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Original Article

Feasibility of the International Classification of Functioning, Disability and Health Rehabilitation Set for inpatient rehabilitation: Selection and validity of a set of categories for inpatients in a convalescent rehabilitation ward

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ABSTRACT

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Objective: To evaluate the feasibility of the International Classification of Functioning, Disability and Health (ICF) Rehabilitation Set for inpatients in a convalescent (Kaifukuki) rehabilitation ward.

Methods: Overall, 295 inpatients in convalescent rehabilitation wards were rated using the ICF Rehabilitation Set, and the proportion of missing values was investigated. Categories with missing values <10% were selected, and internal construct validity of the total score of the selected categories was examined using Rasch analysis.

Results: Missing values were detected in 25 items, of which seven had missing values of ≥10%. No ceiling or floor effects were noted. Rasch analysis of 23 categories with missing values <10% showed a good fit to the model after applying testlet solution and item splitting, which supported the internal construct validity of the ICF Rehabilitation Set.

Conclusion: This identified the set of categories of the ICF Rehabilitation Set that could be used for evaluating rehabilitation inpatients. These categories had good internal construct validity based on Rasch analysis.

Key words: ICF, ICF Rehabilitation Set, Rasch analysis, convalescent rehabilitation

Introduction

The International Classification of Functioning, Disability and Health (ICF) was developed by the World Health Organization and provided a comprehensive framework for describing health-related functioning profiles. ICF classifies functioning based on a wide range of categories, including body functions, activities and participation, and environmental factors, which more broadly contextualize additional variables that affect a patient's functioning [1]. ICF has > 1,400 classification categories that describe each aspect of a patient's functioning. Furthermore, ICF provides a coding system to describe the extent of patients' problems within each category.

However, it is difficult to apply all the categories of this comprehensive classification directly for evaluation. Thus, studies aimed to develop ICF Core sets, which are a more focused collection of categories related to specific diseases and health conditions as determined by international clinical experts [2−7]. The ICF Generic Set comprising seven categories and the

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ICF Rehabilitation Set comprising 30 categories were recently introduced for evaluating functioning across various populations [8, 9]. The ICF Generic Set was developed based on a psychometric study in which regression analyses were performed using database data. The ICF Rehabilitation Set is an extended version of the ICF Generic Set and is more focused on the patient population receiving rehabilitation [8]. The ICF Rehabilitation Set was developed using both the regression analysis of the ICF database data and expert reviews of the existing ICF Core Sets [9].

The ICF Rehabilitation Set covers extended areas of human functioning, thereby enabling comprehensive assessment of a patient's functioning by assessing a broader range of patient variables compared with existing clinical scales for evaluating functioning [10, 11]. However, there are categories, including using transportation (ICF#: d470) and remunerative employment (ICF#: d850) are difficult to evaluate in hospitalized patients and thus possibly have missing values. Excessive categories with missing data make it difficult to describe the extent of a patients' problem using a single total score, which is a practical attribute of medical scales used in the clinic. Identifying common categories with complete data (i.e., no missing data) would be helpful in implementing ICF, and in using the ICF for statistics of rehabilitation.

For use in real-world clinical settings, the validity of the selected categories of the ICF Rehabilitation Set should be confirmed. In many cases, the external criteria are used for assessing criterion-related validity of a clinical scale. The activities and participation items of the ICF Rehabilitation Set have criterion-related validity compared with the Functional Independence Measure [12]. Conversely, internal construct validity is an important aspect of validity and is often conducted to support the validity of a scale [13, 14]. Internal construct validity refers to whether the scale has a theoretically correct structure for evaluating the concept of interest, and Rasch analysis is frequently performed to evaluate internal construct validity [15]. Rasch analysis is a probabilistic approach for estimating the difficulty of items and different levels of personal ability [16]. The validity of the internal construct is verified by assessing construct irrelevant variance and construct underrepresentation of scales [15, 17]. The existence of construct irrelevant variance indicates sub-dimensions irrelevant to the focal construct of the scale, which is evident by the poor item fit and existence of differential item functioning (DIF).

Construct underrepresentation indicates the imperfectness of tests for assessing all features of a construct [15], thereby possibly manifesting as gaps in the distribution of the item and person location.

To determine a commonly collectable dataset that can be used for comparison across different health conditions, this study aimed to assess the feasibility of the ICF Rehabilitation Set to evaluate functioning in subacute patients receiving inpatient rehabilitation. Moreover, Rasch analysis was performed to investigate internal construct validity of the acquired data set, which is evident by the absence of construct irrelevant variance or construct underrepresentation.

Methods

In this study, inpatients from convalescent rehabilitation wards were included. The convalescent rehabilitation ward, supported by the Japanese health insurance system, provides intensive rehabilitation during the subacute phase (up to 180 days after onset) of diseases and conditions such as stroke and spinal cord injury [18].

The ICF Rehabilitation Set, developed by Prodinger et al. [9], was used. The raters used the following ratings based on ICF qualifiers to evaluate each category of the ICF Rehabilitation Set. The qualifiers, i.e., the rating system for ICF categories, are described as follows: 0: no problem (0%−4%), 1: mild problem (5%−24%), 2: moderate problem (25%−49%), 3: severe problem (50%−95%), 4: complete problem (96%−100%), 8: not specified, and 9: not applicable [1]. Based on this rating system, a physiatrist, physical therapist, or occupational therapist in charge of the patient rated each category. To record the ICF ratings, we used the Japanese version of simple, intuitive descriptions and the rating reference guide previously developed as a clinical tool to support the use of ICF in clinics [19]. Because the ability of patients to walk indoors and outdoors significantly differed, only that of patients to walk indoors was evaluated.

1. Statistical analysis

To identify categories with missing values when evaluating inpatients, the proportion of missing values, rating 8 or 9, in each of the 30 categories of the ICF Rehabilitation Set was assessed. Because excessive missing values can bias results, categories with <10% of missing data were selected for inclusion in the study for validation [20].

After identifying the categories, the total score of the selected categories was calculated. The ceiling and floor effects were analyzed to measure the percentage of subjects with the best and worst possible score obtained, respectively. Ceiling or floor effects were assigned when >10% of the responses had the best or worst possible score, respectively.

2. Rasch analysis

Rasch analysis was performed to examine the internal construct validity of the ICF Rehabilitation Set. The overall fit of the data into the Rasch model was examined using χ^2 statistics. A non-significant χ^2 (>0.05) value was considered to indicate an overall good fit [21]. A testlet approach was employed to

accommodate a high local dependency of the items, which could cause a problem in the fit of the scale to the model [22]. The testlets were constructed by aggregating items with high residual correlations into super-items, wherein the same iterative process of scale adjustment as a single-item design was applied.

Principal component analysis (PCA) of the standardized Rasch residuals was performed to examine the unidimensionality of the scale [23]. Unidimensionality was assessed using *t*-tests that compared pairs of ability estimates from separate Rasch calibration of the two sets of items, either loading positively or negatively on the first component of PCA. To achieve strict unidimensionality, the proportion of significant *t*-tests had to be <5%. The lower bound of the binomial confidence interval for proportions <5% would then be acceptable.

The lack of DIF is an important assumption in scale evaluation using the Rasch model [24, 25]. The absence of DIF indicates that an individual can achieve comparable levels of ability regardless of group characteristics such as age and disease. In this study, DIF was investigated using an analysis of variance test for sex (male and female), age groups (<40, 40–60, 60–80, and ≥80 years), and disease groups (neurological, musculoskeletal, and others). DIF could be resolved by splitting an item showing DIF for certain groups into group-specific items. If DIF was observed in either of the group characteristics, the item was split to assess whether this solution would improve the item fit [26].

In this study, to examine whether there was a difference in the distribution of item difficulty and person ability estimate, we prepared a person-item threshold map using Rasch analysis. The upper half of the map was a histogram of the person ability estimate, whereas the lower half was a histogram of the item difficulty. The difference in the difficulty level of the scale and the ability of the measurement object can thus be assessed [27]. The distribution of item difficulty was revealed based on the threshold from the categories. The ICF Rehabilitation Set is structured so that each category is given a rating of 0–4. Therefore, there are four thresholds for each item to divide the ratings. In this study, the distribution of the difficulty of each item was represented by the distribution of the difficulty of those thresholds.

All analyses were performed using JMP 11 software (SAS Institute Inc., Cary, NC, USA) and RUMM2030 software (RUMM Laboratory, Perth, Australia).

Results

1. Patient characteristics

Overall, 295 inpatients from six convalescent rehabilitation wards were included. The age of the participants ranged from 17 to 101 years (median: 74 years); 177 patients were male, and the remainder were female. Results of assessing the patients' conditions were as follows: 91 patients had hemorrhagic stroke, 64 had ischemic stroke, 17 had subarachnoid hemorrhage, 27 had hip fracture, 23 had spinal cord injury, and 73 had other diseases such as various orthopedic and neurological diseases. The patient's days after onset ranged from 17 to 177 days (median: 74 days).

2. Missing values

The number of missing values and the score for each category are shown in Table 1. Missing values were found in 25 categories. The categories with >10% missing values were sexual function (ICF#: b640), using transportation (ICF#: d470), doing housework (ICF#: d640), assisting others (ICF#: d660), intimate relationships (ICF#: d770), remunerative employment (ICF#: d850), and recreation and leisure (ICF#: d920). Data of the remaining 23 categories were further analyzed. For the 23 categories, the total score was calculated, and their ceiling and floor effects were assessed. We found that no cases had the maximum total score value, whereas two cases had the minimum total score value. No ceiling or floor effects were observed.

3. Results of the Rasch analysis

Rasch analysis was performed using the total score of 23 selected categories (Table 2). The results of the initial Rasch analysis revealed that the data did not fit the assumptions of the Rasch model. The residual correlations indicated a robust local dependency among several items. For example, correlations were observed between categories related to mental functions or activities and between categories related to physical activities. Disease- and gender-related DIFs was observed in several categories (Table 3).

Given the strong local dependency among items, we attempted a testlet approach by grouping items into four groups. Body function categories were subdivided into two groups (Categories related to mental function [b130, b134, and b152] and physical function [b280, b455, b620, b710, and b730]), and activity and participation categories were subdivided into two groups (categories related to mental activity [d230, d240, and d710] and physical activity [d410, d415, d420, d450, d455, d465, d510, d520, d530, d540, d550, and d570]). Using this strategy, the fit of the model improved, which was supported by a non-significant χ^2 value (χ^2=12.18, p=0.73). The percentage of significant pairwise comparison of the principal components of the Rasch residuals was 5.3%, and the lower 95% CI was 2.7%.

However, DIF related to disease between patients with neurological diseases and those with other diseases was still observed. However, after item splitting of the physical function item groups, DIF was not observed, and the fit of the model improved (Table 2; χ^2=14.83, p=0.78). The findings of the initial Rasch

Table 1. Distribution of ratings and number of missing value

		0: No problem *n* (%)	1: Mild problem *n* (%)	2: Moderate problem *n* (%)	3: Severe problem *n* (%)	4: Complete problem *n* (%)	Missing value *n* (%)	Categories with less than 10% of missing value
b130	Energy and drive functions	118 (40.0)	70 (23.7)	50 (16.9)	34 (11.5)	18 (6.1)	5 (1.7)	✓
b134	Sleep functions	162 (54.9)	78 (26.4)	43 (14.6)	5 (1.7)	5 (1.7)	2 (0.7)	✓
b152	Emotional functions	147 (49.8)	73 (24.7)	41 (13.9)	18 (6.1)	13 (4.4)	3 (1.0)	✓
b280	Sensation of pain	119 (40.3)	103 (34.9)	50 (16.9)	14 (4.7)	2 (0.7)	7 (2.4)	✓
b455	Exercise tolerance functions	64 (21.7)	89 (30.2)	76 (25.8)	41 (13.9)	21 (7.1)	4 (1.4)	✓
b620	Urination functions	138 (46.8)	38 (12.9)	43 (14.6)	13 (7.8)	62 (21.0)	1 (0.3)	✓
b640	Sexual functions	138 (46.8)	9 (3.1)	1 (0.3)	6 (2.0)	16 (5.4)	125 (42.4)	
b710	Mobility of joint functions	86 (29.2)	98 (33.2)	81 (27.5)	22 (7.5)	8 (2.7)	0	✓
b730	Muscle power functions	29 (9.8)	86 (29.2)	109 (36.9)	59 (20.0)	11 (3.7)	1 (0.3)	✓
d230	Carrying out daily routine	77 (26.1)	50 (16.9)	58 (19.7)	53 (18.0)	54 (18.3)	3 (1.0)	✓
d240	Handling stress and other psychological demands	93 (31.5)	73 (24.7)	53 (18.0)	34 (11.5)	32 (10.8)	10 (3.4)	✓
d410	Changing basic body position	44 (14.9)	96 (32.5)	87 (29.5)	36 (12.2)	31 (10.5)	1 (0.3)	✓
d415	Maintaining a body position	72 (24.4)	114 (38.6)	63 (21.4)	19 (6.4)	27 (9.1)	0	✓
d420	Transferring oneself	80 (27.1)	116 (39.3)	54 (18.3)	16 (5.4)	28 (9.5)	1 (0.3)	✓
d450	Walking	37 (12.5)	90 (30.5)	65 (22.0)	34 (11.5)	63 (21.4)	6 (2.0)	✓
d455	Moving around	23 (7.8)	54 (18.3)	55 (18.6)	18 (6.1)	121 (41.0)	24 (8.1)	✓
d465	Moving around using equipment	99 (33.6)	62 (21.0)	39 (13.2)	19 (6.4)	61 (20.7)	15 (5.1)	✓
d470	Using transportation	8 (2.7)	22 (7.5)	9 (3.1)	9 (3.1)	125 (42.4)	122 (41.4)	
d510	Washing oneself	46 (15.6)	60 (20.3)	83 (28.1)	44 (14.9)	58 (19.7)	4 (1.4)	✓
d520	Caring for body parts	74 (25.1)	63 (21.4)	77 (26.1)	37 (12.5)	44 (14.9)	0	✓
d530	Toileting	91 (30.8)	48 (16.3)	49 (16.6)	48 (16.3)	59 (20.0)	0	✓
d540	Dressing	97 (32.9)	50 (16.9)	64 (21.7)	44 (14.9)	39 (13.2)	1 (0.3)	✓
d550	Eating	158 (53.6)	73 (24.7)	20 (6.8)	11 (3.7)	33 (11.2)	0	✓
d570	Looking after one's health	68 (23.1)	78 (26.4)	51 (17.3)	28 (9.5)	67 (22.7)	3 (1.0)	✓
d640	Doing housework	14 (4.7)	19 (6.4)	11 (3.7)	6 (2.0)	122 (41.4)	123 (41.7)	
d660	Assisting others	14 (4.7)	8 (2.7)	12 (4.1)	6 (2.0)	113 (38.3)	142 (48.1)	
d710	Basic interpersonal interactions	132 (44.7)	59 (20.0)	52 (17.6)	26 (8.9)	20 (6.8)	6 (2.0)	✓
d770	Intimate relationships	144 (48.8)	32 (10.8)	24 (8.1)	15 (5.1)	19 (6.4)	61 (20.7)	
d850	Remunerative employment	5 (1.7)	4 (1.4)	4 (1.4)	3 (1.0)	108 (36.6)	171 (58.0)	
d920	Recreation and leisure	27 (9.1)	32 (10.8)	37 (12.5)	46 (15.6)	100 (33.9)	53 (18.0)	

analysis are shown in Table 4. Figure 1 demonstrates the distribution of individuals (top panel) and item thresholds (bottom panel) for the total score of the ICF Rehabilitation Set. The detailed findings of the models are reported in Table 3, with the item difficulty, fit statistics, and DIF.

Discussion

In this study, 30 categories of the ICF Rehabilitation Set data were identified. Of the 30 categories, 25 had missing values, of which seven had >10% of their data missing and therefore were excluded from subsequent analysis. This study was conducted using the total scores of the remaining 23 categories that demonstrated no ceiling or floor effects. The Rasch analysis revealed the good internal construct validity of the a scale, which was evident by the total score of the 23 categories.

1. Feasibility of the ICF Rehabilitation Set in rehabilitation clinics

Some categories were difficult to use for inpatient rehabilitation. In this study, among the body function categories, the category with the highest number of missing values was sexual functions (ICF#: b640). This could be because of the older age of patients who participated in this study. Moreover, there is a possibility that the evaluators avoided inherently private questions regarding sexual function.

Several categories with missing values are possibly difficult to assess while patients stay in hospitals. Previous studies on the ICF Generic Set discussed that the inclusion of remunerative employment (ICF#: d850) may not be suitable for evaluating patients during their hospital stay or at the age of retirement [28, 29]. Consistently, we found a high frequency of missing values in several categories related to body functions or activities that inpatients did not frequently use or experience during their hospital stay. Because the high rate of missing values can create a bias in the statistical analysis [20], the functioning score used for the analysis should only include categories with a low amount (<10%) of missing values. Although several categories were excluded from the data set for comparison, our analysis still used several categories traditionally not considered by existing clinical scales. For example, categories such as energy and drive functions (ICF#: b130), sleep functions (ICF#: b134), and handling stress and other psychological demands (ICF#: d240) have not been included in most existing scales of functioning assessment used in rehabilitation clinics [30]. The categories of the ICF Rehabilitation Set are selected by assessing functioning profiles that are strongly related to self-reported general health. Inclusion of these categories in the data set may result in a new perspective for clinical assessment of patients' functioning, which would be beneficial from a patient-

Table 2. Fit statistics of ICF Rehabilitation Set 23 categories.

Analysis	Location				Fit residual				Item-trait interaction chi square			Reliability PSI		Unidimensionality paired *t*-tests				LD	DIF
	Item		Persons		Item		Persons												
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Value	df	*p*	WITH extremes	NO extremes	*n* Significant tests	Sample	% PST	CI % PST		
ICF Rehabilitation Set 23 categories (Basic module)	0.00	0.61	−0.64	1.40	−0.16	3.38	−0.25	1.45	434.99	92	0.0000	0.95	0.95	56	292	19.2	16.7–21.7	Yes	Yes
4 Testlets	0.00	0.34	−0.47	0.68	−0.03	2.70	−0.36	0.98	12.18	16	0.7318	0.85	0.86	15	284	5.3	2.7–7.9		Yes
4 Testlets (Item split)	0.00	0.32	−0.49	0.71	−0.04	2.28	−0.33	0.91	14.83	20	0.7862	0.85	0.86						

centered point of view.

2. Internal construct validity of the ICF Rehabilitation Set

Despite the large variety of categories included in the ICF Rehabilitation Set, the fit to the Rasch model was generally good. The existence of construct irrelevant variance indicates that there are subdimensions irrelevant to the focal construct of the scale, which could demonstrate a poor item fit and the presence of DIF. In this study, although the initial Rasch analysis showed a poor fit to the Rasch model, a testlet approach according to the chapter structure of the ICF significantly improved the fit to the Rasch model. Furthermore, unidimensionality of the scale was acceptable.

We noted DIF related to the disease types after applying the testlet approach. This could indicate that using this scale for comparisons across populations having different diseases may be problematic [24]. DIF can be resolved by splitting an item showing DIF for certain groups into group-specific items[31, 32], as performed in this study. However, it may be necessary to consider the stratification of data when dealing with samples with more diverse backgrounds in the future. In such cases, comparisons between different disease groups can be made by transforming scores to standardized metrics based on person ability estimates of the results of Rasch analysis.

The well-balanced distribution of person ability estimate and item difficulty was shown in the person-item threshold map, negating the existence of construct underrepresentation [15]. This could be interpreted because the set of categories used in our study was well targeted to patients who participated. Overall, the study results negate the existence of construct irrelevant variance and construct underrepresentation, thereby supporting the good internal construct validity of the selected 23 categories from the ICF Rehabilitation Set.

Limitations

This study included subacute patients receiving inpatient rehabilitation at convalescent rehabilitation wards. The feasibility and validity of the ICF Rehabilitation Set for patients receiving rehabilitation in the acute phase of the disease should be further investigated.

In this study, seven categories with high rates of missing values were excluded from the total score analysis. However, the categories excluded from the score could still be considered important even if it was not used for statistical analysis to compare patients' functioning in general. These sparse categories, if present in the functioning profile of the patient, may serve as additional independent indicators to help reveal a more complete picture of the patient's status,

Table 3. Findings of initial Rasch analysis based on individual categories of the ICF Rehabilitation Set (selected 23 categories).

Item		Item difficulty		Item fit					Differential item functioning (DIF) sub-groups with DIF	Local item dependency residual correlations >0.3	Grouping into the testlet
		Location	SE	Fit residuals	Df	χ^2	Df	Prob			
b130	Energy and drive functions	0.465	0.07	0.184	270.4	1.95	4	0.745008		b152	MF
b134	Sleep functions	1.17	0.084	6.492	273.22	78.2	4	0			MF
b152	Emotional functions	0.795	0.075	2.024	272.28	8.205	4	0.084337		b130, d240, d710	MF
b280	Sensation of pain	0.932	0.08	5.414	268.51	100.43	4	0	Disease	b710	PF
b455	Exercise tolerance functions	0.086	0.073	0.702	271.34	1.217	4	0.875372			PF
b620	Urination functions	−0.039	0.059	1.21	275.11	9.107	4	0.058489		d530	PF
b710	Mobility of joint functions	0.576	0.077	4.119	275.11	29.543	4	0.000006		b280	PF
b730	Muscle power functions	−0.156	0.081	0.823	274.16	4.153	4	0.385731	Gender		PF
d230	Carrying out daily routine	−0.437	0.063	−0.642	272.28	12.738	4	0.012631	Gender		MA
d240	Handling stress and other psychological demands	0.01	0.067	2.27	265.68	2.533	4	0.638733		b152	MA
d410	Changing basic body position	−0.246	0.075	−4.176	274.16	19.035	4	0.000774		d415, d420, d450	PA
d415	Maintaining a body position	0.186	0.076	−3.893	275.11	19.015	4	0.000782		d410, d420	PA
d420	Transferring oneself	0.228	0.075	−3.74	274.16	11.723	4	0.019536		d410, d415, d450, d540	PA
d450	Walking	−0.807	0.068	−3.155	269.45	12.612	4	0.013339		d410, d420, d455	PA
d455	Moving around	−1.513	0.067	−0.357	252.49	8.537	4	0.073785		d450	PA
d465	Moving around using equipment	−0.183	0.061	−1.17	260.97	5.827	4	0.212417			PA
d510	Washing oneself	−0.761	0.068	−4.841	271.34	25.774	4	0.000036		d520, d540	PA
d520	Caring for body parts	−0.266	0.067	−3.395	275.11	16.179	4	0.002789	Disease	d510, d540	PA
d530	Toileting	−0.369	0.062	−3.988	275.11	12.844	4	0.012067			PA
d540	Dressing	−0.065	0.066	−4.815	274.16	24.699	4	0.000059		d420, d520, d510	PA
d550	Eating	0.449	0.069	2.928	275.11	5.52	4	0.237998			PA
d570	Looking after one's health	−0.524	0.062	1.284	272.28	13.661	4	0.008462			PA
d710	Basic interpersonal interactions	0.469	0.069	2.93	269.45	11.494	4	0.021542		b152	MA

Df, degrees of freedom; Prob, probability; SE, standard error.

Table 4. Individual item fit statistics in the testlet analysis.

		Item split for DIF	Item difficulty		Item fit					
			Location	SE	Fit residual	Df	ChiSq	Df	Prob	DIF
4 Testlets	Cognitive function		0.43	0.033	2.382	202.32	3.242	4	0.5181	
	Physical function		0.088	0.025	−0.307	200.88	3.049	4	0.5973	Disease
	Cognitive activities		−0.155	0.028	1.526	195.12	4.678	4	0.3219	
	Physical activities		−0.363	0.013	−3.717	175.68	1.206	4	0.8770	
4 Testlets (Item split)	Cognitive function		0.449	0.034	2.493	201.27	1.409	4	0.8426	
	Cognitive activities		−0.159	0.029	1.565	194.11	5.067	4	0.2805	
	Physical activities		−0.37	0.013	−3.424	174.77	1.75	4	0.7816	
	Physical function	Neurological disease	0.195	0.032	−0.692	131.8	3.344	4	0.5020	
		Orthopaedic and the other diseases	−0.116	0.045	−0.157	68.05	3.257	4	0.5157	

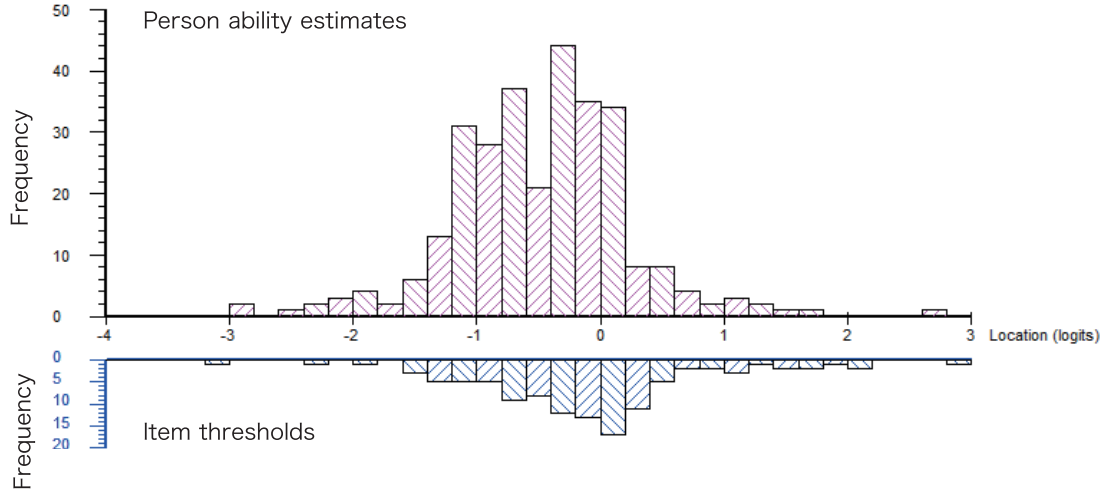

Figure 1. A person-item threshold map for the International Classification of Functioning, Disability and Health (ICF) Rehabilitation Set.
The bar graph shows the distribution of person ability estimates (red bars) and item thresholds (blue bars).

as demonstrated in previous studies [28, 29].

Conclusion

In this study, we assessed data on the functioning of patients receiving inpatient rehabilitation using the ICF Rehabilitation Set. We identified the set of categories with few missing values from the ICF Rehabilitation Set. Furthermore, Rasch analysis revealed that the calculated score from the selected set of categories had good internal construct validity in evaluating inpatients in rehabilitation wards.

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