



# A cross-sectional survey of consistent rehabilitation through long-term care insurance in Japan: a questionnaire survey

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**Background:** There seems to be a lack of consistency of maintenance/community-based rehabilitation through long-term care insurance. We aimed to clarify whether consistent rehabilitation can be performed through long-term care insurance by questionnaires.

**Materials and Methods:** This study was a cross-sectional study in a nationwide survey among rehabilitation staff and care recipients who completed disease-specific rehabilitation and required maintenance/community-based rehabilitation through long-term care insurance. Consistency of rehabilitation was compared using Fisher's exact tests. The concordance of the rehabilitation evaluation and treatment conducted under medical and long-term care insurance was assessed using the  $\kappa$  coefficient.

**Results:** Six hundred questionnaires from care recipients and staff were analyzed. Of the rehabilitation staff, 264 (44%) obtained rehabilitation plans from medical institutions. There was a significant difference between the responses of "referral from the same medical corporation" and "obtaining the rehabilitation plan" by Fisher's exact test (odds ratio: 3.242;  $P < 0.001$ ). Most rehabilitation treatments under medical insurance comprised walking or training with parallel rods/canes [498 patients (83%)], and 454 patients (76%) received stretching and range-of-motion training for the limbs and spine for long-term care insurance. Muscle strength evaluation was the most frequently conducted under medical and long-term care insurance [383 (73%) and 487 (83%), respectively]. The concordance of the evaluation and treatment content, except for disease-specific evaluation, was low ( $\kappa$  coefficient  $\leq 0.6$ ).

**Conclusions:** The rate of provision of rehabilitation plans was low, and evaluation and treatment content under medical and long-term care insurance was inconsistent. Our results draw attention to the need for consistent rehabilitation plans between disease-specific and maintenance/community-based rehabilitation.

**Keywords:** aged, community health services, questionnaires, rehabilitation medicine, surveys

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Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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Annals of Medicine & Surgery (2023) 85: 17–23

Received 9 October 2022; Accepted 24 December 2022

Supplemental Digital Content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website, [www.annalsjournal.com](http://www.annalsjournal.com).

Published online 27 January 2023

<http://dx.doi.org/10.1097/MS9.000000000000199>

## HIGHLIGHTS

- Long-term care insurance (LTCI) for rehabilitation is increasing in Japan.
- Whether consistent rehabilitation can be performed was assessed by a questionnaire.
- The implementation rate of a rehabilitation program was low.
- Consistency in receiving rehabilitation could not be implemented.
- It is necessary to develop and ensure consistent rehabilitation program.

## Introduction

Community-based rehabilitation (CBR) involves collaboration between individuals with disabilities, families, and communities for appropriate health, education, vocational, and social services<sup>[1]</sup>. Japan has an aging rate of 28.4%, which is predicted to reach 37.7% by 2050, with one in 2.6 people aged 65 years and above<sup>[2]</sup>. To respond to the increase in older people requiring long-term care over an extended period, a LTCI system was established in 2000<sup>[3,4]</sup>, and many patients have received outpatient and home-visit rehabilitation using long-term care services<sup>[5]</sup>.

In Japan, disease-specific rehabilitation is a medical fee-based system that uses medical insurance under the direction of a

doctor, and the medical fee and the maximum number of days for rehabilitation differ depending on the disease. During rehabilitation by LTCl, doctors' instructions are required before starting rehabilitation through LTCl. In Japan, LTCl helps in the seamless transition between treatments from acute to chronic phases to improve and maintain functional activity of patients<sup>[6]</sup>. Disease-specific rehabilitation in each clinical department is widely recognized<sup>[7]</sup> and has been established in Japan<sup>[8–10]</sup>. Scarce evidence is available for successful rehabilitation using LTCl as opposed to medical insurance; however, success has been reported in different patients, including those with reduced dementia symptoms<sup>[11]</sup>, improved cognitive function<sup>[12]</sup>, and reduced fall risk and improved mobility<sup>[13,14]</sup>. The number of deaths from acute heart failure can be reduced by home-visit rehabilitation after hospitalization and increasing the number of physiotherapists in nursing homes<sup>[15,16]</sup>. Regarding the transition from disease-specific to CBR through LTCl, ~36% of patients are stroke patients<sup>[17]</sup>.

While devising a new CBR program, we first need to perform a “situation analysis” for examining community status and needs and to explain the choices for rehabilitation collectively for all diseases at the national level<sup>[1]</sup>. In Japan, as of 31 March 2019, CBR through medical insurance was revised, which established a shift to rehabilitation through LTCl-paid programs after disease-specific rehabilitation using a rehabilitation plan including. However, there are few reports on rehabilitation received through public LTCl and no reports on the effectiveness of public LTCl<sup>[18]</sup>, and the status of consistency in rehabilitation from medical insurance to LTCl is unknown in Japan.

In this study, we administered a questionnaire to two focus groups: (i) patients requiring long-term care who had completed disease-specific rehabilitation through medical insurance and (ii) the CBR staff who worked in long-term care facilities to evaluate the contribution of the First Step of the CBR Management Cycle<sup>[1]</sup> in Japan. Investigating rehabilitation plans and differences in the evaluation and treatment content of rehabilitation between medical insurance and LTCl allows to clarify whether the consistency of rehabilitation from the hospital to the community is possible. We hypothesized that the rate of obtaining rehabilitation plans from medical insurance was low, with differences in the implementation of evaluation and treatment content between medical insurance and LTCl.

## Materials and methods

This was a cross-sectional survey (UIN: 8378, <https://www.researchregistry.com/register-now#user-researchregistry/register-researchdetails/633a7ca2e71d14002339063d/>) on the rehabilitation content in long-term healthcare and medical facilities that conduct outpatient (day-care, day-service) and/or home-visit rehabilitation. This study was approved by the Research Ethics Committee of Wakayama Medical University and was performed according to the Declaration of Helsinki (Approval number: 2938). This cross-sectional study is reported in line with the STROCCS Guidelines<sup>[19]</sup> (Supplemental Digital Content 1, <http://links.lww.com/MS9/A13>).

### Participants

Individuals requiring long-term care (care recipients) who started CBR in long-term care health facilities or outpatient

rehabilitation and home-visit rehabilitation in medical facilities were included in the study. To be eligible, care recipients must have completed their disease-specific rehabilitation through medical insurance within 3 months. A questionnaire was also distributed to the rehabilitation staff (physiotherapists, occupational therapists, speech therapists) in charge of the care recipients.

### Survey method and questionnaire content

We mailed 1300 questionnaires to long-term healthcare facilities and outpatient rehabilitation or home-visit rehabilitation services of medical facilities nationwide from the beginning of November 2020, with a response deadline of January 2021. The sample size was estimated according to a previous report<sup>[20]</sup>. The required sample size was 384 with an expected response rate of 30%. The questionnaire was developed by a psychiatrist (rehabilitation physician), registered therapist, nurse, and medical statistics specialist based on the aim of the study. The questionnaire used in this study was developed particularly for this study. We prepared a questionnaire through multiple online meetings attended by authors. Before administering the questionnaire, it was distributed to multiple psychiatrists other than the authors and its contents were verified. Care recipients were asked to complete the survey but could be assisted by family members or staff. Care recipients were asked to describe rehabilitation treatment (“type of rehabilitation treatment under medical insurance,” “rehabilitation treatment under long-term care insurance”); rehabilitation staff were asked to describe rehabilitation evaluation (“the evaluation item that was performed through medical insurance,” “the evaluation item that is performed through LTCl”). We included questions to investigate “whether the rehabilitation evaluation/treatment through medical insurance and LTCl are consistent” and “whether information about the rehabilitation is transmitted smoothly.” We classified “the main illnesses and injuries that required long-term care” in the questionnaire for care recipients based on definitions of rehabilitation medicine provided by the Japanese Association of Rehabilitation Medicine.

### Data analysis

Basic information on care recipients and rehabilitation evaluation and treatment content of medical insurance and LTCl were tabulated. The Fisher's exact test was used to compare the responses between “whether the referral was from the same medical corporation or a related medical institution” and “whether the rehabilitation plan was obtained from the same medical institution” from the staff questionnaire. Furthermore, the degree of correspondence of the rehabilitation treatment content between the two insurance groups was evaluated using the  $\kappa$  coefficient<sup>[21]</sup>. We used IBM SPSS Statistics 27 (IBM Japan, Tokyo, Japan) for the statistical analyses, and the significance was set at *P*-value less than 0.05.

## Results

### Response rate and demographic variables

Among the 601 questionnaires that were returned, one patient aged less than 40 was excluded because younger than the age covered by LTCl; thus, 600 questionnaires were analyzed. The median age of the care recipients was 79.0 years (interquartile

range: 72.0–85.0); with 242 males (41%), 349 females (59%), and nine (0.02%) participants without information on sex. Among the five care levels for long-term care, 40 (7%), 67 (11%), 86 (14%), 105 (18%), and 109 (18%) patients were listed for care levels 5, 4, 3, 2, and 1, respectively. Outpatient facilities (day-care and day-service) were the most common facilities under LTCI currently in use [388 patients (65%)], followed by home-visit rehabilitation for the elderly [197 (33%)], and healthcare facilities for the elderly (Roken) [85 (14%)].

### Questionnaire content

#### Answers from care recipients

Cerebrovascular disease and brain injury were the most common reasons for care [235 patients (39%)], followed by bone and joint diseases and trauma [223 (37%)], cardiovascular disease [20 (3%)], neuromuscular disease [20 (3%)], respiratory disease [19 (3%)], spinal cord injury [8 (1%)], prevention/recovery of peri-operative physical function [6 (1%)], cancer [5 (0.8%)], renal disease [5 (0.8%)], rheumatic disease [4 (0.7%)], amputation [trauma/circulatory deficit/tumor; 2 (0.3%)], diabetes [2 (0.3%)], and osteoporosis/burns [1 (0.3%)]. Difficulty in classification was encountered in 32 patients (5%), and 17 (3%) were unlisted. Hypertension was the most common disease currently treated [182 patients (30%)], followed by heart disease [heart failure, angina; 42 (7%)]; 214 patients (36) were not treated for any disease at the time of the study.

The last facility where rehabilitation under medical insurance was received was the convalescent ward (303 patients, 50%), followed by the general (81 patients, 14%) and acute (75 patients, 12%) wards. The frequency of rehabilitation (average number of times per week) under the medical insurance was the highest at seven times a week (238 patients, 40%), while it was twice a week (236 patients, 39%) under the LTCI. The most common rehabilitation duration (average daily duration) under medical insurance was 120–139 min (110 patients, 18%) and under LTCI was 20–39 min (202 patients, 34%).

Most rehabilitation treatments under medical insurance comprised walking or training with parallel rods and canes in 498 patients (83%). Under LTCI, stretching and range-of-motion training for the limbs and spine was provided to 454 (76%) patients. Details are shown in Table 1.

#### Staff responses

Rehabilitation staff worked mainly in outpatient facilities (day-care and day-service; 286 individuals, 48%), followed by home-visit rehabilitation (162 individuals, 27%) and long-term care facilities (126 individuals, 21%). Regarding the referral of patients requiring long-term care, 400 staffs (67%) were referred from the same medical corporation or related medical institutions, and 354 staff (59%) responded that medical information could be obtained when needed via electronic medical records. Overall, 264 staff (44%) received a rehabilitation plan from a medical institution.

When performing rehabilitation under LTCI, those who considered the content of disease-specific rehabilitation obtained through medical insurance was 426 (71%). The rehabilitation classification by disease among the referred care recipients was 183 patients (36%) for cerebrovascular rehabilitation and 158 (30%) for musculoskeletal rehabilitation. In addition, 144 staff

**Table 1**

#### Responses from care recipients (rehabilitation treatment)

Treatment contents	Medical insurance	Long-term care insurance
Massage	312 (52)	311 (52)
Physical agents	101 (17)	91 (15)
Stretching and range-of-motion training for limbs and spine	482 (80)	454 (76)
Sitting/standing training	475 (79)	393 (66)
Walking training with parallel rods and canes	498 (83)	402 (67)
Aerobic exercise with rowing/foot rowing bicycle	177 (30)	181 (30)
Walking/aerobic exercise with running machine	60 (10)	181 (30)
Extremities/body trunk strength training	337 (56)	371 (62)
Sit on a chair and work on the table	200 (33)	97 (16)
ADL training	345 (58%)	191 (32)
IADL movement training	87 (15)	57 (9)
Training considering reinstatement/work	79 (3)	22 (4)
Recreation activities	113 (19)	122 (20)
Speech language therapy training	171 (29)	52 (9)
Swallowing training	102 (17)	29 (5)
Breathing training	43 (7)	30 (5)
Prosthetic leg/hand training	7 (1)	4 (1)
Training related to spinal cord injury or limb paralysis	26 (4)	11 (2)
Home renovation and home training	123 (21)	102 (17)
Not listed	18 (3)	14 (2)

ADL, activities of daily living; IADL, instrumental activities of daily living.

members (28%) answered that they did not know the disease classification.

For disease-specific rehabilitation, 527 (88%) staff members answered “yes” to the question “do you know if you received disease-specific rehabilitation until the latest registration (within about 3 mo)?”

Muscle strength evaluation was performed in 383 patients (73%). The evaluation items for LTCI included 558 (93%) patients who answered “yes” to the question “do you regularly and quantitatively evaluate LTCI rehabilitation?” Under LTCI, muscle strength was evaluated in 487 patients (83%), range of motion in 412 (74%). Details are shown in Table 2.

#### Consistency between disease-specific rehabilitation and community-based rehabilitation in long-term care insurance

When comparing results for the questions, “whether the referral was from the same medical corporation or a related medical institution” and “whether the rehabilitation plan was obtained from the same medical institution” for the rehabilitation staff, the Fisher’s exact test showed a significant difference (odds ratio: 3.242; 95% confidence interval: 2.205–4.766;  $P < 0.001$ ).

We analyzed 563 patients that responded to “the main illnesses and injuries that required long-term care,” “type of rehabilitation treatment under medical insurance,” and “rehabilitation treatment under long-term care insurance” in care recipients, and the 406 that staff members responding to “The rehabilitation classification by disease among the referred care recipients,” “the evaluation item that was performed through medical insurance.” and “the evaluation item that is

**Table 2**  
**Responses from staff (rehabilitation evaluation)**

Evaluation items	Medical insurance	Long-term care insurance
Disease-specific evaluation		
Brunnstrom stage	130 (21)	100 (16)
The Hoehn and Yahr score	28 (4)	27 (4)
JOA hip score	26 (4)	25 (4)
Knee JOA score	24 (4)	24 (4)
Frankel score	26 (4)	22 (3)
New York Heart Association (NYHA) classification	25 (4)	25 (4)
Not listed	454 (75)	488 (81)
Body functions and structures		
Muscle strength	388 (64)	489 (81)
Sensory	274 (45)	269 (44)
Range of motion	379 (63)	413 (68)
Pain	315 (52)	358 (59)
Swallowing	141 (23)	130 (21)
Executive function	178 (29)	148 (24)
Aphasia dysfunction	157 (26)	139 (23)
Not listed	198 (33)	77 (12)
Activities		
Sitting	264 (44)	229 (38)
Standing	284 (47)	290 (48)
6-min walking test	131 (21)	128 (21)
Timed Up & Go Test	170 (28)	301 (50)
MMSE	169 (28)	156 (26)
HDS-R	173 (28)	262 (43)
Communication ability	153 (25)	143 (23)
Not listed	241 (40)	117 (19)
ADL		
FIM	325 (54)	247 (41)
Barthel Index	176 (29)	352 (58)
Not listed	228 (38)	161 (26)
IADL		
Frenchay Activities Index	42 (7)	99 (16)
Life Space Assessment	28 (4)	70 (11)
Gerontology Index of Competence	33 (5)	66 (11)
Preparing and cleaning up meals	73 (12)	136 (22)
Washing	69 (11)	130 (21)
Cleaning and tidying	68 (11)	137 (22)
Shopping	58 (9)	151 (25)
Going out	83 (13)	185 (30)
Outdoor walking	119 (19)	207 (34)
Hobbies	64 (10)	143 (23)
Traveling	42 (7)	95 (15)
Reading	41 (6)	95 (15)
Work	49 (8)	89 (14)
Not listed	442 (73)	326 (54)

ADL, activities of daily living; FIM, Functional Independence Measure; IADL, instrumental activities of daily living; HDS-R, Hierarchic Dementia Scale-Revised; JOA, Japanese Orthopaedic Association; MMSE, Mini-Mental State Examination.

performed through LTCI.” Tables 3–5 demonstrate the rehabilitation evaluation and treatment. The  $\kappa$  coefficient for all treatment and evaluation items, except the disease-specific evaluation, was 0.6 or less, and the index score was “moderately consistent” or lower. The  $\kappa$  coefficient for disease-specific evaluation ranged from 0.656 (Brunnstrom stage) to 0.737 (Japanese Orthopaedic Association hip score). The implementation rate of disease-specific evaluations was low for both medical insurance and LTCI.

**Table 3**  
**Type of rehabilitation treatment under medical insurance versus long-term care insurance**

Treatment contents	$\kappa$ coefficient	95% CI
Massage	0.550	0.481–0.619
Physical agents	0.302	0.200–0.404
Stretching and range-of-motion training for limbs and spine	0.292	0.198–0.386
Sitting/standing training	0.323	0.241–0.405
Walking training with parallel rods and canes	0.340	0.260–0.420
Aerobic exercise with rowing/foot rowing bicycle	0.329	0.245–0.413
Walking/aerobic exercise with running machine	0.357	0.237–0.477
Extremities/body trunk strength training	0.459	0.385–0.533
Sit on a chair and work on the table	0.306	0.227–0.384
ADL training	0.232	0.165–0.299
IADL movement training	0.234	0.126–0.342
Training considering reinstatement/work	0.549	0.359–0.739
Recreation activities	0.391	0.297–0.485
Speech language therapy training	0.262	0.183–0.340
Swallowing training	0.220	0.122–0.318
Breathing training	0.459	0.312–0.606
Prosthetic leg/hand training	0.541	0.184–0.898
Training related to spinal cord injury or limb paralysis	0.373	0.171–0.575
Home renovation and home training	0.288	0.192–0.384

For the  $\kappa$  coefficient, the responses of “type of rehabilitation treatment under medical insurance” and “rehabilitation treatment under long-term care insurance” of care recipients are cross-tabulated by rehabilitation treatment to see how well the treatments between medical and long-term care insurance match.

ADL, activities of daily living; CI, confidence interval; IADL, instrumental activities of daily living.

## Discussion

This nationwide survey on whether CBR under LTCI is consistent with disease-specific rehabilitation for patients requiring long-term care clarified that, under LTCI, the implementation rate of rehabilitation treatment and instrumental activities of daily living

**Table 4**  
**Rehabilitation evaluation through medical insurance versus LTCI (disease-specific evaluation and body functions and structures)**

Evaluation items	$\kappa$ coefficient	95% CI
Disease-specific evaluation		
Brunnstrom stage	0.656	0.568–0.743
The Hoehn and Yahr score	0.680	0.517–0.844
JOA hip score	0.737	0.581–0.893
Knee JOA score	0.703	0.537–0.87
Frankel score	0.671	0.489–0.853
New York Heart Association (NYHA) classification	0.668	0.492–0.844
Body functions and structures		
Muscle strength	0.074	–0.034 to 0.182
Sensory	0.378	0.288–0.468
Range of motion	0.219	0.111–0.328
Pain	0.339	0.241–0.436
Swallowing	0.505	0.408–0.601
Executive function	0.445	0.354–0.536
Aphasia dysfunction	0.496	0.404–0.589

For the  $\kappa$  coefficient, the responses of “the evaluation item that was performed through medical insurance” and “the evaluation item that is performed through LTCI” of rehabilitation staff are cross-tabulated by rehabilitation treatment to see how well the treatments between medical and long-term care insurance match.

CI, confidence interval; JOA, Japanese Orthopaedic Association; LTCI, long-term care insurance.

**Table 5**  
**Rehabilitation evaluation through medical insurance versus LTCI**  
**(activities, ADL and IADL)**

Evaluation items	$\kappa$ coefficient	95% CI
Activities		
Sitting	0.429	0.343–0.515
Standing	0.418	0.328–0.509
6-min walking test	0.480	0.382–0.579
Timed Up & Go Test	0.333	0.245–0.422
MMSE	0.344	0.247–0.442
HDS-R	0.275	0.180–0.371
Communication ability	0.478	0.383–0.573
ADL		
FIM	0.262	0.179–0.346
Barthel Index	0.287	0.206–0.368
IADL		
Frenchay Activities Index	0.479	0.365–0.594
Life Space Assessment	0.499	0.364–0.634
Gerontology Index of Competence	0.514	0.378–0.650
Preparing and cleaning up meals	0.504	0.403–0.606
Washing	0.490	0.386–0.594
Cleaning and tidying	0.445	0.342–0.549
Shopping	0.419	0.318–0.519
Going out	0.433	0.342–0.524
Outdoor walking	0.442	0.354–0.531
Hobbies	0.435	0.334–0.536
Traveling	0.534	0.414–0.653
Reading	0.541	0.422–0.660
Work	0.573	0.457–0.690

For the  $\kappa$  coefficient, the responses of “the evaluation item that was performed through medical insurance” and “the evaluation item that is performed through LTCI” of rehabilitation staff are cross-tabulated by rehabilitation treatment to see how well the treatments between medical and long-term care insurance match.

ADL, activities of daily living; CI, confidence interval; FIM, Functional Independence Measure; IADL, instrumental activities of daily living; HDS-R, Hierarchic Dementia Scale-Revised; JOA, Japanese Orthopaedic Association; LTCI, long-term care insurance; MMSE, Mini-Mental State Examination.

(ADL) evaluation was low. The probability that the same corporation could obtain a rehabilitation plan is higher, and there was discrepancy in the rehabilitation treatment/evaluation content between medical insurance and LTCI.

Among the rehabilitation staff in long-term care, 264 (44%) participants obtained a rehabilitation plan from a medical institution, while more than half did not. The probability of obtaining a rehabilitation plan increased if referrals were made from the same medical corporation or a related medical institution. Further, CBR could not be performed for disease-specific rehabilitation using the current rehabilitation plan. Although the study targeted patients requiring long-term care within 3 months of completing disease-specific rehabilitation, some patients also require long-term care when they start rehabilitation under LTCI. Therefore, the total amount of CBR that can be performed based on the rehabilitation plan may be smaller than that reported in this study.

Convalescent rehabilitation within the same medical corporation improved physical function and ADL among post-operative patients with heart disease<sup>[22]</sup>. However, under the Japanese system, long-term care services cannot be provided to all long-term care recipients within the same corporation. Therefore, in addition to standardizing the format of the rehabilitation plan, an information-sharing system should be built for cooperation within the same corporation. A database for long-term care information (LIFE: Long-term care Information system For

Evidence) was developed in Japan<sup>[23]</sup>, and the management of rehabilitation plans using this database is being promoted<sup>[24]</sup>.

Regarding the degree of agreement between the rehabilitation evaluation of the two insurance types, all  $\kappa$  coefficients, except the disease-specific evaluation, were 0.6 or less. A previous study indicated that physiotherapists working in home care settings were more likely to use any outcome measures than those who were working in the acute care settings<sup>[25]</sup>. Conversely, in Germany, more physiotherapists use device-based evaluations when providing physiotherapy treatment to inpatients<sup>[26]</sup>. The evaluation implementation rate varied depending on the insurance system and implementation time in each country. In Japan, there has been survey performed on rehabilitation evaluation covered by medical insurance and subsequently LTCI, so this study can act as an index for the evaluation content of rehabilitation in Japan.

In the ADL evaluation items, the implementation rate for medical insurance and LTCI is low for both Functional Independence Measure (FIM) and the Barthel Index, confirming that consistent evaluation was not implemented. In the 2016 revision of medical fees in Japan, the rehabilitation performance index based on FIM was evaluated in the convalescent rehabilitation period; therefore, the FIM implementation rate under medical insurance is higher than that under LTCI. In contrast, the Barthel Index, which is often used in the LTCI field, including rehabilitation, correlates with the degree of support/need under LTCI<sup>[27]</sup>. The use of home-visit care maintains the Barthel Index for frail older individuals<sup>[28]</sup>, and the implementation rate of this index is higher than that of FIM under LTCI.

The ADL and instrumental ADL evaluations in care recipients depend on the number of chronic illnesses and the risk of ADL and instrumental ADL disorders increase with two or more chronic illnesses<sup>[29]</sup>, thus, rehabilitation under LTCI may require a whole-body evaluation. Among the care recipients in this study, 65% presented concomitant diseases other than the one requiring long-term care. However, the evaluation implementation rate of measures other than the Barthel Index, muscle strength, range of motion, and pain was less than 50%, suggesting that sufficient evaluation was not performed in older people with multiple diseases. Furthermore, the implementation of aerobic exercise in LTCI, expected to be effective against multiple diseases<sup>[30]</sup>, was only 11% (walking/running machine) and 30% (rowing/treadmill), and it is possible that effective CBR for older patients has not been performed sufficiently.

A limitation of this study is that the questionnaire was unevenly distributed nationwide and centered on facilities related to the authors; thus, our results may not be generalizable to all of Japan. Validity has not been evaluated other than the number of responses. We did not consider the content validity of the questionnaires<sup>[31]</sup> for the Japanese population. In addition, as this was a cross-sectional study, it is uncertain whether consistent rehabilitation treatment can be implemented from medical insurance to LTCI by enhancing rehabilitation plans. In addition, although the questionnaire was distributed to rehabilitation professionals, the type of job and years of experience were not queried, and the results of rehabilitation evaluation may differ depending on the years of experience. In the supply and demand survey of rehabilitation professionals in Japan, all physiotherapists, occupational therapists, and speech therapists who worked in LTCI facilities are in their 20s, so younger than those covered by medical insurance field<sup>[32]</sup>. In addition, the recommended ratio

of home-visit and outpatient facility rehabilitation was slightly different from rehabilitation receivers in the government's long-term care service protocol announced by the Ministry of Health, Labour and Welfare in Japan<sup>[5]</sup>. Furthermore, 67% of the referrals were from the same corporation or related medical institutions, and many establishments were able to conduct consistent rehabilitation from disease-specific to CBR. We did not conduct an analysis to clarify significant differences between medical insurance and LTCI. Therefore, a limitation of this study was that we did not perform a power analysis. We interviewed care recipients and staff and did not directly acquire information on treatment details and evaluation items from facilities that perform disease-specific rehabilitation. Furthermore, self-management exercises can prevent the requirement for long-term care from occurring<sup>[33]</sup>, therefore, self-care may also contribute to the development of LTCI rehabilitation treatment by the therapists targeted in this study. Thus, the cognitive bias of participants may have a strong influence on the results. Finally, we did not fully investigate dementia, with 2% of patients reporting treatment for dementia. Day-care users with risk factors such as diabetes, hypertension, and obesity could have reduced risk of exacerbation of dementia for 1 year compared with that of home caregivers<sup>[34]</sup>. Thus, dementia in the consistent implementation of LTCI rehabilitation is a topic of interest for future studies. Last, this research was a survey on rehabilitation within LTCI specific to Japan, and those results cannot be generalized to CBR in all countries.

The major findings of this study were as follows: (i) the implementation rate of the rehabilitation plan was low and was affected by referrals from the same medical corporation and related medical institutions, (ii) a low degree of agreement existed in the evaluation and treatment content between medical insurance and LTCI, and (iii) consistency in rehabilitation from disease-specific rehabilitation to CBR could not be implemented. The reasons for the lack of consistency may be attributed to the lack of unified evaluation and treatment in both the insurance programs. Thus, unified information sharing is requiring in Japan to improve the quality of long-term care by introducing evidence into the long-term care field<sup>[23]</sup>. The Japanese Ministry aims to standardize the contents of the rehabilitation plan and implement consistent rehabilitation treatment regardless of the type of insurance provided. Other clinical implications from this study include the recommendation for objective indicators regarding the condition and rehabilitation treatment effect of the care recipient. This study, which clarified the actual condition of evaluation and treatment content of CBR in Japan, will help guide the development policies to promote long-term care based on objective results.

### Provenance and peer review

Not commissioned, externally peer reviewed.

### Ethical approval

This study was approved by the Research Ethics Committee of Wakayama Medical University and was performed according to the Declaration of Helsinki (Approval number: 2938). Patients provided informed consent for study participation by answering and returning the written questionnaire. All study methods were

performed in accordance with the relevant guidelines and regulations.

### Sources of funding

This work was supported by the Ministry of Health, Labour and Welfare, Health Labour Sciences Research Grant (20GA1001).

### Authors' contribution

M.A. was a major contributor in writing the manuscript. Yukio M., Y.N., T.S., H.S., T.K., K.K., H.O., H.U., R.K., Yasuo M., F.T., and T.K. were involved in the study design and data interpretation. Yukio M., Y.N., H.S., T.K., K.K., T.O., H.O., H.U., and Yasuo M. collected the data. M.A., Yukio M., T.S., and H.S. were involved in the data analysis.

### Conflicts of interest disclosure

Y.N. received the Ministry of Health, Labour and Welfare, Health Labour Sciences Research Grant (20GA1002). The remaining authors declare that they have no financial conflict of interest with regard to the content of this report.

### Research registration unique identifying number (UIN)

researchregistry8373.

### Guarantor

Yukio Mikami.

### Acknowledgements

The authors thank the members of Rehabilitation Medicine, Wakayama Medical University, for distributing and collecting questionnaires.

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