Knowledge translation about frailty prevention
– From prevention to practice

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Longitudinal studies on aging and health

- National Survey of Japanese Elderly (NSJE) or Japanese Study of Assets and Health Dynamics among the Oldest Old (JAHEAD)
  - 1987- present, in collaboration with University of Michigan and University of Tokyo
  - National probability sample of Japanese aged 60+

- Longitudinal Interdisciplinary Study on Aging (TMIG-LISA)
  - 2002-present (2nd term): intervention studies for developing effective program for geriatric syndrome, and community system for assisting healthy aging.
Image of Healthy Life Expectancy

Life expectancy at age XX

Healthy life expectancy

Age XX

Disabled period

Death
TMIG-LISA, Longitudinal Interdisciplinary Study on Aging

1. 1\textsuperscript{st} term project, 1991-2001
2. 2\textsuperscript{nd} term project, 2002-present
Study design and setting in the 1st-term project

- Longitudinal cohort study (1991-2001)
- Koganei, Tokyo and Nangai, Akita
Follow-up for 10 years

→ Primary outcomes
  • Total mortality
  • Mortalities from major causes
  • ADL disability
  • IADL limitation

→ Secondary outcomes
  • Walking ability, Cognition
  • Frailty
  • Social activity and participation
## Risk and Protective Factors for ADL Disability

<table>
<thead>
<tr>
<th>Life-style variables</th>
<th></th>
<th>Medical variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol drinking (moderate)</td>
<td>↑</td>
<td>Hearing impairment (+)</td>
</tr>
<tr>
<td>Smoking (+)</td>
<td>↓</td>
<td>Visual impairment (+)</td>
</tr>
<tr>
<td>Sleep hours (longer)</td>
<td>↓↓</td>
<td>Chewing ability (low)</td>
</tr>
<tr>
<td>Productive behavior (active)</td>
<td>↑↑</td>
<td>Outpatient clinics (attended)</td>
</tr>
<tr>
<td>Psychological Health</td>
<td></td>
<td>Hospital admission (admitted)</td>
</tr>
<tr>
<td>Self-rated health (excellent/good)</td>
<td>↑↑</td>
<td>Chronic medical condition (+)</td>
</tr>
<tr>
<td>Depressive mode (+)</td>
<td>↓</td>
<td>Biomarkers</td>
</tr>
<tr>
<td>Physical Fitness</td>
<td></td>
<td>Albumin (higher)</td>
</tr>
<tr>
<td>Grip-strength (good)</td>
<td>↑↑</td>
<td>Total cholesterol (higher)</td>
</tr>
<tr>
<td>Standing balance (good)</td>
<td>↑↑</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>Walking speed (good)</td>
<td>↑↑</td>
<td>(6-year follow-up of the TMIG-LISA)</td>
</tr>
</tbody>
</table>

- Risk factor
- Protective factor
Functioning and healthy aging

- cognitive function (MMSE)
- oral function (chewing ability, etc)
- nutrition (BMI, Alb, T-C, Hb)
- physical performance (walking speed, etc)
- psychological function (SRH, GDS)
- social function (TMIG-IC)
Kaplan-Meier estimate of survival by quartiles of BMI at baseline

Cumulative Survival (%)

Year of Follow-up

1st quartile: BMI ≤ 20
2nd quartile: Men: 20–22, Women: 20–23
3rd quartile: Men: 22–24, Women: 23–25
4th quartile: Men: ≥ 24, Women: ≥ 25

unit: kg/m²
Kaplan-Meier estimate of survival by quartiles of serum albumin at baseline

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th</td>
<td>≥ 4.3</td>
<td>≥ 4.4</td>
</tr>
<tr>
<td>3rd</td>
<td>4.1~4.2</td>
<td>4.2~4.3</td>
</tr>
<tr>
<td>2nd</td>
<td>3.9~4.0</td>
<td>4.0~4.1</td>
</tr>
<tr>
<td>1st</td>
<td>≤ 3.8</td>
<td>≤ 3.9</td>
</tr>
</tbody>
</table>

Cumulative Survival (%)

Year of Follow-up

Unit: g/dl

Alb
Kaplan-Meier estimate of survival by quartiles of total cholesterol at baseline

Cumulative Survival (%)

Year of Follow-up

1st quartile
Men: ≤156
Women: ≤182

2nd quartile
Men: 157~184
Women: 183~206

3rd quartile
Men: 185~208
Women: 207~229

4th quartile
Men: ≥209
Women: ≥230

unit: mg/dL
Kaplan-Meier estimate of survival by quartiles of blood hemoglobin at baseline

Cumulative Survival (%)

Year of Follow-up

RBC

unit: g/dL

4th quartile
Men: ≥ 14.7
Women: ≥ 13.3

3rd quartile
Men: 13.7~14.6
Women: 12.6~13.2

2nd quartile
Men: 12.8~13.6
Women: 11.7~12.5

1st quartile
Men: ≤ 12.7
Women: ≤ 11.6
Possible mechanism which leads to low nutrition in the elderly

- Lower food intake
- Lower physical fitness & social activity
- Lower chewing ability
- Inappropriate health behavior, SES
- Depression
- Disease, frailty, disability
- Inflammation
- Low nutrition
- Lower appetite

Factors:
- Lower food intake:
  - Lower physical fitness & social activity
  - Depression
  - Lower appetite
  - Inflammation
  - Low nutrition
- Inappropriate health behavior, SES
**Adjusted hazard ratios** for each quartiles of nutritional parameters for 8-year mortality by Cox-proportional hazard models.

<table>
<thead>
<tr>
<th>Quartiles</th>
<th>BMI</th>
<th>Albumin</th>
<th>T-cholesterol</th>
<th>Hemoglobin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest (1st)</td>
<td>1.0 [Reference]</td>
<td>1.0 [Reference]</td>
<td>1.0 [Reference]</td>
<td>1.0 [Reference]</td>
</tr>
<tr>
<td>Higher (2nd)</td>
<td>1.10 (0.72-1.68)</td>
<td>1.10 (0.72-1.66)</td>
<td>1.22 (0.80-1.87)</td>
<td>1.43 (0.92-2.22)</td>
</tr>
<tr>
<td>Lower (3rd)</td>
<td>1.36 (0.88-2.10)</td>
<td>1.15 (0.76-1.76)</td>
<td>1.12 (0.73-1.70)</td>
<td>1.54 (0.99-2.39)</td>
</tr>
<tr>
<td>Lowest (4th)</td>
<td>1.65 (1.09-2.50)</td>
<td>1.60 (1.02-2.53)</td>
<td>1.51 (1.01-2.27)</td>
<td>1.57 (1.03-2.41)</td>
</tr>
<tr>
<td>Lowest (4th)**</td>
<td>1.78 (1.15-2.74)</td>
<td>1.46 (0.92-2.33)</td>
<td>1.37 (0.90-2.08)</td>
<td>1.61 (1.03-2.51)</td>
</tr>
</tbody>
</table>

Adjusted for age, sex, study area and clinically relevant variables (history of stroke, heart disease, hypertension, and type 2 diabetes mellitus; alcohol drinking and smoking status; systolic BP, HbA$_1c$, Cr, ALT; self-rated health and depression; grip strength and usual walking speed)

**Additional adjustment for WBC, logCRP, logIL-6, logTNF α**
Functioning and healthy aging

- cognitive function (MMSE)
- oral function (chewing ability, etc)
- nutrition (BMI, Alb, T-C, Hb)
- physical performance (walking speed, etc)
- psychological function (SRH, GDS)
- social function (TMIG-IC)
Walking speed test

Average speed

[Diagram showing a walking speed test with a distance of 8 meters and measuring average speed]
Grip strength

Standing balance
## Tertiles of each physical performance

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grip strength (kg)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest</td>
<td>≥ 35</td>
<td>≥ 22</td>
</tr>
<tr>
<td>Middle</td>
<td>29-34</td>
<td>17-21</td>
</tr>
<tr>
<td>Lowest</td>
<td>≤ 28</td>
<td>≤ 16</td>
</tr>
<tr>
<td><strong>Walking speed (m/sec)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest</td>
<td>≥ 1.32</td>
<td>≥ 1.22</td>
</tr>
<tr>
<td>Middle</td>
<td>1.11-1.32</td>
<td>0.96-1.22</td>
</tr>
<tr>
<td>Lowest</td>
<td>≤ 1.11</td>
<td>≤ 0.96</td>
</tr>
<tr>
<td><strong>Standing balance (sec)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest</td>
<td>≥ 60</td>
<td>≥ 42</td>
</tr>
<tr>
<td>Middle</td>
<td>19-59</td>
<td>11-41</td>
</tr>
<tr>
<td>Lowest</td>
<td>≤ 18</td>
<td>≤ 10</td>
</tr>
</tbody>
</table>
Usual walking speed

**All cause mortality**

- highest
- middle
- lowest

Log Rank $\chi^2=70.5$  $p=0.000$

**Cardiovascular death**

- highest
- middle
- lowest

Log Rank $\chi^2=50.1$  $p=0.000$

**Cancer death**

- highest
- middle
- lowest

Log Rank $\chi^2=0.86$  $p=0.355$

**Other causes death**

- highest
- middle
- lowest

Log Rank $\chi^2=34.7$  $p=0.000$
Grip strength

All cause mortality

Cardiovascular death

Cancer death

Other causes death

Accumulated survival

Year of follow up

Log Rank $\chi^2=47.1$  $p=0.000$

Log Rank $\chi^2=33.9$  $p=0.000$

Log Rank $\chi^2=18.1$  $p=0.000$

Log Rank $\chi^2=2.07$  $p=0.151$
Standing Balance

All cause mortality

Cardiovascular death

Cancer death

Other causes death

Accumulated survival vs. Year of follow up

Log Rank $\chi^2=68.7$ $p=0.000$

Log Rank $\chi^2=48.9$ $p=0.000$

Log Rank $\chi^2=36.9$ $p=0.000$

Log Rank $\chi^2=1.04$ $p=0.241$

Log Rank $\chi^2=36.9$ $p=0.000$

highest 12.3%
middle 14.9%
lowest 37.4%
### Multivariate-adjusted hazard ratios for cardiovascular mortality

**A.** Each physical performance, respectively entered into the model

<table>
<thead>
<tr>
<th></th>
<th>Lowest</th>
<th>Middle</th>
<th>Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip strength</td>
<td>3.03 (1.32-6.95)</td>
<td>2.48 (1.11-5.54)</td>
<td>1 [reference]</td>
</tr>
<tr>
<td>Walking speed</td>
<td>3.34 (1.61-6.93)</td>
<td>0.96 (0.42-2.19)</td>
<td>1 [reference]</td>
</tr>
<tr>
<td>Standing balance</td>
<td>2.92 (1.46-5.82)</td>
<td>1.01 (0.45-2.27)</td>
<td>1 [reference]</td>
</tr>
</tbody>
</table>

**B.** Three of physical performances, simultaneously entered into the model

<table>
<thead>
<tr>
<th></th>
<th>Lowest</th>
<th>Middle</th>
<th>Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip strength</td>
<td>2.47 (1.05-5.81)</td>
<td>2.43 (1.07-5.52)</td>
<td>1 [reference]</td>
</tr>
<tr>
<td>Walking speed</td>
<td>2.29 (1.07-4.92)</td>
<td>0.90 (0.40-2.03)</td>
<td>1 [reference]</td>
</tr>
<tr>
<td>Standing balance</td>
<td>2.08 (1.01-4.92)</td>
<td>0.94 (0.42-2.11)</td>
<td>1 [reference]</td>
</tr>
</tbody>
</table>
Functioning and healthy aging

- cognitive function (MMSE)
- oral function (chewing ability, etc)
- nutrition (BMI, Alb, T-C, Hb)
- physical performance (walking speed, etc)
- psychological function (SRH, GDS)
- social function (TMIG-IC)
Functional transition in progressive disability

Restriction in social role and/or intellectual activity

5 years

IADL limitation

5 years

ADL disability

Approx. 10 years
Interactions Between the Components of ICF (WHO 2001)

Body Functions and Structures
- Physiological functions, physical and mental functions, etc.

Activities
- Everyday life activities (ADLs, IADLs, work, etc.)

Participation
- Roles in family or work place, community participation, etc.
Two major factors influencing functional health

- Diseases
- Aging

Functional health
TMIG-LISA,
Longitudinal Interdisciplinary Study on Aging

1. 1\textsuperscript{st} term project, 1991-2001
2. 2\textsuperscript{nd} term project, 2002-present
Randomized controlled trials

- Falls
- Urinary incontinent
- Depressive mood
- Frailty
- Mild cognitive impairment, etc.
Participants of the Hatoyama Cohort Study (n = 742)

Frailty screening using CL15

Pre- and Frailty (n = 283) defined as CL15 ≥2 points

Baseline assessment (n = 77)

Randomization (n = 77)

Immediate intervention group (n = 38)

Multidimensional intervention

4 withdrew

3 months Second assessment (n = 70)

Control phase

1 withdrew

Multidimensional intervention

2 withdrew*

Delayed intervention group (n = 39)

Control phase

3 withdrew

3 months Second assessment (n = 70)

Multidimensional intervention

2 withdrew*

6 months Third assessment (n = 68)

*One of two individuals participated in the third assessment.
Multi-component program on frailty

• Class, twice a week for a 3-month period (22 sessions)

• Exercise program (60 min)
  Resistance exercise designed to load the upper and lower extremities and trunk

• Nutritional program (30 min)
  Nutritional education for increasing protein intake and dietary variety

• Psychosocial program (30 min)
  Group work for increasing social participation and neighborhood attachment
Long-term effect of multi-component program on frailty (CL15): a propensity score matching analysis

![Graph showing the mean CL15 score over time with 95% CI and group-by-time interaction, P = 0.036.](image)

- No intervention group (n = 74)
- Intervention group (n = 74)

Frailty screening, Pre-intervention, Middle assessment, Post-intervention
Community intervention for frailty prevention

Kusatsu Town, Gunma Prefecture

Population, 7,200
(≥65 y, 29.4%)
Main industry, hot spa & resort

Town view
Public health approach to preventing frailty in the community and its effect on healthy aging in Japan

Shoji Shinkai,¹ Hiroto Yoshida,² Yu Taniguchi,¹ Hiroshi Murayama,¹,³ Mariko Nishi,¹ Hidenori Amano,¹ Yu Nofuji,⁴ Satoshi Seino¹ and Yoshinori Fujiwara¹

¹Research Team for Social Participation and Community Health, Tokyo Metropolitan Institute of Gerontology, ³Institute of Gerontology, The University of Tokyo, ⁴Health Promotion Center, Japan Association for Development of Community Medicine, Tokyo, and ²Faculty of Medical Science and Welfare, Tohoku Bunka Gakuen University, Miyagi, Japan
Strategy for frailty prevention in Kusatsu

- Community empowerment
- Health education
- Comprehensive geriatric assessment
- Multi-component program on frailty
Self-care notebook on functional health

Manual for managing multi-component program on frailty

Training health volunteers

Holding event for measuring physical performance in the community
Trend in incidence rate of certification under the LTCI program among senior citizens in Kusatsu

Incidence of certification (per 1,000 person-year)

- ≥ 75 years
  - 2001: 88.3
  - 2002: 121.7
  - 2003: 93.3
  - 2004: 75.0
  - 2005: 64.3
  - 2006: 65.2
  - 2007: 63.5
  - 2008: 53.7
  - 2009: 59.9

- 65-74 years
  - 2001: 19.7
  - 2002: 18.1
  - 2003: 10.9
  - 2004: 15.8
  - 2005: 11.1
  - 2006: 9.7
  - 2007: 14.0
  - 2008: 20.3
  - 2009: 10.6

Intervention period

(year)
Trend in proportions of service users under the LTCI program among senior citizens

- **≥ 75 years**
  - Whole nation:
    - 2002: 21.5%
    - 2003: 23.6%
    - 2004: 25.3%
    - 2005: 26.2%
    - 2006: 27.2%
    - 2007: 26.9%
    - 2008: 27.1%
    - 2009: 27.4%
    - 2010: 28.0%
  - Gunma prefecture:
    - 2002: 21.4%
    - 2003: 25.2%
    - 2004: 26.6%
    - 2005: 26.5%
    - 2006: 24.4%
    - 2007: 24.6%
    - 2008: 24.8%
    - 2009: 24.5%
    - 2010: 23.6%
  - Kusatsu town:
    - 2002: 24.2%
    - 2003: 25.2%
    - 2004: 25.3%
    - 2005: 24.4%
    - 2006: 24.5%
    - 2007: 24.3%
    - 2008: 24.2%
    - 2009: 23.6%
    - 2010: 23.6%

- **65-74 years**
  - Whole nation:
    - 2002: 3.9%
    - 2003: 4.4%
    - 2004: 4.8%
    - 2005: 4.9%
    - 2006: 4.8%
    - 2007: 4.7%
    - 2008: 4.5%
    - 2009: 4.3%
    - 2010: 4.2%
  - Gunma prefecture:
    - 2002: 3.3%
    - 2003: 4.0%
    - 2004: 4.0%
    - 2005: 4.1%
    - 2006: 4.1%
    - 2007: 4.3%
    - 2008: 4.3%
    - 2009: 4.3%
    - 2010: 4.1%
  - Kusatsu town:
    - 2002: 4.5%
    - 2003: 4.4%
    - 2004: 4.3%
    - 2005: 4.1%
    - 2006: 4.3%
    - 2007: 4.5%
    - 2008: 4.4%
    - 2009: 4.3%
    - 2010: 4.2%
Implications of the public health approach in preventing frailty in the community

The present community health system in Japan used a disease-oriented approach. However, focusing on functional health or frailty would be more effective for older person.

1. **Public health professionals** should consider incorporating the concept of functional health, frailty and healthy aging, and carrying out routine services such as health education and consultation.

2. **Community health services for older people** might also need to be rethought. To take one example, under the medical care system for older adults, the disease-oriented preventive health check-ups are provided even to the old-old population; however, *geriatric health check-ups* would be more effective.

3. The health administration notebook for older adults should be revised so as to improve *self-care ability for functional health*. 
Policy Responses

• The revised Long-Term Care Insurance Act (2006)
  → implemented long-term care prevention programs

• “Healthy Japan 21 (secondary)” (2012)
  → stressed the importance of functional health and community environment for healthy aging

• The Japanese government has started to discuss how to reorganize the community health system for older adults.
Frailty Clinic in TMGH (2015.10-)
Geriatricians from different disciplines are involved.

**Advisors at Regular Meeting on Frailty**
Psychiatrics, Neurologist, Gastroenterologist, Rheumatologist, Researchers in TMIG, etc.
Consulting room
Clinical psychologists
Measuring physical functions
Outpatients consulted

From October 1, 2015 to May 31, 2015.

170 older persons.
Mean age, $77.6 \pm 7.1$(SD), range, 50～95
Males 37.9 %, Females 62.1 %
<table>
<thead>
<tr>
<th>Main symptoms and reasons (Top 10)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low physical function in strength and walking speed</td>
<td>30</td>
</tr>
<tr>
<td>Subjective memory deficit, Some deficit of medication</td>
<td>28</td>
</tr>
<tr>
<td>Unstable blood pressure</td>
<td>22</td>
</tr>
<tr>
<td>Dizziness, Wandering</td>
<td>14</td>
</tr>
<tr>
<td>Recommended by friend, Willing to be assessed</td>
<td>13</td>
</tr>
<tr>
<td>Recommended by doctor</td>
<td>7</td>
</tr>
<tr>
<td>Depressive mood</td>
<td>6</td>
</tr>
<tr>
<td>Sleep disorder</td>
<td>6</td>
</tr>
<tr>
<td>Food numbness, Low back pain</td>
<td>4</td>
</tr>
<tr>
<td>Anxiety</td>
<td>4</td>
</tr>
</tbody>
</table>
### Diseases and habits

<table>
<thead>
<tr>
<th>Condition</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>72.5%</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>62.3%</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>62.3%</td>
</tr>
<tr>
<td>Addictive drinking</td>
<td>21.1%</td>
</tr>
<tr>
<td>Smoking habit</td>
<td></td>
</tr>
<tr>
<td>past</td>
<td>33.3%</td>
</tr>
<tr>
<td>current</td>
<td>4.9%</td>
</tr>
<tr>
<td>Heart failure</td>
<td>6.6%</td>
</tr>
<tr>
<td>History of Stroke</td>
<td>10.9%</td>
</tr>
<tr>
<td>History of Cardiac Infarction</td>
<td>5.4%</td>
</tr>
<tr>
<td>Others included Parkinson’s disease, Dementia, etc.</td>
<td></td>
</tr>
</tbody>
</table>
## Cognition and Depressive Mood

<table>
<thead>
<tr>
<th>Scale</th>
<th>Score (Mean±SD)</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hasegawa’s dementia scale revised (HDS-R)</td>
<td>25.6±4.7</td>
<td>HDS-R ≤20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11.8%</td>
</tr>
<tr>
<td>Mini-Mental State Examination (MMSE)</td>
<td>27.1±3.7</td>
<td>MMSE ≤ 23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11.8%</td>
</tr>
<tr>
<td>Geriatric Depression Scale 15 (GDS)</td>
<td>4.8±3.4</td>
<td>GDS15≥5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48.5%</td>
</tr>
</tbody>
</table>
## Physical function

<table>
<thead>
<tr>
<th>Physical Function</th>
<th>Women</th>
<th>Men</th>
<th>Prevalence* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip strength</td>
<td>19.0 ± 6.7 Kg</td>
<td>20.0 ± 7.5 Kg</td>
<td>58.2 %</td>
</tr>
<tr>
<td>Usual walking speed</td>
<td>1.0 ± 0.3 m/sec</td>
<td></td>
<td>24.8 %</td>
</tr>
<tr>
<td>Appendicular Skeletal Muscle Index (ASMI)</td>
<td>6.9 ± 1.5 g/m²</td>
<td>6.0 ± 1.9 kg/m²</td>
<td>62.8 %</td>
</tr>
</tbody>
</table>

* Low grip strength, Women < 18kg, Men < 26 Kg  
Slow walking speed, < 0.8 m/sec  
Low ASMI, Women < 5.7 kg/m², Men < 7.0 kg/m²
Distribution of Clinical Frailty Scale

- Mean = 3.4
- Std. Dev. = 0.781
- N = 164

1. Very fit
2. Fit
3. Managing well
4. Vulnerable
5. Mildly frail
6. Moderately frail
7. Severely frail
8. Very severely frail
9. Terminally ill
### Diagnosis, Top 10

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarcopenia suspected&lt;br&gt;Low ASMI, Low grip strength and/or Slow walking speed</td>
<td>75</td>
</tr>
<tr>
<td>MCI (mild cognitive impairment) suspected</td>
<td>57</td>
</tr>
<tr>
<td>Diabetes Mellitus, Impaired Glucose Tolerance</td>
<td>34</td>
</tr>
<tr>
<td>Depressive Mood</td>
<td>27</td>
</tr>
<tr>
<td>Dementia suspected</td>
<td>17</td>
</tr>
<tr>
<td>Hypertension</td>
<td>17</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>12</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>12</td>
</tr>
<tr>
<td>Orthostatic blood pressure adjustment disorder</td>
<td>10</td>
</tr>
<tr>
<td>Osteoarthritis of the knee or the hip, Lower extremity injury</td>
<td>8</td>
</tr>
</tbody>
</table>

Other conditions include:<br>DM neuropathy 4; balance disorder 4; angina pectoris, ischemic HD 3; Thyroid Struma, Subclinical hypothyroidism 3; AF 3; Sleep disorder 2; Hearing impairment 2; heart failure 2; kidney dysfunction 2; post-operation disused syndrome 2; etc.
Tools used for counselling
Post frailty assessment

Patient with frailty, sarcopenia or MCI

- Explanation about the results of assessment
- General exercise and nutrition guidance
- Introduction of exercise and cognitive rehabilitation program in the TMGH,
- Introduction of nutrition support services in the TMGH
- Introduction of memory clinic in the TMGH

Non-frail patient

- Introduction of frailty prevention program provided by the Health Promotion Center in the TMGH
Future perspective of frailty assessment in hospital and clinic

It could present the prognostic value, treatment target for multi-morbid patients, the chance to correct polypharmacy, eligibility of surgery for advanced older patient, and so on.

Frailty assessment could be a gate to integrated medicine.