderly requiring care in this super-aging society prompted Japanese officials to establish a long-term care insurance system in 2000. The number of individuals certified under this insurance system has tremendously increased since 2000. In particular, elderly requiring support was almost 26% of those under long-term care insurance. The care services provided to the elderly requiring support are called preventive care services. The aim of care services for the elderly requiring support is to improve the functioning and activities of daily living (ADL), rather than simply to alleviating the burden on care. However, it has been pointed out that while appropriate preventive care services are effective at maintaining and improving ADL, overuse of these services can lead to deterioration in ADL.

Frailty is associated with characteristics such as fall, gait difficulty, mild depression, being homebound and malnutrition, and these associated characteristics have received attention as factors necessitating support for the elderly. Frailty is present in 4%-27% of the elderly living at home and has been related to death due to sarcopenia, deterioration in ADL, and other causes. Therefore, it is important to elucidate the relationship between frailty, mortality, and the required level of care in the elderly requiring support; it is also important to improve the content of care services on the basis of this knowledge.

Therefore, in this study we aimed to elucidate the relationship between frailty, mortality and required level of care by conducting a prospective survey over a 4-year period targeting the elderly requiring support and independent elderly people matched for sex and age.

MATERIALS AND METHODS

We conducted a baseline survey of disease, lifestyle, and frailty in 75 elderly requiring

support newly certified as requiring support at levels 1 or 2 (the support level group) and 75 independent elderly people (the independent group). The independent group was matched for age, sex and residential area of the people to the support level group by Unnan city. We determined the mortality and required level of care (the support level group, n = 60; the independent group, n = 62) for four years. Trained public health nurses conducted the baseline survey in August 2007 through the interview at each subject's home. During the 4-year follow-up period, there were a total of 28 dropouts: 15 subjects in the support level group and 13 subjects in the independent group. Follow-up rate at 5 years was 80.0% for the support level group and 82.7% for the independent group.

The survey covered information regarding the following: sex, age, long-term care insurance certification, disease (current and previous history of hypertension, heart disease, dementia, fracture, and knee osteoarthritis), lifestyle (physical activity, smoking, and drinking) and frailty (fall, gait difficulty, mild depression, homebound, and malnutrition). The outcome variables were death and deterioration in the required level of care after four years. Information regarding time of death was collected from long-term care insurance certification information held by the Unnan Wide Area Union.

Fisher's exact probability test was used to compare the characteristics of the support level group and the independent group at baseline and follow-up. We used a prospective cohort study design to investigate death and deterioration in the required level of care after four years separately for each group. Odds ratios (OR) and 95% confidence intervals (CI) were then calculated using bivariate logistic regression analysis (stepwise, backward conditional) to analyses independent correlations between frailty at baseline, death and deterioration in the required level of care after four years, adjusted with sex, age, disease, and lifestyle.

RESULTS AND DISCUSSION

At the baseline, a comparison of the characteristics of the support level group and the independent group found no statistically significant regarding the differences between sex, age, current and previous history of heart disease and hypertension, physical activity, smoking, BMI, and fall. However, the support level group had significantly more frailty-related characteristics than the independent group. Gait difficulty, mild depression, and homebound were significantly higher in the support group than that those in the independent group.

With regard to deterioration in the required level of care, the number of individuals in the support level group was significantly higher [nine individuals (20.9%)] than the independent group [one individual (1.9%)], with $p = 0.004$ and OR = 14.03 (95% CI: 1.70–115.76). Regarding death, the percentage of individuals who died [seven (28.3%)] in the support level

group was significantly higher than the percentage of individuals [eight (12.9%)] in the independent group, and the OR was 2.67 (95% CI: 1.05–6.77). Previous research has shown that the risk of death and deterioration in the required level of care increases in the elderly as the required level of support increases, and that the elderly requiring support tend to have a higher mortality rate than the independent elderly. Furthermore, our study further demonstrated that death and deterioration in required level of care are more likely to occur for the requiring level of care in the elderly with mild impairments requiring daily care for only short periods of time as demonstrated by the long-term care insurance criteria.

In the support level group, death was significantly correlated with being aged ≥ 75-years (OR = 20.19), falls (OR = 4.82), sex (male; OR = 4.57) and no physical exercise (OR = 3.34). In the independent group, death was significantly correlated with smoking (OR = 52.50) and gait difficulty (OR = 8.24). The characteristics of frailty that were risk factors resulting in death were fall and gait difficulty in the support level and the independent groups, respectively. Because exercise habits, fall risk, and incidence of fractures and knee osteoarthritis were similar in both the support level and the independent groups, the gradual decline in walking ability with age was a problem persistent in individuals of both subject groups. Because of the decline in walking ability and instrumental activities of daily living (IADL) the elderly also tend to miss out on opportunities to participate in leisure activities and other aspects of social life. In particular, the elderly requiring support are often housebound and depressive. For the elderly, the support and the independence group will maintain functional ADL, and they require social or leisure activities that promote the maintenance of walking ability.

Deterioration in the required level of care in the support level group was significantly correlated with sex (male; OR = 75.45) and malnutrition (subjects with BMI < 18.5; OR = 29.62). Thus, malnutrition and body weight decrease lead to impairments in leg function and are effective predictors of death. Therefore, improving nutrition to prevent malnutrition is an important frailty prevention strategy for the elderly.

CONCLUSION

The frailty such as falls, gait difficulty, and malnutrition for the required level of care was independently associated with death and deterioration in the individuals of the support level groupkuni0919

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論文審査及び最終試験又は学力の確認の結果の要旨

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論文審査の結果の要旨

高齢者の介護予防対策として，日常生活動作が悪化しやすい要支援高齢者への介護予防サービスのあり方が重要な課題となっている。要介護状態となる原因では疾病以外に加齢に伴う虚弱が注目されている。虚弱は，地域高齢者の4～27%の発生率との報告があり，死亡や要介護度への関連が示唆されている。しかし，地域高齢者を対象とした虚弱と死亡や要介護度の関連についての前向き研究は少ない。

申請者は，要支援高齢者と自立高齢者を対象に前向き研究を実施し、虚弱と死亡及び要介護度との関連を検討した。2007年に雲南市の要支援高齢者75人と要支援高齢者と性、年齢をマッチングした自立高齢者75人について性，年齢，要介護認定，疾病（高血圧，心臓病，認知症，骨折，膝関節疾患の現病歴と既往），生活習慣（身体活動，喫煙，飲酒），虚弱（転倒のしやすさ，歩行困難，うつ傾向，閉じこもり，低栄養）について疫学情報を収集した。要支援高齢者75人、自立高齢者75人を4年間追跡した結果、要支援高齢者60人，自立高齢者62人の死亡と要介護度の悪化に関する疫学資料を収集した。２項ロジスティク回帰分析により、要介護度の悪化及び死亡に対するオッズ比(OR)を算出した。要支援高齢者は，自立高齢者より，死亡や要介護度の悪化が有意に多かった。要支援高齢者の死亡は75歳以上（OR＝20.19），転倒のしやすさ（OR＝4.82），男（OR=4.57），身体活動なし（OR＝3.34）と有意に関連した。自立高齢者の死亡は喫煙（OR＝52.50），歩行困難（OR＝8.24）と有意に関連していた。要支援高齢者における要介護度の悪化は，男（OR＝75.45），低栄養（OR=29.62）と有意に関連していた。高齢者の死亡と要介護度の悪化が，疾病や生活習慣とは独立して，転倒のしやすさ，歩行困難や低栄養のような虚弱と関連していた。

本研究は、介護予防サービス強化に虚弱改善を目標とした対策が必要なことを明らかにした。介護予防対策に寄与する意義ある研究として，学位授与に値すると判断した。

最終試験又は学力の確認の結果の要旨

申請者は、要支援高齢者60名と自立高齢者62名を対象に縦断研究を実施した。その結果、高齢者の死亡と要介護度の悪化は虚弱と関連することを明らかにした。本研究は高齢者の介護予防対策に寄与すると考え学位授与に値すると判定した。　（主査：藤田委由）

申請者は要支援高齢者と自立高齢者を前向きに追跡調査し、死亡と要介護度悪化の要因として、虚弱が疾病や生活習慣とは独立して関連することを明らかにした。本結果は高齢者の介護予防対策としての虚弱改善の重要性を提起するものであり、関連領域の知識も豊富であることより，学位授与に値すると判断した。（副査：杉本利嗣）

申請者は、高齢者の虚弱が特に要支援者においてその予後悪化に影響していることを、４年間の前向き研究により明らかにした。今後の高齢者の介護予防対策に重要な示唆を与える研究成果で、豊富な関連知識も有しており学位授与に値すると判断する。　（副査：山口修平）

（備考）要旨は、それぞれ４００字程度とする。