Original Article

Sarcopenia and cachexia evaluation in different healthcare settings: a questionnaire survey of health professionals

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Background and Objectives: The rates of sarcopenia and cachexia evaluations by different occupational groups at different settings are unclear. The objectives are to evaluate and compare the relative use of sarcopenia and cachexia evaluations among dietitians and associated healthcare professionals in a diverse range of settings. **Methods and Study Design:** Participants were 4,621 members from the Japanese Association of Rehabilitation Nutrition. Settings included acute general wards, convalescent rehabilitation wards, long-term care wards, homecare service, and other settings. A questionnaire-based cross-sectional study was performed to evaluate assessments for sarcopenia and cachexia among dietitians and other professionals. Multiple comparisons based on Bonferroni method and logistic regression analysis were used. **Results:** 718 (15.5%) answered the questionnaire. Data from 683 valid questionnaires were analyzed. Muscle strength, muscle mass, physical function, and cachexia were assessed by 53.4%, 51.1%, 53.4%, and 17.4% of dietitians. At convalescent rehabilitation wards, these rates were 81.8%, 62.0%, 82.5%, and 14.0%. The use of muscle strength and physical function evaluations was significantly lower among dietitians than among physical therapists and occupational therapists. The use of muscle mass and cachexia evaluations was not significantly different among the occupations. The use of muscle mass and strength evaluations was significantly higher in convalescent rehabilitation wards than in acute general wards, long-term care wards and facilities, and other settings, but not in homecare services. Cachexia evaluations were not significantly different between all settings. **Conclusions:** Raising the awareness of cachexia and sarcopenia among dietitians is a key issue, which should be addressed.

Key Words: rehabilitation nutrition, sarcopenia, cachexia, assessment, malnutrition

INTRODUCTION

Malnutrition in older people is common in all settings, including hospitals, rehabilitation wards, nursing homes, and in the community; it is associated with various adverse outcomes.[1] Indeed, a recent study by Cereda et al found that the prevalence of malnutrition in older individuals was 32.5% in rehabilitation/sub-acute care, 30.0% in long-term care, 22.3% in hospital, and 9.9% in homecare services.[2]

Patients with malnutrition show higher mortality rates, longer length of hospital stay, and higher usage of healthcare service in acute care hospitals according to a study by Marshall et al.[3] Furthermore, malnutrition inhibited improving physical function and subsequent return to home.[4] Therefore, for preventive healthcare reasons, nutritional screening and assessment should occur earlier in all settings.

Patients with malnutrition usually experience loss of lean body mass (including skeletal muscle mass) due to protein-energy deficit and inflammation.[5] Thus, malnutrition is closely related with sarcopenia, which is characterized by the progressive and generalized loss of skeletal muscle mass and strength.[6]

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Manuscript received 28 August 2016. Initial review completed 27 September 2016. Revision accepted 12 October 2016.
doi: 10.6133/apjcn.032017.15

According to the concept of nutritional disorder constructed by the European Society for Clinical Nutrition and Metabolism (ESPEN), sarcopenia and cachexia are components of malnutrition.[7] Furthermore, malnutrition is closely connected to chronic illness[5] and cachexia. Therefore, dietitians should recognize the importance of malnutrition, sarcopenia, and cachexia assessments and undertake them routinely in their clinical practice.

Muscle mass and fat mass as well as muscle strength are selected as key indicators of nutritional status according to the recent consensus statement from the Academy of Nutrition and Dietetics/the American Society for Parenteral and Enteral Nutrition[5] who proposed suitable methodology for assessing these components.[8] In fact, many dietitians are familiar with the evaluation of a muscle mass and fat mass through their clinical practice. For instance, dietitians often measure arm muscle circumference, triceps skinfold, and calf circumference or implement bio-impedance analysis; these are all simple, non-invasive body composition assessment methods. Indeed, dietitians often are at least as involved in muscle mass, fat mass, and muscle strength assessments as rehabilitation therapists who routinely assess patients for muscle mass and muscle strength to evaluate physical function.

However, a few reports are available that investigated dietitians' evaluations of nutritional status, including sarcopenia and cachexia. The accuracy of Australian dietitians' diagnoses for starvation, sarcopenia, and cachexia were 6%, 46%, and 21%, respectively according to a study by Yaxley and Miller.[9] On the other hand, 58.0%, 43.1%, and 74.0% of dietitians from four European countries correctly answered these conditions, respectively.[10] However, no studies have compared dietitians and other healthcare professionals with regards to their relative accuracies in assessing malnutrition, sarcopenia, and cachexia. Additionally, differences in the prevalence of these conditions among diverse settings had not been reported apart from the prevalence of sarcopenia in rehabilitation settings being higher than other settings.[11]

In this study, we conducted a questionnaire-based cross-sectional study to evaluate assessments for sarcopenia and cachexia among dietitians and other professionals. In addition we compared the relative prevalence of malnutrition, sarcopenia, and cachexia between diverse settings.

METHODS

Participants

All participants were affiliated with the Japanese Association of Rehabilitation Nutrition. The Japanese Association of Rehabilitation Nutrition was established in 2011. In November 2015, there were 4,621 members comprising 1,354 physical therapists, 958 registered dietitians, 723 speech therapists, 362 nurses, 319 occupational therapists, 315 medical doctors, 182 dentists, 159 dental hygienists, 100 pharmacists, and 149 others.

All members were recruited via Facebook because they all belong to the Facebook group managed by the Japanese Association of Rehabilitation Nutrition. The inclusion criterion were those members who provided consent to answer the questionnaire. The exclusion criteria were members with data that possibly had missing values as well as members who provided answers that were duplicated elsewhere in the questionnaire.

Ethical considerations

Written informed consents were obtained from all study participants. For the protection of personal information in completed questionnaires, full confidentiality was given to respondents' data. The present study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of Suzuka General Hospital (approval number 142).

Study period and methods

The questionnaire was administered to the respondents for 2 weeks (from 8 November to 22 November 2015). The purpose and contents of the questionnaire survey were published on the Facebook group webpage of the Japanese Association of Rehabilitation Nutrition, and respondents were subsequently asked to complete the questionnaire. The questionnaire survey was conducted online using an Internet form. To verify the validity of questions and readability of the research contents, usability testing was conducted via pre-tests. The questions were related to participants' occupations; affiliations (workplace settings); years of work experience; and evaluations of muscle strength, muscle mass, fat mass, physical function, activities of daily living, and cachexia.

Occupations and affiliations

Occupations included registered dietitian, physical therapist, occupational therapist, speech-language hearing therapist, nurse, medical doctor, dental hygienist, dentist, pharmacist, and others.

Affiliations (workplace settings) included convalescent rehabilitation ward, acute general ward, long-term care wards and facility, homecare service, and others.

A convalescent rehabilitation ward is unique because it provides comprehensive rehabilitation for post-acute patients and is covered by national health insurance in Japan.[12] Subacute patients with stroke, musculoskeletal disorders (such as proximal femoral fracture and spinal fracture), and hospital-associated deconditioning can be admitted to the convalescent rehabilitation wards for 60–180 days depending on their diseases. Patients in the convalescent rehabilitation ward can receive intensive rehabilitation from therapists for up to 3 h/day.[12]

Data analysis

The required sample size for this population receiving two-choice questions (population rate is 50%, error 5%, 99% reliability) was calculated at 664 persons.

Statistical analyses were performed using EZR13 v1.31 software, which was developed based on the open-source statistical software named R.[14] Parametric data were reported as the mean ± standard deviation (SD), whereas nonparametric data were expressed as the median and 25–75 percentiles. Chi-square test, Fisher's exact test, and multiple comparisons were used to analyze the differences in evaluations of muscle mass, fat mass, muscle strength, physical function, activities of daily living, and cachexia according to participants' occupations and affiliations. In the univariate analysis, p values of <0.001 for

occupations and <0.005 for affiliations were considered statistically significant based on the Bonferroni method.

Logistic regression analysis was used to examine whether registered dietitians and convalescent rehabilitation wards were independently associated with evaluating muscle mass, fat mass, muscle strength, physical function, activities of daily living, and cachexia following adjustment for settings' years of work experience among their staff. In the logistic regression analysis, p values of <0.05 were considered statistically significant.

RESULTS

Overall, 718 (15.5% of the Facebook group) people answered the questionnaire; questionnaires from 35 people were eliminated because of missing values and duplicated answers. Consequently, 683 questionnaires were analyzed (95.1% participation rate).

Table 1 shows the occupations, affiliations (workplace settings), years of work experience of the valid respondents, and assessment of muscle mass, fat mass, muscle strength, physical function, activities of living, and cachexia. Most respondents were physical therapists, registered dietitians, or speech-language hearing therapists. Years of work experience were shorter for staff in physical therapist and convalescent rehabilitation wards.

Table 2 shows which nutritional-related factors were assessed according to different occupations and affiliations, with univariate analyses of registered dietitians versus the convalescent rehabilitation ward setting. Activities of daily living (578, 84.6%) was the most widely used assessment among the occupations, and cachexia (118, 17.3%) was the least assessed. Overall, 284 (41.6%) respondents measured all items necessary for sarcopenia diagnosis, including muscle mass, muscle strength, and physical function. The use of muscle strength and physical function evaluations was significantly lower among registered dietitians than among physical therapists and occupational therapists. Registered dietitians assessed activities of daily living at a lower rate than physical therapists and speech-language hearing therapists. The use of evaluations of muscle mass, fat mass, and cachexia was not significantly different among all occupations. The use of physical functions and activities of daily living evaluations were at a significantly higher rate in convalescent rehabilitation wards than in the other four settings. In contrast, the use of cachexia evaluations was not significantly different between all affiliations.

Table 3 shows the results of the logistic regression analysis. The use of muscle strength, physical function, and activities of daily living evaluations was significantly lower among registered dietitians than among physical therapists and occupational therapists. Registered dietitians assessed fat mass more than speech-language hearing therapists, dental hygienists, and dentists. However, the use of muscle mass and cachexia evaluations was not significantly different between all occupations. The use of physical function and activities of daily living evaluations was significantly higher in convalescent rehabilitation wards than in the other four settings. The use of muscle mass and muscle strength evaluations was significantly higher in convalescent rehabilitation wards than in acute general wards, long-term care wards and facilities, and other settings, but not at homecare services. In contrast, of the use of cachexia evaluations was not significantly different between all settings.

DISCUSSION

We investigated the rates of using sarcopenia and cachexia evaluations in different workplace settings, and three important results were derived in this study. First, muscle mass and cachexia evaluations were not significantly different between registered dietitians and other occupations. Second, the rate of using sarcopenia evaluations was significantly higher in convalescent rehabilitation wards than in other workplace settings; however, the rates of using cachexia evaluations were not significantly different among all settings. Third, of the rates of using muscle strength, physical function, and activities of daily living evaluations were significantly lower among registered dietitians than among physical therapists and occupational therapists.

The use of muscle mass and cachexia evaluations was not significantly different between registered dietitians and other occupations, thus suggesting that the use of sarcopenia and cachexia evaluations among registered dietitians is not significantly higher than other occupations. The proportion of dietitians who recognized (and evaluated) sarcopenia was 46%–74%.[9,10] Rehabilitation nutrition is implemented using the International Classification of Functioning, Disability and Health to evaluate the nutrition status and to maximize functionality in people with disability.[1] The evaluation of cachexia and sarcopenia is indispensable in maximizing functionality in people with disability because rehabilitation nutrition depends on the presence and etiology of sarcopenia and cachexia.[1] Therefore, raising the awareness of cachexia and sarcopenia among registered dietitians is a key issue in clinical nutrition and should be improved.

The rates of using sarcopenia evaluations were higher in convalescent rehabilitation wards. This result seems reasonable because muscle strength and activities of daily living are routinely measured in convalescent rehabilitation wards. In the present study, the rate of participants implementing sarcopenia evaluations was 41.6%. Sarcopenia evaluation in the convalescent rehabilitation wards is quite an important issue because approximately 50% of older people in the subacute and rehabilitation ward had sarcopenia.[11] If sarcopenia is detected early in convalescent rehabilitation wards, sarcopenia may be improved further via rehabilitation nutrition. Moreover, the use of cachexia evaluations was lower than sarcopenia evaluations in all settings. Indeed, the results indicate that recognition and evaluation of cachexia is insufficient among the healthcare professionals in Japan, despite the considerable clinical impact[15]; this issue should be remedied.

The rates of using muscle strength, physical function, and activities of daily living evaluations were significantly lower among registered dietitians than among physical therapists and occupational therapists. These results seem to be predictable because almost all physical therapists and occupational therapists assess muscle strength, physical function, and activities of daily living as a routine. In other words, registered dietitians involved in rehabilita-

Table 1. Questionnaire and sample characteristics

Characteristics	Number, (%)	Years of work experience median (25–75 percentile)
1. What is your occupation?		
Total	683 (100.0)	11 (7–19)
Dietitian	178 (26.1)	12.5 (7–19)
Physiotherapist	191 (28.0)	6 (6–14)
Occupational therapist	40 (5.9)	8.5 (6–11.3)
Speech-language hearing therapist	107 (15.7)	9 (6.5–13)
Nurse	53 (7.8)	17 (11–23)
Medical doctor	41 (6.0)	20 (14–26)
Dental hygienist	29 (4.2)	25 (16–29)
Dentist	20 (2.9)	12.5 (11–22.3)
Pharmacist	14 (2.0)	19 (13–22.8)
Others	8 (1.1)	13 (9.3–17)
2. What is your affiliation?		
Covalescent rehabilitation wards	171 (25.0)	10 (5–15)
Acute general wards	298 (43.6)	11 (7–18)
Long-term care wards and facilities	102 (14.9)	13 (8–20)
Homecare service	53 (7.8)	15 (8.5–25)
Others	59 (8.6)	15 (10–21)
3. Do you have to measure and evaluate the muscle mass?		
No	331 (48.5)	
Yes	352 (51.5)	
Please answer only those who answer “Yes”. How do you measure?		
Bioelectrical impedence analysis	65 (18.5)	
Computed tomography	3 (0.9)	
Dual energy x-ray absorptiometry	17 (4.8)	
Ultrasonic echo	8 (2.2)	
Measuring tape	280 (79.5)	
Other	4.4 (1.1)	
4. Do you measure and evaluate the amount of fat mass?		
No	469.5 (68.7)	
Yes	214 (31.3)	
Please answer only those who “Yes”. How do you measure?		
Bioelectrical impedence analysis	58 (27.1)	
Computed tomography	2 (0.9)	
Dual energy x-ray absorptiometry	9 (0.4)	
Ultrasonic echo	2 (0.1)	
Caliper/ adipometer	143 (66.8)	
Other	3 (1.4)	
5. Do you have to measure and evaluate muscle strength?		
No	211 (30.9)	
Yes	472 (69.1)	
Please answer only those who “Yes”. How do you measure?		
Hand grip	401 (85.0)	
Manual muscle testing	333 (70.6)	
Other	41 (8.7)	
6. Do you have to measure and evaluate physical function?		
No	219 (32.1)	
Yes	464 (67.9)	
Please answer only those who “Yes”. How do you measure?		
Walking speed	365 (78.7)	
Short physical performance battery	34 (7.3)	
Other	36 (7.8)	
7. Do you have to measure and evaluate the activities of daily living?		
No	105 (15.4)	
Yes	578 (84.6)	
Please answer only those who “Yes”. How do you measure?		
Barthel index	270 (35.8)	
Functional independence measure	412 (71.3)	
Other	7 (1.2)	
8. Do you have to diagnose cachexia?		
No	565 (82.7)	
Yes	118 (17.3)	
Please answer only those who “Yes”. How do you measure?		
European Palliative Care Research Collaborative guidelines	59 (50.0)	
Definition of the Washington Conference	45 (38.1)	
Other	4 (3.4)	

Table 2. Sarcopenia and cachexia evaluations according to occupation and workplace settings

Characteristics	Implementation	Muscle strength	Muscle mass	Fat mass	Physical function	ADL	Cachexia
Occupations							
Total	Yes, n (%)	472 (69.1)	352 (51.5)	214 (31.3)	464 (67.9)	578 (84.6)	118 (17.3)
	No, n (%)	211 (30.9)	331 (48.5)	469 (68.7)	219 (32.1)	105 (15.4)	565 (82.7)
Multiple comparisons		<0.001†**	0.078†	0.027†	<0.001†**	<0.001†**	0.136†
Dietitian	Yes, n (%)	95 (53.4)	91 (51.1)	68 (38.2)	95 (53.4)	133 (74.7)	31 (17.4)
	No, n (%)	83 (46.6)	87 (48.9)	110 (61.8)	83 (46.6)	45 (25.3)	147 (82.6)
Physical therapist	Yes, n (%)	183 (95.8)	114 (59.7)	65 (34.0)	181 (94.8)	190 (99.5)	37 (19.4)
	No, n (%)	8 (4.2)	77 (40.3)	126 (66.0)	10 (5.2)	1 (0.5)	154 (80.6)
	vs dietitian	<0.001†**	0.121†	0.468†	<0.001†**	<0.001†**	0.726†
Occupational therapist	Yes, n (%)	35 (87.5)	25 (62.5)	9 (22.5)	35 (87.5)	39 (97.5)	6 (15.0)
	No, n (%)	5 (12.5)	15 (37.5)	31 (77.5)	5 (12.5)	1 (2.5)	34 (85.0)
	vs dietitian	<0.001†**	0.260†	0.090†	<0.001†**	0.003†	0.893†
Speech-language hearing therapists	Yes, n (%)	72 (67.3)	46 (43.0)	25 (23.4)	71 (66.4)	100 (93.5)	11 (10.3)
	No, n (%)	35 (32.7)	61 (57.0)	82 (76.6)	36 (33.6)	7 (6.5)	96 (89.7)
	vs dietitian	0.029†	0.227†	0.014†	0.043†	<0.001†**	0.141†
Nurse	Yes, n (%)	26 (49.1)	24 (45.3)	17 (32.1)	25 (47.2)	40 (75.5)	9 (17.0)
	No, n (%)	27 (50.1)	29 (54.7)	36 (67.9)	28 (52.8)	13 (24.5)	44 (83.2)
	vs dietitian	0.694†	0.555†	0.516†	0.524†	1.000†	1.000†
Medical doctor	Yes, n (%)	33 (80.5)	21 (51.2)	15 (36.6)	27 (65.9)	36 (87.8)	13 (31.7)
	No, n (%)	8 (19.5)	20 (48.8)	26 (63.4)	14 (34.1)	5 (12.2)	28 (68.3)
	vs dietitian	0.002†	1.000†	0.989†	0.202†	0.111†	0.065†
Dental hygienist	Yes, n (%)	10 (34.5)	10 (34.5)	5 (17.2)	11 (37.9)	16 (55.2)	3 (10.3)
	No, n (%)	19 (65.5)	19 (65.5)	24 (82.8)	18 (62.1)	13 (44.8)	26 (89.7)
	vs dietitian	0.092†	0.167†	0.048†	0.180†	0.051†	0.428‡
Dentist	Yes, n (%)	6 (27.3)	10 (45.5)	2 (9.1)	8 (36.4)	12 (54.6)	4 (18.2)
	No, n (%)	16 (72.7)	12 (54.5)	20 (90.9)	14 (63.6)	10 (45.4)	8 (81.2)
	vs dietitian	0.037	0.783†	0.014†	0.201†	0.081†	0.239‡
Pharmacist	Yes, n (%)	6 (42.8)	6 (42.8)	4 (28.6)	6 (42.8)	5 (35.7)	3 (21.4)
	No, n (%)	8 (57.2)	8 (57.2)	10 (71.4)	8 (57.2)	9 (64.3)	11 (78.6)
	vs dietitian	0.631†	0.750†	0.667†	0.631†	0.004‡	0.717‡
Other	Yes, n (%)	6 (75.0)	5 (62.5)	4 (50.0)	5 (62.5)	7 (87.5)	1 (12.5)
	No, n (%)	2 (25.0)	3 (37.5)	4 (50.0)	3 (37.5)	1 (12.5)	7 (87.5)
	vs dietitian	0.293‡	0.722‡	0.713‡	0.727‡	0.682‡	1.000‡

ADL: activities of daily living.
†Chi-square test.
‡Fisher's exact test.
**p <0.001; *p <0.005.

Table 2. Sarcopenia and cachexia evaluations according to occupation and workplace settings (cont.)

Characteristics	Implementation	Muscle strength	Muscle mass	Fat mass	Physical function	ADL	Cachexia
Place of employment							
Multiple comparisons		<0.001†**	<0.001†**	0.059†	<0.001†**	<0.001†**	0.233†
Convalescent rehabilitation wards	Yes, n (%)	140 (81.8)	106 (62.0)	63 (36.8)	141 (82.5)	166 (97.1)	24 (14.0)
	No, n (%)	31 (18.2)	65 (38.0)	108 (63.2)	30 (17.5)	5 (2.9)	147 (86.0)
Acute general wards	Yes, n (%)	209 (70.1)	145 (48.7)	99 (33.2)	205 (68.8)	261 (87.6)	62 (20.8)
	No, n (%)	89 (29.9)	153 (51.3)	199 (66.8)	93 (31.2)	37 (12.4)	236 (79.2)
	vs convalescent rehabilitation wards	0.007†	0.007†	0.488†	0.002†*	0.001†*	0.089†
Long-term care wards and facilities	Yes, n (%)	56 (54.9)	43 (42.2)	21 (20.6)	59 (57.8)	81 (79.4)	13 (12.8)
	No, n (%)	46 (45.1)	59 (57.8)	81 (79.4)	43 (42.2)	21 (20.6)	89 (87.2)
	vs convalescent rehabilitation wards	<0.001†**	0.002†*	0.007†	<0.001†**	<0.001†**	0.906†
Home care service	Yes, n (%)	39 (73.6)	35 (66.0)	15 (28.3)	31 (58.5)	40 (75.5)	10 (18.8)
	No, n (%)	14 (26.4)	18 (34.0)	38 (71.7)	22 (41.5)	13 (24.5)	43 (81.2)
	vs convalescent rehabilitation wards	0.263†	0.711†	0.329†	0.001†*	<0.001‡**	0.524†
Other settings	Yes, n (%)	28 (47.5)	23 (38.9)	16 (27.1)	28 (47.5)	30 (50.9)	9 (15.2)
	No, n (%)	31 (52.5)	36 (61.1)	43 (72.9)	31 (52.5)	29 (49.1)	50 (84.8)
	vs convalescent rehabilitation wards	<0.001†**	0.004†*	0.231†	<0.001†**	<0.001†**	0.988†

ADL: activities of daily living.
†Chi-square test.
‡Fisher's exact test.
** p <0.001; * p <0.005.

Table 3. Logistic regression analysis for the evaluation of sarcopenia and cachexia

Factor	Muscle strength		Muscle mass		Fat mass		Physical function		ADL		Cachexia	
	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p*-value	OR (95% CI)	*p* value
Physical therapist	19.7 (9.08–42.9)	<0.001**	1.32 (0.87–2.02)	0.200	0.84 (0.54–1.30)	0.440	17.1 (8.34–35.0)	<0.001**	80.2 (10.7–602)	<0.001**	1.10 (0.64–1.89)	0.720
Occupational therapist	6.45 (2.38–17.5)	<0.001**	1.57 (0.77–3.23)	0.220	0.51 (0.23–1.15)	0.100	7.07 (2.59–19.3)	<0.001**	18.8 (2.41–147)	0.005*	0.83 (0.32–2.18)	0.710
Speech-language hearing therapist	1.57 (0.93–2.64)	0.089	0.64 (0.39–1.05)	0.075	0.49 (0.28–0.85)	0.011	1.56 (0.93–2.62)	0.095	4.61 (1.90–11.2)	0.001*	0.54 (0.26–1.13)	0.100
Nurse	0.76 (0.40–1.44)	0.400	0.72 (0.38–1.36)	0.310	0.61 (0.31–1.19)	0.150	0.74 (0.39–1.42)	0.360	0.88 (0.41–1.92)	0.750	0.84 (0.37-1.94)	0.690
Medical doctor	3.66 (1.56–8.59)	0.003*	0.97 (0.48–1.97)	0.940	0.72 (0.34–1.49)	0.370	1.76 (0.84–3.70)	0.140	2.46 (0.86–7.06)	0.09	1.90 (0.86–4.16)	0.110
Dental hygienist	0.60 (0.25–1.45)	0.260	0.57 (0.24–1.35)	0.200	0.30 (0.10–0.87)	0.026	0.78 (0.33–1.84)	0.570	0.73 (0.29–1.84)	0.510	0.55 (0.15–2.00)	0.360
Dentist	0.43 (0.15–1.21)	0.110	0.86 (0.34–2.22)	0.760	0.17 (0.04–0.76)	0.021	0.87 (0.33–2.28)	0.770	0.25 (0.07–0.91)	0.890	1.08 (0.33–3.59)	0.900
Pharmacist	0.85 (0.27–2.66)	0.780	0.87 (0.28–2.68)	0.810	0.55 (0.16–1.87)	0.340	0.86 (0.28–2.71)	0.800	0.25 (0.07–0.91)	0.035	1.15 (0.29–4.48)	0.840
Other occupations	2.62 (0.50–13.8)	0.260	1.45 (0.33–6.43)	0.630	1.52 (0.36–6.46)	0.570	1.86 (0.41–8.40)	0.420	4.18 (0.45–39.2)	0.210	0.59 (0.07–5.05)	0.630
Acute general wards	0.45 (0.27–0.74)	0.002*	0.56 (0.38–0.83)	0.004*	0.80 (0.53–1.19)	0.260	0.41 (0.25–0.67)	<0.001**	0.20 (0.07–0.53)	0.001*	1.52 (0.90–2.56)	0.120
Long-term care wards and facilities	0.31 (0.17–0.58)	<0.001*	0.45 (0.27–0.75)	0.003*	0.42 (0.23–0.77)	0.005	0.32 (0.17–0.60)	<0.001**	0.14 (0.05–0.42)	<0.001**	0.85 (0.40–1.79)	0.670
Homecare service	0.66 (0.28–1.54)	0.330	1.18 (0.60–2.31)	0.640	0.66 (0.32–1.35)	0.250	0.23 (0.10–0.50)	<0.001**	0.06 (0.02–0.22)	<0.001**	1.32 (0.56–3.08)	0.520
Other settings	0.25 (0.12–0.54)	<0.001**	0.40 (0.21–0.76)	0.005*	0.67 (0.33–1.35)	0.270	0.21 (0.10–0.45)	<0.001**	0.06 (0.02–0.22)	<0.001**	1.03 (0.43–2.48)	0.950
Years of work experience	1.00 (0.97–1.02)	0.880	1.00 (0.98–1.02)	0.950	1.03 (1.01–1.06)	0.004*	1.00 (0.98–1.02)	0.970	1.01 (0.98–1.04)	0.500	1.01 (0.99–1.04)	0.350

ADL: activities of daily living; OR: odds ratio; CI: confidence interval.
** $p<0.001$; * $p<0.005$.

tion and treating people with disability should assess muscle strength, physical function, and activities of daily living routinely because these are important factors and outcomes in rehabilitation nutrition.[1]

A rehabilitation nutrition support team (RNST) is a medical practice team for rehabilitation nutrition, comprising such as doctors, registered dietitians, physical therapists, speech therapists, and nurses. Doctors are recognized as the leaders of RNSTs. The responsibilities of registered dietitians in RNSTs are rehabilitation nutrition screening, assessment, management, monitoring, and prognosis prediction regarding nutrition status. The responsibilities of physical therapists are rehabilitation assessment (using the International Classification of Functioning, Disability and Health), prognosis prediction regarding rehabilitation outcome, planning, implementation, and monitoring of the rehabilitation training. The responsibilities of speech therapists are dysphagia screening, assessment, management, monitoring, and prognosis prediction regarding the swallowing function. The responsibilities of nurses are rehabilitation nutrition screening, assessment, management, and monitoring in the hospital ward. However, RNSTs are interdisciplinary or transdisciplinary teams, and may involve the health care workers in tasks somewhat beyond their designated responsibilities.[16] The medical insurance system in Japan assigns incentives to promote nutrition support teams, including RNSTs. The medical fee for a nutrition support team is 2,000 per one malnourished inpatient per week, as long as several conditions are satisfied.

This study has some limitations. First, there was a possibility that some of the respondents may be employed at more than one facility covered in the survey. Second, the participants were only members of the Japanese Association of Rehabilitation Nutrition; hence, external validity is limited. In the future, we should investigate the evaluation of sarcopenia and cachexia as well as rehabilitation nutrition practices by various health professions in several countries.

Conclusion

The use of sarcopenia evaluations was significantly higher in convalescent rehabilitation wards than in other workplace settings. The use of cachexia evaluations was not significantly different between all occupations and settings. Moreover, the use of muscle strength, physical function, and activities of daily living evaluations was significantly lower among registered dietitians than among physical therapists and occupational therapists. Further studies are required to examine the effect of sarcopenia and cachexia evaluations and rehabilitation nutrition practices in the improvement in the function and quality of life of patients.

AUTHOR DISCLOSURES

All authors do not have any conflict of interest. All authors certify that no funding has been received for this study.

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