

図2-5 プログラムでの役割が確立し継続できているE氏・82歳・女性・同居

資料

資料 1 Mini-Mental Examination State
(MMSE)

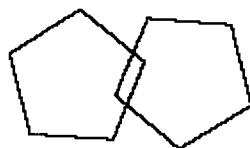
資料 2 Frontal Assessment Battery
(FAB)

資料 3 Medical Outcomes study Short Form
(SF) - 12

資料 4 老研式活動能力指標

Mini-Mental Examination State (MMSE)

	質問内容	回答	得点
1 (5点)	今年は何年ですか 今の季節は何ですか 今日は何曜日ですか 今日は何月何日ですか	年 曜日 月 日	
2 (5点)	ここは何県ですか ここは何市ですか ここは何病院ですか ここは何階ですか ここは何地方ですか (例 関東地方)	県 市 階	
3 (3点)	物品名3個 (相互に無関係) 検者は物の名前を一秒間に一個ずつ言う。その後 被験者に繰り返させる。 正答一個につき1点を与える。3例全て言うまで繰り返す。(6回まで) 何回繰り返したかを記せ。 回		
4 (5点)	100から順に7を引き、(5回まで)あるいは 「フジノヤマ」を逆唱させる		
5 (3点)	3で提唱した物品名を再度復唱させる		
6 (2点)	(時計を見せながら) これはなんですか (鉛筆を見せながら) これはなんですか		
7 (1点)	次の文章を繰り返しさせる。 「みんなで力をあわせて綱を引きます。」		
8 (3点)	(3段階の命令) 「右手にこの紙を持ってください」 「それを半分に折りたたんでください」 「机の上に置いてください」		
9 (1点)	(次の文章を読んでその指示に従ってください。) 「目を閉じなさい」		
10 (1点)	(何か文章を書いてください。)		
11 (1点)	(次の図形を書いてください)		
		合計得点	



Frontal Assessment Battery (FAB)

氏名: 様(才 男・女) 疾患名: 病巣: 右・左()

方法・手順		得点	採点基準	
類似性	◇概念化 「次の2つは、どのような点が似ていますか？」 ① バナナとオレンジ (果物) ② 机と椅子 (家具) ③ チューリップとバラとヒナギク (花)	3	3つとも正答	《回答》 ① ② ③
		2	2つ正答	
		1	1つ正答	
	①のみヒント可: 完全な間違いの場合や「皮がある」など部分的な間違いの場合は「バナナとオレンジはどちらも…」とヒントを出す。②③はヒントなし	0	正答なし	
語の流暢性	◇柔軟性 「‘か’で始まる単語をできるだけたくさん言ってください。ただし、人の名前や固有名詞は除きます」 制限時間は60秒。最初の5秒間反応がなかったら「例えば、紙」とヒントを出す。さらに10秒間黙っていたら「‘か’で始まる単語なら何でもいいですから」と刺激する。 同じ単語の繰り返しや変形(傘、傘の柄など)、人の名前、固有名詞は正答としない。	3	10語以上	《回答》
		2	6～9語	
		1	3～5語	
		0	2語以下	
運動系列	◇運動プログラミング 「私がすることをよく見ておいてください」 検者は左手で Luria の系列「拳 fist—刀 edge—掌 palm」を3回実施する。「では、右手で同じことをしてください。はじめは私と一緒に、次は独りでやってみてください。」と言う。 《メモ》	3	被検者独りで、正しい系列を6回連続してできる	
		2	被検者独りで、正しい系列を少なくとも3回連続してできる	
		1	被検者独りでできないが、検者と一緒に正しい系列を3回連続してできる	
		0	検者と一緒でも正しい系列を3回連続ですることができない	
葛藤指示	◇干渉刺激に対する敏感さ 「私が1回叩いたら、2回叩いてください」 被検者が指示を理解したことを確かめてから、次の系列を試行する: 1-1-1 次は、「私が2回叩いたら、1回叩いてください」 被検者が指示を理解したことを確かめてから、次の系列を試行する: 2-2-2 そして、つぎの系列を実施する 1-1-2-1-2-2-2-1-1-2	3	間違いなく可能	《メモ》
		2	1, 2回の間違いで可能	
		1	3回以上の間違い	
		0	被検者が4回連続して検者と同じように叩く	
Go/No-Go	◇抑制コントロール 「私が1回叩いたら、1回叩いてください」 被検者が指示を理解したことを確かめてから、次の系列を試行する: 1-1-1 次は、「私が2回叩いたら、叩かないでください」 被検者が指示を理解したことを確かめてから、次の系列を試行する: 2-2-2 そして、つぎの系列を実施する 1-1-2-1-2-2-2-1-1-2	3	間違いなく可能	《メモ》
		2	1, 2回の間違いで可能	
		1	3回以上の間違い	
		0	被検者が4回連続して検者と同じように叩く	
把握行動	◇環境に対する被影響性 「私の手を握らないでください」 被検者に両手の手掌面を上に向けて膝の上に置くよう指示する。検者は何も言わないか、あるいは被検者の方を見ないで、両手を被検者の手の近くに持って行って両手の手掌面に触れる。そして、被検者が自発的に検者の手を握るかどうかを見る。もし、被検者が検者の手を握ったら、「今度は、私の手を握らないでください」と言って、もう一度繰り返す。	3	被検者は検者の手を握らない	
		2	被検者は戸惑って、何をすればいいのか尋ねてくる	
		1	被検者は戸惑うことなく、検者の手を握る	
		0	被検者は握らなくともいいと言われた後でも、検者の手を握る	
検査者:	合計	/18		

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SF-12

あなたの健康状態についておうかがいします

1. 全般的にあなたは健康ですか
- | | | |
|----------|----------|-------|
| 1. 非常に健康 | 2. とても健康 | 3. 健康 |
| 4. まあまあ | 5. 不健康 | |

あなたの日常的な活動についておうかがいします。現在、次のような活動がどれくらい負担になりましたか

2. テーブルを動かしたり、掃除機をかけたり、ボーリングやゴルフをするなどの適度な活動
- | | | |
|----------|---------|----------|
| 1. かなり負担 | 2. 少し負担 | 3. 負担はない |
|----------|---------|----------|
3. 階段を数階上まで上ること
- | | | |
|----------|---------|----------|
| 1. かなり負担 | 2. 少し負担 | 3. 負担はない |
|----------|---------|----------|

過去4週間で、身体的健康が原因で、次のような問題が生じましたか

4. 仕事や活動が、思うほどできない
- | | |
|-------|--------|
| 1. はい | 2. いいえ |
|-------|--------|
5. 仕事や活動が、普段できるところまでできない
- | | |
|-------|--------|
| 1. はい | 2. いいえ |
|-------|--------|

過去4週間で、精神状態が原因で、次のような問題が生じましたか

6. 仕事や活動が、思うほどできない
- | | |
|-------|--------|
| 1. はい | 2. いいえ |
|-------|--------|
7. 仕事や活動が、普段ほど集中してできない
- | | |
|-------|--------|
| 1. はい | 2. いいえ |
|-------|--------|
8. 過去4週間で、普段の活動（仕事、家事も含む）を妨げる痛みがどのくらいありましたか
- | | | |
|-----------|------------|----------|
| 1. まったくない | 2. わずかにあった | 3. ややあった |
| 4. かなりあった | 5. 極度にあった | |

過去4週間で、次のような気分がどのくらい続きましたか。もっとも近い程度でお答え下さい

9. 穏やかで落ち着いた気分だった
- | | | |
|---------|---------|-----------|
| 1. ずっと | 2. ほとんど | 3. かなり |
| 4. ときどき | 5. わずか | 6. まったくない |
10. やる気がかなりあった
- | | | |
|---------|---------|-----------|
| 1. ずっと | 2. ほとんど | 3. かなり |
| 4. ときどき | 5. わずか | 6. まったくない |
11. 落ち込んでゆううつな気分だった
- | | | |
|---------|---------|-----------|
| 1. ずっと | 2. ほとんど | 3. かなり |
| 4. ときどき | 5. わずか | 6. まったくない |
12. 過去4週間で、身体的健康または精神状態が原因で社会活動（友人や親戚を訪ねたりすること）への支障がどのくらいありましたか
- | | | |
|--------|-----------|---------|
| 1. ずっと | 2. ほとんど | 3. ときどき |
| 4. まれに | 5. まったくない | |

調査日 年 月 日 ()

被調査者氏名/番号

年齢 歳 性別 (男 ・ 女)

老研式活動能力指標

毎日の生活についてうかがいます。以下の質問のそれぞれについて、「はい」、「いいえ」のいずれかに○をつけて、お答えください。質問が多くなっていますが、ご面倒でも全部の質問にお答えください。

- | | |
|----------------------------|-------------|
| 1. バスや電車を使って一人で外出ができますか | (はい いいえ) |
| 2. 日用品の買い物ができますか | (はい いいえ) |
| 3. 自分で食事の用意ができますか | (はい いいえ) |
| 4. 請求書の支払いができますか | (はい いいえ) |
| 5. 銀行預金、郵便貯金の出し入れが自分でできますか | (はい いいえ) |
| 6. 年金などの書類が書けますか | (はい いいえ) |
| 7. 新聞などを読んでいますか | (はい いいえ) |
| 8. 本や雑誌を読んでいますか | (はい いいえ) |
| 9. 健康についての記事や番組に関心がありますか | (はい いいえ) |
| 10. 友だちの家を訪ねることがありますか | (はい いいえ) |
| 11. 家族や友だちの相談にのることがありますか | (はい いいえ) |
| 12. 病人を見舞うことができますか | (はい いいえ) |
| 13. 若い人に自分から話しかけることがありますか | (はい いいえ) |

(古谷野 亘ほか：地域老人における活動能力の測定—老研式活動能力指標の開発—
日本公衆衛生雑誌34：109－114，1987. より引用)

調査実施者氏名/役職

備 考

Ⅲ. 研究成果の刊行に関する一覧表

研究成果の刊行に関する一覧表

雑誌

著者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
Iizaka S, Tadaka E, Sanada H	Comprehensive assessment of nutritional status and associated factors in the health, community-dwelling elderly	Geriatrics & Gerontology International	8(1)	24-31	2008

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発表者氏名	論文タイトル名	発表学会名	発表年月
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田高悦子, 金川克子, 佐藤弘美, 天津栄子, 酒井郁子, 松平裕佳, 伊藤麻美子, 前田充代	認知機能に着目した新たな介護予防ハイリスクアプローチプログラムのモデル開発	第12回日本老年看護学会	平成19年11月
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田高悦子, 金川克子, 佐藤弘美, 天津栄子, 酒井郁子, 松平裕佳, 田中奈津子, 国井由生子, 前田充代	認知機能に着目した介護予防ハイリスクアプローチ-第二報軽度認知機能障害者の前頭葉機能への有効性	第27回日本看護科学学会	平成19年12月
酒井郁子, 田高悦子, 金川克子, 佐藤弘美, 天津栄子, 松平裕佳, 田中奈津子, 国井由生子, 前田充代	認知機能に着目した介護予防ハイリスクアプローチ-第三報日記法によるセルフリフレクション	第27回日本看護科学学会	平成19年12月

IV. 研究成果の刊行物・別刷

Comprehensive assessment of nutritional status and associated factors in the healthy, community-dwelling elderly

Shinji Iizaka,¹ Etsuko Tadaka² and Hiromi Sanada¹

¹Department of Gerontological Nursing, Division of Health Sciences and Nursing, Graduate School of Medicine, The University of Tokyo, Tokyo, and ²Department of Community Health Nursing, School of Medicine, The Yokohama City University, Kanagawa, Japan

Background: Malnutrition among the elderly has become a serious problem as their population increases in Japan. To approach the risk of malnutrition in the healthy, community-dwelling elderly is important for early prevention of malnutrition. The nutritional status and mutable associated factors with poor nutritional status specific to the healthy elderly were examined comprehensively.

Methods: One hundred and thirty healthy elderly people from a senior college in Tokyo, Japan were eligible for this study. Nutritional status was evaluated by Mini-Nutritional Assessment (MNA). The demographic status and potential correlates with poor nutritional status, including the physical factors (mobility, cognitive impairment and oral status) and the psychosocial factors (depression, self-efficacy, attitudes toward health, instrumental activities of daily living, public health service knowledge, and difficulty and dissatisfaction with meal preparation) were investigated. The multiple linear regression analysis using a stepwise procedure adjusted for demographic status was performed to detect independent associated factors.

Results: There were 16 participants (12.6%) at risk of malnutrition. The independent associated factors with lower MNA scores were depression ($\beta = -0.27$, $P = 0.005$), lower self-efficacy ($\beta = 0.25$, $P = 0.009$), lower attitudes toward health scores ($\beta = 0.21$, $P = 0.02$) and difficulty with meal preparation ($\beta = -0.18$, $P = 0.03$).

Conclusion: The prevalence of the healthy elderly at the initial risk of malnutrition was relatively high and should not be overlooked. The comprehensive geriatric screening and intervention including mental health, health management and life-situation will be important for the healthy, community-dwelling elderly.

Keywords: comprehensive health care, healthy elderly people, malnutrition, nutritional assessment, preventive health services.

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Correspondence: Shinji Iizaka RN, Department of Gerontological Nursing, Division of Health Sciences and Nursing, Graduate School of Medicine, University of Tokyo, Faculty of Medicine Bldg. 5-308, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan. Email: iizaka-ky@umin.ac.jp

Introduction

Recently, malnutrition among the elderly has become a serious problem as their population increases in Japan. Malnutrition is defined as "the state of deficient energy or protein intake or absorption, which is characterized by weight loss and changes in body composition".¹ More than 50% of the elderly in hospitals and institutions were malnourished.²⁻⁴ Malnutrition leads to poor outcomes such as functional decline, frailty, the decline of quality of life and higher mortality.⁵⁻⁷ Moreover, it is possible that severe malnutrition has become too advanced to be improved.⁸ Therefore, early screening and preventive intervention are one of the most important aspects for successful aging.

Although recognition of the need for the prevention of malnutrition is widespread, many studies on malnutrition have been conducted for the frail elderly or hospitalized people, not for the healthier elderly. Because 80% and more of the elderly in Japan are the healthy elderly who do not need care, they are considered to be the most prior targets of early nutritional screening. A previous study, using a common screening tool (i.e. serum albumin), has reported that less than 1% of the healthy, community-dwelling elderly were at moderate risk of malnutrition,⁹ which is, however, considered the almost same meaning as obvious malnutrition, in need of treatment rather than prevention. Because one of the signs of malnutrition (e.g. the declines in muscle strength) can occur even within the normal range of serum albumin levels,¹⁰ the prevalence of the potential risk population in the healthy elderly must be investigated for prevention as this number has been increasing, especially in Japan.

Although there are many factors associated with malnutrition, including demographic, physical and psychosocial factors such as age, living alone, eating and oral problems, low functional capacity, depression and more,^{11,12} they are factors almost applied to the frail elderly not to the healthy elderly. Factors related to each population are different in terms of the possibility of intervention or priority due to the physical and psychosocial differences between the healthy elderly and the frail. Therefore, for effective intervention in the healthy elderly, factors must be applied to the specific population, that is the healthy elderly in this study, and be mutable to promote behavioral change for prevention.

The aims of this study were: (i) to describe the nutritional status comprehensively in the healthy, community-dwelling elderly; and (ii) to investigate mutable associated factors with poor nutritional status specific to this population as a base for future preventive intervention in Japan.

Methods

Study population and settings

The study enrolled 210 eligible participants aged 65 and older who met the criteria for inclusion at Setagaya Senior College, which is a public recurrent school for the healthy elderly in Tokyo, Japan. The criteria for inclusion were that the individual was: (i) community-dwelling; and (ii) not certified as "on the care level" according to the Japan Long-term Care Insurance System.

This cross-sectional study conducted a questionnaire survey and subsequent clinical evaluations performed by well-trained observers at the Setagaya Senior College in November–December 2006. One hundred and thirty-one participants underwent both survey and evaluations. Moreover, one participant who did not meet inclusion criteria was excluded from the analytical sample. Thus, a total of 130 participants (61.9%) were analyzed. Ethical approval was obtained from the Institutional Review Board of University of Tokyo and the Setagaya Senior College Administrative Office, and written informed consent was obtained from each participant.

Nutritional status

The Mini-Nutritional Assessment (MNA) was used to evaluate the risk of malnutrition. The MNA was developed in Europe to evaluate the nutritional status of the elderly¹³ and translated into Japanese,¹⁴ including 18 items (range of scores, 0–30) consisting of four domains: (i) anthropometric; (ii) general; (iii) dietary; and (iv) subjective assessment. Participants were categorized by the MNA into three groups: (i) well-nourished (≥ 24 points); (ii) at risk of malnutrition (17–23.5 points); and (iii) malnutrition (< 17 points). The validity of the MNA for malnutrition has been proven for the Japanese elderly; the sensitivity and specificity for hypoalbuminemia was 0.81 and 0.86, respectively.¹⁴ The MNA also has been shown to have good reliability according to internal consistency (Cronbach's alpha, 0.8) and test-retest reliability (intraclass correlation coefficient, 0.89).¹⁵ Anthropometric assessment of the MNA was conducted according to the MNA clinical practice user guide.

Demographic characteristics

Age, sex, living arrangement, economic status and comorbidity were assessed for demographic characteristics which were used as covariates in the analyses. For living arrangement, the participants were classified as living alone or not. Economic status was categorized subjectively as "good", "average" or "bad". Comorbidity was measured by the Charlson index¹⁶ in the form of a self-report questionnaire, which is a 17-item scale

(range of scores, 0–30) with higher scores indicating higher or more severe comorbidity. This score has been shown to correlate with mortality in Japan¹⁷ and have excellent interrater reliability (intraclass correlation coefficients, 0.80).¹⁸

Physical factors

Physical functional status was measured by “1 km mobility”,¹⁹ which consists of the following self-report categories: “I am able to walk without difficulty”, “I am able to walk with difficulty” and “I am unable to walk”.

Cognitive impairment was measured by the Frontal Assessment Battery (FAB).²⁰ The FAB is a six-item performance test (range of scores, 0–18). The FAB has been used to detect mild cognitive impairment (MCI) with good validity (concurrent and discriminant validity), and reliability (interrater reliability and internal consistency).²¹

For dental status, the use of partial or complete dentures was assessed. Subjective dental and oral problems were also assessed, including bad condition of teeth, problems swallowing, problems chewing and dry mouth. Oral problems were defined as problems with frequency of greater than “sometimes”. The total number of problems was calculated and classified into: 0, 1 or ≥ 2 problems.

Psychosocial factors

Mental status was measured by the Geriatric Depression Scale-5 (GDS-5),²² a dichotomized five-item scale (range of scores, 0–5) for screening depression. Depression was defined as a score of two or higher. The GDS-5 has been shown to have good validity for clinical diagnosis (sensitivity of 0.94 and specificity of 0.81), and interrater reliability ($\kappa = 0.88$).²³ A Japanese version of GDS-5 was used.

Self-efficacy was evaluated by the Perceived Health Competence Scale (PHCS).²⁴ The PHCS is a domain-specific self-efficacy scale including eight items (range of scores, 0–40) used to measure the degree of ability to manage health outcomes. A Japanese version of the PHCS was used, which has been shown to have good construct, content validity and internal consistency.²⁵

To investigate actual health attitudes, the following dichotomized four-item questions (range of scores, 0–4) were used: “Do you know your ideal body weight?”, “Do you know your energy requirements?”, “Do you usually weigh yourself?” and “Do you take an interest in the size of your meals?”. The total score was calculated as the score of “attitudes toward health”, with higher scores indicating better attitudes.

Instrumental activities of daily living (IADL) were measured by the Tokyo Metropolitan Institution of Gerontology Index of Competence (TMIG index),

which was developed in Japan.²⁶ The TMIG index includes 13 dichotomized items (range of scores, 0–13) consisting of three subcategories: instrumental self-maintenance (range of scores, 0–5), intellectual activity (0–4) and social role (0–4). The TMIG index has been shown to have good validity (construct, discriminant and predictive validity) and reliability (internal consistency and test–retest reliability).²⁷

To investigate the degree of knowledge regarding public health services, the following public health services were selected: meals-on-wheels, health checkups, dietary counseling, and a service for the prevention of malnutrition. The total number of knowing services was calculated (range of scores, 0–4). Higher scores indicated better knowledge about services.

Meal preparation, including cooking and shopping, was measured by the following two measures: (i) the degree of difficulty felt due to physical or mental reasons; and (ii) the degree of dissatisfaction felt with respect to one’s own meal preparation. The degree of difficulty was measured by a four-level Likert scale (“often”, “sometimes”, “seldom” and “never”) and difficulty was defined as “a subjective feeling of difficulty toward either cooking or shopping often or sometimes”. For the degree of dissatisfaction, dissatisfaction was defined as “a subjective feeling of dissatisfaction with either cooking or shopping”.

Statistical analysis

Descriptive statistics were shown by the mean \pm standard deviation (SD) for continuous variables and the number (percentage) for categorical variables. In the first analyses for the detection of possible associated factors to poor nutritional status, relationships between each factor and the MNA total score were examined by calculating Spearman’s r . The factors that correlated with the MNA at $P < 0.20$ were included in the multivariate analyses. In the second analyses to examine the independent effects of possible associated factors on poor nutritional status, a multiple linear regression analysis using a stepwise procedure was performed. The significance levels for both entry and stay were set at $P < 0.15$. The final multivariate model included demographic characteristics (age, sex, living arrangement, economic status and comorbidity) as covariates. The statistical significance level was set at $P = 0.05$. Analyses were conducted by Statistical Analysis System version 9.1 (SAS Institute, Cary, NC, USA).

Results

Characteristics of participants

The characteristics of the participants are shown in Tables 1 and 2. The mean age \pm SD was 72.2 ± 4.3 years old. Sixty-two (47.7%) participants were males. The

Table 1 Demographic characteristics of participants ($n = 130$)

Characteristics	Values
Age (years, mean \pm SD)	72.2 \pm 4.3
Males, n (%)	62 (47.7)
Living arrangement, n (%)	
Living alone	27 (20.8)
Living together	103 (79.2)
Economic status, n (%)	
Good	92 (70.8)
Average	31 (23.9)
Bad	7 (5.3)
Charlson index, n (%)	
0	102 (78.5)
1	19 (14.6)
≥ 2	9 (6.9)

SD, standard deviation.

Charlson index detected that 102 (78.5%) participants had no comorbidity. Only two were certified as on the support level.

Nutritional status

The nutritional characteristics of the participants are shown in Table 3. For nutritional status, the mean MNA score \pm SD was 27.0 ± 2.2 . One hundred and eleven participants (87.4%) were well-nourished, 16 participants (12.6%) were at risk of malnutrition and none were malnourished (score was missing for three participants).

Correlations between nutritional status and associated factors

The results of the first and second analyses are shown in Table 4. In the first analyses, possible factors associated with lower MNA scores were explored using correlation coefficients. The following variables correlated at $P < 0.20$ with the MNA score and were included in the multivariate model: three subcategories of the TMIG score, dental status, depression, the PHCS score, the attitudes toward health score, the public health service knowledge score, and difficulty and dissatisfaction with meal preparation. In addition, demographic characteristics (sex, age, living arrangement, economic status and the Charlson score) were included as covariates in the multiple regression model.

In the second analyses, performed to detect the independent effects of possible factors associated with lower MNA scores, meaning poorer nutritional status, a multiple regression analysis adjusted for demographic characteristics was conducted using a stepwise

Table 2 Physical and psychosocial characteristics of participants ($n = 130$)

Characteristics	Values
1 km mobility, n (%)	
Can walk without difficulty	121 (95.3)
Can walk with difficulty or cannot	6 (4.7)
Frontal Assessment Battery, mean \pm SD	15.5 \pm 1.8
Dental status, n (%)	
Natural dentition	67 (51.5)
Partial or complete dentures	63 (48.5)
Number of dental and oral problems, n (%)	
0	57 (44.9)
1	33 (26.0)
≥ 2	37 (29.1)
Geriatric Depression Scale-5	
≥ 2 (risk of depression), n (%)	15 (11.5)
Perceived Health Competence Scale, mean \pm SD	27.4 \pm 6.5
Attitudes toward health, mean \pm SD	3.2 \pm 0.9
TMIG index total score, mean \pm SD	12.3 \pm 1.0
Instrumental self-maintenance score, mean \pm SD	4.9 \pm 0.3
Intellectual activity score, mean \pm SD	3.9 \pm 0.3
Social role score, mean \pm SD	3.5 \pm 0.9
Public health service knowledge, n (%)	
0	6 (5.0)
1	45 (37.2)
≥ 2	70 (57.9)
Difficulty with meal preparation, n (%)	14 (10.8)
Dissatisfaction with meal preparation, n (%)	13 (10.6)

TMIG, Tokyo Metropolitan Institute of Gerontology Index of Competence.

approach. The independent associated factors with lower MNA scores were depression (standardized $\beta = -0.27$, $P = 0.005$), lower PHCS scores ($\beta = 0.25$, $P = 0.009$), lower attitudes scores ($\beta = 0.21$, $P = 0.02$) and difficulty with meal preparation ($\beta = -0.18$, $P = 0.03$). Dental status did not significantly correlate with the MNA score ($\beta = -0.15$, $P = 0.09$). All demographic characteristics did not significantly correlate with the MNA score. The adjusted R^2 of the final model was 0.38.

Discussion

The results of this study suggest that approximately 13% of the healthy elderly are at risk of malnutrition using a comprehensive and valid instrument, the MNA, and that poor nutritional status has a significant association with depression, lower self-efficacy, a lower

Table 3 Nutritional characteristics of participants. (*n* = 130)

MNA items (rating)	Score, <i>n</i> (%)				
	0	0.5	1	2	3
1 Body mass index (0, <19; 1, 19 to <21; 2, 21 to <23; 3, ≥23)	4 (3.1)	–	26 (20.3)	36 (28.1)	62 (48.5)
2 Mid-arm circumference in cm (0, <21; 0.5, 21 to ≤22; 1, >22)	2 (1.6)	4 (3.1)	122 (95.3)	–	–
3 Calf circumference in cm (0, <31; 1, ≥31)	6 (4.7)	–	123 (95.3)	–	–
4 Weight loss during last 3 months (0, >3 kg; 1, does not know; 2, 1–3 kg; 3, no weight loss)	1 (0.8)	–	1 (0.8)	26 (20.0)	102 (78.4)
5 Lives independently (not in a nursing home or hospital) (0, no; 1, yes)	0 (0)	–	130 (100)	–	–
6 Takes more than three prescription drugs per day (0, yes; 1, no)	28 (21.7)	–	101 (78.3)	–	–
7 Has suffered psychological stress or acute disease in the past 3 months (0, yes; 2, no)	13 (10.0)	–	117 (90.0)	–	–
8 Mobility (0, bed- or chair-bound; 1, able to get out of bed/chair but does not go out; 2, goes out)	0 (0)	–	0 (0)	130 (100)	–
9 Neuropsychological problems (0, severe dementia or depression; 1, mild dementia; 2, no psychological problems)	0 (0)	–	1 (0.8)	129 (99.2)	–
10 Pressure sores or skin ulcers (0, yes; 1, no)	0 (0)	–	130 (100)	–	–
11 How many full meals does the patient eat daily? (0, one meal; 1, two meals; 2, three meals)	0 (0)	–	5 (3.9)	124 (96.1)	–
12 Selected consumption markers for protein intake					
• At least one serving of dairy products per day?					
• Two or more servings of legumes or eggs per week?					
• Meat, fish or poultry every day?					
(0, if 0 or 1 yes for the above questions; 0.5, if 2 yes; 1, if 3 yes)	6 (4.6)	24 (18.5)	100 (76.9)	–	–
13 Consumes two or more servings of fruits or vegetables per day? (0, no; 1, yes)	5 (3.9)	–	125 (96.1)	–	–
14 Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties? (0, severe loss; 1, moderate loss; 2, no loss)	1 (0.8)	–	7 (5.6)	117 (93.6)	–
15 How much fluid is consumed per day? (0, less than 3 cups; 0.5, 3–5 cups; 1, more than 5 cups)	10 (7.8)	52 (40.6)	66 (51.6)	–	–
16 Mode of feeding (0, unable to eat without assistance; 1, self-fed with some difficulty; 2, self-fed without any problem)	1 (0.8)	–	1 (0.8)	128 (98.4)	–
17 Do they view themselves as having nutritional problems? (0, major malnutrition; 1, does not know or moderate malnutrition; 2, no nutritional problem)	9 (7.0)	–	20 (15.5)	100 (77.5)	–
18 In comparison with other people of the same age, how do they consider their health status? (0, not as good; 0.5, does not know; 1, as good; 2, better)	15 (11.5)	6 (4.6)	54 (41.6)	55 (42.3)	–

Data were missing for item 3, 6, 11, 15 and 17 (*n* = 1, respectively), 1 and 2 (*n* = 2, respectively), and 14 (*n* = 5). MNA, Mini-Nutritional Assessment.

Table 4 Correlation between the nutritional status and factors, and the final multiple regression model

Variables	Correlation coefficient [†]	P-value	Multiple regression model [‡]	
			Standardized β	P-value
Age	0.05	0.58	0.02	0.82
Sex	0.11	0.25	0.11	0.20
Living arrangement	-0.02	0.85	0.07	0.46
Economic status	-0.17	0.06	0.07	0.41
Charlson index	-0.27	0.003	-0.13	0.14
1 km mobility	0.11	0.22	Not included [§]	
Frontal Assessment Battery	0.11	0.23	Not included	
Dental status	-0.23	0.009	-0.15	0.09
Number of dental and oral problems	-0.11	0.21	Not included	
Depression (GDS, ≥ 2)	-0.37	<0.001	-0.27	0.005
Perceived Health Competence Scale	0.48	<0.001	0.25	0.009
Attitudes toward health	0.23	0.01	0.21	0.02
TMIG index total score	0.30	0.001	Not selected [§]	
Instrumental self-maintenance	0.14	0.12	Not selected	
Intellectual activity	0.22	0.02	Not selected	
Social role	0.25	0.007	Not selected	
Public health service knowledge	0.16	0.09	Not selected	
Difficulty with meal preparation	-0.23	0.01	-0.18	0.03
Dissatisfaction with meal preparation	-0.16	0.08	Not selected	

[†]Spearman's r . [‡]The final multiple regression model using stepwise procedure was adjusted for demographic characteristics (age, sex, economic status, living arrangement and the Charlson index). Adjusted $R^2 = 0.38$. [§]"Not included" means "not included in the independent variables for the multivariate model". "Not selected" means "not selected in the final model". GDS, Geriatric Depression Scale.

score of attitudes toward health and difficulty with meal preparation.

The prevalence of risk of malnutrition in this study was high, compared with a previous study in Japan conducted in a community, which, using serum albumin, reported that less than 1% were at moderate risk of malnutrition.⁹ Another study conducted in Ireland also reported that only 3% of the healthy elderly had malnutrition, defined as having a body mass index of less than 20.²⁸ On the other hand, the results in this study were almost consistent with other research using MNA, which reported the prevalence of the elderly at risk of malnutrition as 17%.²⁹ These may suggest that comprehensive nutritional assessments, like MNA, will be more useful to detect the potential risk population in the healthy elderly before a moderate decline of nutritional status is reflected in low serum albumin.^{13,14} Although it might be possible that normal physiological change influences the nutritional status of the elderly in the risk population, it is clear that the risk group of MNA had poorer outcomes such as mortality or hospital admission than the well-nourished group had.⁵ If 13% of the healthy elderly are at risk of malnutrition detected by MNA, more than 2 million of the Japanese elderly will be at risk of malnutrition. This indicates that there can be relatively many elderly people with a mild or initial risk of malnutrition in Japan. Therefore, in

order to prevent declines in nutritional status and functional capacity, early comprehensive screening and early intervention in initial risk populations will be important before irrecoverable change occurs in nutritional status.⁸ Further research will be needed to investigate the nutritional change of healthy, community-dwelling elderly people at risk of malnutrition.

There were four factors associated with poor nutritional status. This result revealed the importance of comprehensive geriatric assessment including mental health and life-situation for prevention of malnutrition.

Depression had already been identified as an associated factor in the frail or hospitalized elderly³ because depression reduces dietary intake.³⁰ Even in the healthy elderly, depression was found to be one of the associated factors, which means comprehensive assessment and intervention will be effective in preventing malnutrition in the healthy elderly.

Lower self-efficacy, a lower score of attitudes toward health and difficulty with meal preparation are associated factors unique to the healthy elderly. Self-efficacy has been recognized to be associated not only with eating behaviors, including dietary variety,²⁵ but also with self-perceived health.³¹ This may influence one's health management directly through behavior and indirectly through self-perceived health. Moreover, attitudes toward health evaluated in this study reflect actual

health behaviors and interest as well as health knowledge. Therefore, low self-efficacy can change one's habit, especially dietary habit, into a worse one, and low attitudes will become a barrier for the elderly in coping with inappropriate changes, causing the risk of malnutrition. These results indicated that factors related to health management or behavior are the direct target for the healthy elderly to prevent malnutrition. Further research will be needed to detect more detailed and practical contents of attitudes toward health.

Difficulty with meal preparation was also associated with poor nutritional status. "Tiredness", which is a general perception in daily living, is known as a predictor of the decline in functional capacity among the community-dwelling elderly.³² In comparison, "Difficulty with meal preparation", which is the specific perception to the dietary behavior, can be a predictor of the decline in nutritional status. Moreover, IADL, which had been associated with nutritional status in the frail elderly,⁶ were not associated with nutritional status in this study. "Difficulty with meal preparation" can be the key factor of malnutrition, especially in the healthy elderly, rather than abilities such as IADL. Therefore, the assessment of not only abilities but also actual life-situation or perception of meal preparation are important to prevent malnutrition among the healthy, community-dwelling elderly.

There were several limitations in this study. First, because sample size was not large enough and the participants were recruited from only one city, the results in this study may not be necessarily generalized. Causal relationships between the factors and nutritional status were unclear due to the use of a cross-sectional design. Because this study focused on revealing the nutritional characteristics of the healthy elderly, the majority of factors were skewed due to the ceiling effect, and this might explain the lack of correlation between some factors and the MNA. Finally, there may have been unrecognized factors and stratified relationships among various factors at different levels. Further research is needed to develop validated intervention models for more effective prevention.

In conclusion, this study revealed that people at risk of malnutrition were relatively common, even in the healthy, community-dwelling elderly. Detecting and following up these people will be needed to prevent the decline of nutritional status in the future. The comprehensive geriatric screening and intervention including mental health, health management and life-situation will be important for the healthy, community-dwelling elderly.

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農山村地域における認知機能に着目した新介護予防プログラムの開発に関する研究

—脳いきいき教室の実践報告—

佐藤弘美¹、金川克子¹、田高悦子²、天津栄子³、酒井郁子⁴、松平裕佳¹、伊藤麻美子¹

1. 石川県立看護大学、2. 横浜市立大学、3. 金沢医科大学、4. 千葉大学

【目的】

軽度の認知機能低下のある高齢者（そのおそれのある者を含む）における、日常生活習慣（思考活動、身体活動、対人交流）の活性化により、認知機能の維持、向上をととした生活機能全体の維持、向上（介護予防）、ひいてはQOLの維持・向上をはかる。また、地域特有の文化や土壌の活用により、地域全体の活性化（地域づくり）をはかる。

【方法】

対象：農山村地域に居住する（平成16年度老年人口44.9%、一人暮らし高齢者20.6%）特定高齢者候補者であって、かつ軽度の認知機能低下がある者、もしくはそのおそれのある者（「基本チェックリスト」18-20のいずれかの項目に該当する者もしくは、そのおそれのある者（Clinical Rating Dementia :CDR0.5）25名を介入群とし、自らの意思により参加を希望しなかった者のうち介入群に年齢（±5歳）をマッチングさせて抽出された25名を対照群とする。

研究の倫理的配慮として、対象者の個人情報への漏洩がないように管理し、調査票は無記名方式とした。介入研究のプログラム内容の説明は書面と口頭で対象者へ説明を行い、自由意志による参加者のみ対象とした。

プログラムの構成内容

1) スキル1: 認知機能（記憶）と生活習慣についての健康学習（開催回数:2回）

(1) 目標: 認知機能（記憶）の働きや、物忘れと生活習慣との関連、また、物忘れ予防のための日常生活や地域の社会資源利用等について知識・技術を習得する

2) スキル2: 2日遅れの日記法による生活習慣のセルフリフレクション（開催回数:2回）

目標: 2日遅れの日記（自記式ワークシート）をとおしてエピソード記憶を賦活化させるとともに、生活習慣のセルフリフレクションスキルを習得する。

3) スキル3: グループアクティビティによる対人交流（開催回数:4回）

目標: 精神活動（回想法）、身体活動（太極拳）リラクゼーションを取り入れたグループアクティビティを通じて、心地よく楽しい対人交流の機会を得る。

期間：2006年10月3日（火）-12月5日（火）週1回×8回、事前・事後アセスメント合わせ計10回、各回2時間（10:00-12:00）

評価指標：本プログラムで期待される効果としてQOLの維持向上についてプログラム開始前後に介入群と対照群に健康関連QOL（Short-Form 12Item Health Survey, SF-12 身体的健康関連、精神的健康関連2領域12項目：アルゴリズム評価）を介入効果の尺度としてベースラインからフォローアップまでの平均値の差についてt検定（SAS ver.9.1）で解析を行った。

【結果】

脳いきいき教室として開催した10回のプログラムへの参加率として、介入群における参加率は全プログラム出席は21名（87.9%）であった。脳いきいき教室のプログラムの介入群と対照群におけるベースラインからフォローアップまでの平均値の変化についてみると健康関連QOL（SF-12）においては、身体関連QOLにおいては、介入群では45.3点から49.1点と得点が上昇したのに対し、対照群では43.5点から42.2点へ微減し、両群の変化の平均値の差に有意差が認められた（ $P=0.0146$ ）精神的健康関連QOLでは両群に有意な差は認められなかった。

【考察】

本研究は、農山村地域における要介護状態となるおそれの高い65歳以上の高齢者（特定高齢者）の認知機能に着目した、新たな介護予防プログラムの開発を検討した。老年人口の割合が44.9%、一人暮らし高齢者20.6%のこの地域において、在宅における認知症高齢者への支援が今後の課題となっている。本研究において、脳いきいき教室の参加者が健康関連QOLについて、身体的健康度関連QOLにおいて対照群より有意な差が認められたことは、今回の脳いきいき教室のプログラムは、高齢者の認知機能の賦活化や対人交流の向上を通して、生活機能の維持、拡大に有効であることが示唆された。

介護予防ハイリスクアプローチとしてのマインドマップ法を用いた健康教育

横浜市立大学¹⁾, 石川県立看護大学²⁾, 千葉大学大学院³⁾, 金沢医科大学⁴⁾

○田高悦子¹⁾, 金川克子²⁾, 酒井郁子³⁾, 佐藤弘美²⁾, 天津栄子¹⁾, 松平裕佳²⁾, 田中奈津子¹⁾, 国井由生子¹⁾, 前田充代²⁾

【目的】本研究の目的は 65 歳以上の軽度認知機能低下 (mild cognitive impairment) もしくはそのおそれのある特定高齢者を対象とする、介護予防ハイリスクアプローチとしてのマインドマップ法を用いた健康教育の適用性ならびに有用性を検証することである。

【方法】研究対象は、a 市 a 地区在住の 65 歳以上の特定高齢者候補者であって、かつ、軽度認知機能低下 (Clinical Dementia Rating : 0.5) もしくはそのおそれのある者のうち、本研究事業への参加希望者 25 名(全数)である。研究方法は、本研究班開発による介護予防ハイリスクアプローチプログラム (「脳生き生き健康教室」: 認知症の概念と予防に関する健康教育, 日記法によるセルフリフレクション, グループアクティビティ) による 3 ヶ月間 (連続 10 回) の介入研究である。うち、マインドマップ法 (認知症予防を図の中央に置きそこから放射状に関連するイメージを繋げる図解表現技法) を用いた健康教育 (1 グループファシリテーター 1 名、参加者 6~8 名からなる小集団グループワーク) を最終回に実施し、その成果マップから同方法の健康教育ツールとしての適用性と有用性を検討した。なお、本研究は「疫学研究に関する倫理指針」に従うとともに、研究対象者における十分な説明及び自由意志による同意取得並びに個人情報の保護に留意した。

【成績】対象者は、平均年齢 \pm SD=79.8 \pm 4.6 (歳)、男性 4 名、女性 20 名であり、ベースライン (事業前) の平均 MMSE \pm SD (点) は、24.4 \pm 2.9、平均 FAB \pm SD (点) は、9.7 \pm 3.0 であった。マインドマップ法を用いた健康教育には全員が参加し、成果マップでは認知症予防に向けて賦活化すべき認知機能 5 カテゴリ「計画する」「楽しむ」「集中する」「コミュニケーション」「五感を用いる」「記憶する」および各々のカテゴリを具現化するために見直すべき自らの日常生活習慣 (思考、運動、対人交流) 52 活動が抽出された。

【結論】軽度認知機能低下者に対する介護予防ハイリスクアプローチプログラムとしてのマインドマップ法を用いた健康教育は、臨地における適用性を有し、地域高齢者の日常生活習慣のセルフリフレクションを促す有用性が示唆された。本研究は、平成 18 年度厚生労働科学研究費補助金長寿科学総合研究事業 (主任研究者: 田高悦子) によるものである。

認知機能に着目した新たな介護予防ハイリスクアプローチプログラムのモデル開発

田高悦子¹⁾, 金川克子²⁾, 佐藤弘美²⁾, 天津栄子³⁾, 酒井郁子⁴⁾, 伊藤麻美子²⁾, 松平裕佳²⁾, 前田充代²⁾

1)横浜市立大学, 2)石川県立看護大学, 3) 金沢医科大学, 4) 千葉大学大学院

[目的] 高齢者の軽度認知機能障害(mild cognitive impairment : MCI) は、日常における認知機能の不活用や対人交流の不活発さなど生活のありように起因する言わば心身の生活習慣病ともいふべき状態であり、認知症の前駆状態を含むものとして近年、注目されている。すなわち高齢者の介護予防に向けては着眼すべきニーズの高い状態であるが、その取り組みはまだ緒に就いたばかりである。よって、本研究ではこの高齢者の MCI における認知機能に着目した新たな介護予防ハイリスクアプローチプログラムのモデルを開発することを目的とした。

[方法] PRECEDE-PROCEED モデルを基盤として、研究班による討議及び文献レビューを実施し、効率的・効果的な介入を行っていくためのプログラムモデルのコンテンツを開発した。主要な構成要素は、1)最終目標 2)疫学評価 3)行動・環境評価 4)教育・組織評価 (準備・強化・実現因子) 5)施策評価 (プログラムスキル) である。本研究は疫学研究における倫理指針(文部科学省)に従って実施した。

[結果] 図1のように、プログラムモデル(脳いきいき健康教室)は、最終目標を QOL の維持・向上に向けた生活機能の維持・低下予防とし、そのための行動指標を認知機能の活性化ならびに適度な思考・運動・対人交流からなる好ましいライフスタイルの定着とした。また、これらの前提として「準備因子」(動機づけ): 自分自身の認知機能や生活習慣に関する知識・技術の増強、「強化因子」: 自分自身の生活習慣に対するサポート、心地良さ・楽しさの実感、「実現因子」: 継続できる場や仲間づくりの場と仕組みと整理し、これらのため高齢者自身が習得すべきスキルとして、スキル 1 : 健康学習による認知機能に関する知識・調整技術、スキル 2 : 2 日遅れの日記法による生活習慣のセルフリフレクション、スキル 3 : グループアクティビティによる対人交流からなるプログラムを開発した。今後は、このモデルに基づいた実証的な介入研究による評価が必要である。(本研究は、平成 18 年度厚生労働科学研究費補助金長寿科学総合研究事業 (H18 長寿一般 013, 主任研究者: 田高悦子) によるものである。)

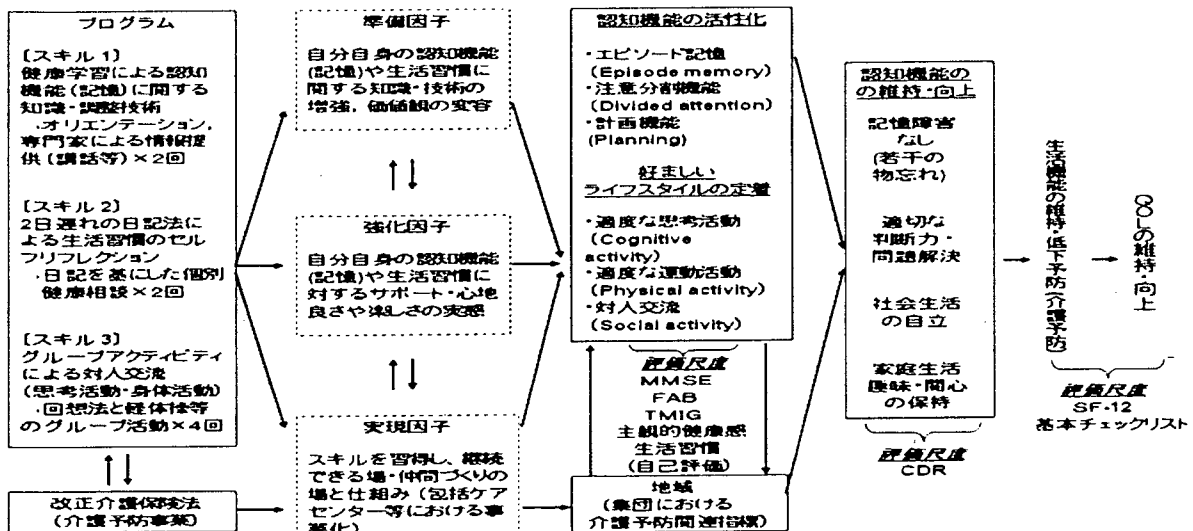


図1 「脳いきいき健康教室」プログラムの枠組み