

## 修士論文要旨

十文字学園女子大学大学院人間生活学研究科食物栄養学専攻

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### 地域在住高齢者の体組成、身体機能と栄養素摂取量との関連

【目的】我が国の高齢化率（65歳以上人口割合）は28.8%となり、総人口が減少する中で65歳以上の者が増加することにより高齢化率は上昇を続けている。我が国で増加している高齢者の健康寿命を延伸させるために、身体機能を維持・向上させることの重要性が高まっている。本研究では、身体機能に焦点をあてて地域で独自に行われている体操教室を行っている高齢者の身体機能維持に関連する要因を探索し、人間の身体をつくっている栄養と身体機能の関連についても検討することを目的に、体操教室に通う地域在住高齢者を対象に、身体機能、身体計測、食事調査を行い、半年間の身体機能の変化及び食事摂取状況の実態の把握と半年間の身体機能の変化と栄養素摂取量との関連を調査した。

【方法】対象者はN市内の週1回自主的に体操教室に参加している70歳以上の男性22名、女性45名の計67名とした。ベースライン時の調査項目として、身長、体重、BMI、筋肉量、体脂肪量、体脂肪率、四肢骨格筋指数(SMI)、大腿周径囲、下腿周径囲、普通歩行速度、握力、Timed Up & Go Test (TUG)、ファンクショナルリーチ(FR)、長座体前屈、30秒立ち上がりテスト、骨量測定、3日間の平均栄養素等摂取量(目安量記録法)とした。半年後に同様の調査を行い、身体機能の変化量と栄養素摂取量の変化量との相関関係を調べた。

【結果】男女別半年間での体組成・身体機能の変化では、男性は身長、ファンクショナルリーチ、普通歩行速度はベースライン時と比べて低値であった。また、大腿周径囲、握力ではベースライン時と比べて低い傾向がみられた。女性はTimed Up & Go Testでベースライン時と比べて高値であった。握力、普通歩行速度はベースライン時と比べて低値であった。また、食事摂取状況について男女ともに大きな変化はみられなかった。SMI、音響的骨評価値(OSI)、握力、普通歩行速度、Timed Up & Go Test、BMIの変化量と身体機能・栄養素摂取量の変化量との相関では、男性では握力の変化量とたんぱく質エネルギー比および1000kcal当たりの鉄摂取量の変化量で相関がみられ、女性ではSMIの変化量とたんぱく質摂取量および体重1kgあたりのたんぱく質摂取量の変化量で相関がみられた。

【考察】高齢者の身体機能は歩行速度、動的バランス(Timed Up & Go Test)が低下しやすいことが考えられる。また、男性では静的バランス(ファンクショナルリーチ)、女性は握力が低下しやすいことが示唆された。男女ともにSMIは有意な低下はみられなかった一

方、女性では握力が有意に低下していることから、半年間で低下するものは筋肉量ではなく筋力の方が顕著に表れることが推察される。男性では筋力（握力）の有意な低下がみられなかったことについて、たんぱく質エネルギー比の変化量および 1000kcal あたりの鉄摂取量の変化量で正の相関がみられたことから、たんぱく質および鉄が握力の維持に関与した可能性が考えられる。

## **Relationships among body composition, physical function, and nutrient intake in the elderly**

[Purpose] The percentage of the population that is aged 65 years and over in Japan is 28.8%. This percentage continues to increase, as the number of people aged 65 and over has been increasing while the total population has been declining. In order to extend the healthy life expectancy of the increasing number of elderly Japanese, it is becoming more important to maintain and improve their physical function. In this study, we explore factors related to the maintenance of physical function in elderly people who attended gymnastics classes that were uniquely conducted in their area, focusing on their physical function and nutrition. In order to examine the relationship between their physical function and nutrition, and the changes in physical function and actual dietary intake, we conducted surveys of physical function, physical measurement, and diet of elderly people living in the area and who attended gymnastics classes at baseline and six months later. We investigated the relationship between changes in physical function during this period and the intake of nutrients.

[Methods] Sixty-seven individuals (22 males and 45 females) aged 70 years or over, who voluntarily participated in a gymnastics class once a week in N city, were enrolled in this study. Baseline items included height, weight, body mass index (BMI), muscle mass, body fat mass, body fat percentage, limb skeletal muscle index (SMI), thigh circumference, lower leg circumference, normal walking speed, and grip strength. Measurements included the Timed Up & Go Test (TUG) test, functional reach (FR), long-seat forward bending, 30-second rise test, bone mass measurement, and average nutrient intake for three days (using the reference amount customarily consumed method). Six months later, a similar survey was conducted to investigate the correlation between changes in physical function and changes in nutrient intake.

[Results] Regarding changes in body composition and physical function in men, the height, FR, and normal walking speed six months later were lower than those at baseline. Their thigh circumference and grip strength tended to be lower at six months than at baseline. Females performed better on the TUG test at six months than at baseline, but their grip strength and normal walking speed were lower at six months. There was no significant change in dietary intake between the two time points in both the men and women. Regarding the correlation between changes in SMI, the osteo sono assessment index (OSI), grip strength, normal walking speed, TUG test, BMI and physical function/nutrient intake, there were correlations between the change in grip strength and the change in protein energy ratio, and between the change in grip strength and the change in iron intake per 1000 kcal in men. In females, there were correlations between the change in SMI and the change in protein intake, and between

the change in SMI and the change in protein intake per 1kg of body weight.

[Discussion] It is considered that physical function in the elderly tends to decrease over time, and that there are decreases in walking speed and dynamic balance (TUG test). Our results also suggested that static balance (FR) tended to decrease in males and grip strength tended to decrease in females over the six-month period. While SMI did not significantly decrease in either men or women, grip strength was significantly reduced six months later in women, suggesting that the decrease in grip strength over six months reflected a decrease in muscle strength and not a decrease in muscle mass. Protein and iron intake may be involved in maintaining grip strength, as in men there was a positive correlation between the change in protein energy ratio and change in iron intake per 1000 kcal while there was no significant decrease in muscle strength (i.e., grip strength).