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Consistency evaluation of nursing interns and nurses using the ICF-RS for rehabilitation assessment

Shufen Pan^{1†}, Yan Han^{1†}, Jinling Zhu², Yingna Li², Bing Guo¹, Caiyan Lan¹, Danni Li², Cuiying Tang^{2*}, Dongxu Si^{2*} and Shuyun Xiong^{2*}

Abstract

Objective This study sought to evaluate the consistency of functional level assessments conducted by nursing interns and an experienced nurse in elderly patients, using the International Classification of Functioning, Disability, and Health Rehabilitation Set (ICF-RS).

Methods Forty-one elderly residents from a care facility in Guangzhou were included in this study. Functional evaluations were performed using the ICF-RS by six nursing interns and one experienced nurse. The consistency of assessments between the nursing interns, as well as between the interns and the experienced nurse, was measured using Kendall and Kappa coefficients.

Results Consistency among the nursing interns was good, with Kendall coefficients greater than 0.6 for most categories, except for sexual function. However, the consistency between the nursing interns and the experienced nurse was lower in categories such as energy and drive functions (b130), sleep functions (b134), emotional functions (b152), pain sensation (b280), sexual functions (b640), and urination functions (b620), where Kappa coefficients were below 0.3. For other categories, consistency was deemed acceptable (Kappa > 0.3).

Conclusion There is a need to enhance the training of nursing interns to ensure they can effectively utilize the ICF-RS assessment tool.

Clinical trial number Not applicable.

Keywords International classification of functioning, Disability, and health rehabilitation set (ICF-RS), Nursing interns, Consistency, Kendall coefficient, Kappa coefficient

[†]Shufen Pan and Yan Han contributed equally to this work.

*Correspondence: Cuiying Tang 13668901945@139.com Dongxu Si 763565458@qq.com Shuyun Xiong 10162644@qq.com ¹Guangzhou Nursing Home, Guangzhou, Guangdong 510000, China ²Guangdong Provincial Hospital of Chinese Medicine, Guangzhou, Guangdong 510000, China



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Introduction

The global demographic is experiencing a rapid increase in the proportion of elderly individuals, with forecasts suggesting that by 2050, elderly individuals may comprise nearly or more than 22% of the total population worldwide [1]. China, in particular, has entered a stage of accelerated demographic aging. By 2021, adults aged 65 and above accounted for 14.2% of the nation's total population, and this number is projected to rise significantly, reaching an estimated 395 million by 2050 [2]. In 2019, the number of elderly people in China who were either disabled or semi-disabled reached 40 million, and 10 million were diagnosed with dementia [3]. The increasing incidence of disabilities among older adults, combined with the accelerating aging of the population, has resulted in a substantial surge in the need for rehabilitation nursing and elderly care services. This escalating demand places considerable burdens on families, communities, and the nation as a whole [4]. Therefore, as society ages, the role of nurses and nursing interns in elderly rehabilitation has become increasingly vital. To promote healthy aging, they must be proficient in using various assessment tools to accurately evaluate the functional status of elderly individuals and implement personalized rehabilitation interventions to meet the multidimensional care needs of the elderly [5].

In 2001, the World Health Organization (WHO) adopted the International Classification of Functioning, Disability and Health (ICF), which provides a universal conceptual framework and standardized classification for assessing human functioning [6]. The ICF Rehabilitation Set (ICF-RS) is a selection of 30 core categories from the more than 1,400 categories in the ICF, designed as a universally applicable assessment tool to describe key functions across a considerable range of diseases and health conditions [7-9]. This assessment tool has been rigorously validated and has exhibited high reliability and validity, confirming its effectiveness and consistency in measuring the intended constructs [10-15]. The assessment standards of the ICF-RS have been established as the national standard (GB/T 41843-2022) in China, and it is recommended as a general functional assessment tool for adult rehabilitation in China.

Consistency is a key factor in measuring the reliability of assessment results [16–18], especially in healthcare settings, where it refers to the degree to which different evaluators reach similar results when assessing the same patient. In the field of rehabilitation nursing, consistency in assessment outcomes is critically important, as it directly influences the quality of rehabilitation plans and their actual impact on improving patients' functional status. Consistency evaluation standards help ensure the standardization and reliability of the assessment process, ensuring that both nursing interns and experienced nurses achieve consistent results when using the ICF-RS. Some studies have reported on the consistency of ICF-RS assessments among rehabilitation team members [19]. However, in the nursing field, evaluations of ICF-RS application by nurses and nursing interns are still relatively rare. With the increasing demand for rehabilitation nursing services in China, there is growing attention to improving the accuracy of assessments. Although empirical research is limited, there is a notable gap in studies that systematically explore consistency in ICF-RS application in the nursing domain. This study aims to fill that gap and provide valuable insights for the training of nursing interns and nursing practice. This research seeks to examine the consistency among nursing interns and experienced nurses in using the ICF-RS assessment tool, with the goal of identifying potential training deficiencies or experience gaps in practical nursing work. Through this research, we hope to offer targeted training strategies to enhance the professional competencies of the nursing workforce and promote the widespread application of ICF-RS in China's rehabilitation nursing services.

Materials and methods

Study participants

This study included elderly individuals residing in a care facility in Guangzhou from December 2022 to December 2023, with a total of 41 participants. The inclusion criteria were: (1) age \geq 60 years; (2) a score of \geq 6 on the Abbreviated Mental Test (AMT) [20, 21]; (3) no cognitive impairment and the ability to communicate effectively; and (4) provision of informed consent and voluntary participation. Exclusion criteria included patients with critical conditions and unstable vital signs. Individuals will be excluded when they (1) did not cooperate with the assessment, (2) requested to withdraw, or (3) had more than 25% missing data in the ICF-RS questionnaire.

Assessments

General survey questionnaire

The questionnaire was designed according to the national standard 《Assessment of rehabilitation set for classification of functioning, disability and health》 (GB/T 41843 – 2022). The questionnaire also covered demographic information, including age, gender, marital status, education level, occupation, underlying diseases, caregiver information, and primary source of medical expenses.

ICF clinical functioning information tool (ClinFIT)

The International Society of PRMs (ISPRM), in collaboration with national and regional PRM associations, developed ClinFIT, an ICF-based functional assessment clinical tool [22]. ClinFIT features simple descriptions in user-friendly language, making it easier to understand the ICF categories directly and clearly. It is designed to be customizable, allowing adaptation to the specific needs of different rehabilitation services, patient populations, and countries [23]. In this study, the ClinFIT was designed using a mobile application based on the national standard ICF-RS quantitative criteria (GB/T 41843-2022) on an Android system [24]. This tool includes 30 s-level categories covering three domains: body functions and structures (9 items), activities (14 items), and participation (7 items). Each parameter was evaluated using a five-point scale ranging from 0 to 4, where a score of 0 signifies no functional impairment and 4 indicates complete functional impairment. Additionally, an 8 was used when there was insufficient information to assess the severity, and a 9 was used for items not applicable to the participant [25].

This study builds on previous research to distinguish between the categories of activities and participation [26]. In simple terms, activities refer to an individual's capabilities, independent of environmental factors. For this reason, the following categories are classified under activities: d240 Handling stress and other demands, d410 Changing basic body positions, d415 Maintaining a body position, d420 Moving oneself, d450 Walking, d455 Moving around, d465 Moving around using equipment, d510 Washing oneself, d520 Caring for body parts, d530 Toileting, d540 Dressing, d550 Eating, and d570 Looking after one's health. In contrast, participation is conceptualized based on the work of Heinemann and colleagues [27], who describe it as concentric circles representing different levels of engagement, including "world, country, community, and family." Accordingly, the following categories are included under participation: d640 Doing housework, d230 Carrying out daily routines, d770 Intimate relationships, d470 Using transportation, d660 Assisting others, d710 Basic interpersonal interactions, d850 Paid employment, and d920 Recreation and leisure.

Assessment method

The study's assessments were conducted by six trained nursing interns and one experienced nurse who had been working in the care facility for seven years. All assessors received training in the clinical application of the ICF-RS, including familiarity with data collection procedures and the definitions, content, and evaluation methods of each ICF-RS category. Assessors followed the research design and evaluation guidelines while screening participants based on inclusion and exclusion criteria. After obtaining informed consent, the assessors first provided a comprehensive explanation of the study's objectives. The assessors then conducted a combination of questionnaires and clinical examinations to complete the ICF-RS assessment, and filled out the relevant survey forms.

Data analysis

The statistical program SPSS 22.0. was utilized to process the collected information. Descriptive statistical method was employed for describing the distribution of demographic data and ICF-RS category values, with percentages used for categorical data. For consistency analysis, Kendall and Kappa coefficients were computed using SPSS, with the significance threshold established at P < 0.05.

In this study, we used the Kendall and Kappa coefficient to evaluate inter-rater consistency. According to JR Landis et al. [28], a Kendall coefficient serves as an indicator of consistency, with different value ranges representing varying levels of agreement. Specifically, a coefficient below 0.2 suggests weak consistency, while a value between 0.2 and 0.4 indicates poor consistency. A range of 0.4 to 0.6 corresponds to moderate consistency, whereas values between 0.6 and 0.8 denote strong consistency. Finally, a Kendall coefficient falling within the range of 0.8 to 1.0 reflects very strong consistency.

Similarly, according to JR Landis et al. [29], the Kappa coefficient is used to assess consistency, with different intervals representing distinct levels of agreement. A Kappa value lower than 0.2 signifies poor consistency, whereas a range of 0.21 to 0.40 indicates fair consistency. If the coefficient falls between 0.41 and 0.60, it is considered to demonstrate moderate consistency. A range of 0.61 to 0.80 is indicative of substantial consistency, while values between 0.81 and 1.00 suggest an almost perfect level of consistency.

Results

Basic characteristics of study participants

41 individuals participated in this research, and their fundamental attributes are listed in Table 1. Among those individuals, 21 were female and 20 were male. Participants aged 65 years or older accounted for 95.12% of the total. Regarding education background, 53.66% had attained a high school education or higher (including technical secondary education). Regarding marital status, 53.66% were married, while 7.32%, 31.71%, and 7.32% were unmarried, widowed, and divorced, respectively.

Additionally, detailed information regarding the participants' underlying diseases was gathered. Among the participants, cardiovascular disease was the most common condition, affecting 90.24% of the sample. Additionally, neurological diseases were reported in 24.39% of the participants, diabetes in 9.76%, respiratory diseases in 7.32%, and cancer in 2.44%.

Kendall coefficients for ICF-RS assessments by nursing interns

First, we evaluated the consistency of nursing interns' assessments of ICF-RS items using Kendall's coefficient

Table 1	Baseline	inform	ation	of sti	Jdy	partici	pants
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Variable	Distribution
	[%(N)]
Gender	
Male	48.78% (20)
Female	51.22% (21)
Age	
50–64 years	4.88% (2)
65 years and above	95.12% (39)
Mean \pm SD (years)	80.90 ± 9.18
Education Level	
Middle school or below	46.34% (19)
High school (including technical school) or above	53.66% (22)
Marital Status	
Married	53.66% (22)
Unmarried	7.32% (3)
Widowed	31.71% (13)
Divorced	7.32% (3)
Underlying Conditions	
Cardiovascular Disease	90.24% (37)
Neurological Disease	24.39% (10)
Diabetes	9.76% (4)
Respiratory Disease	7.32% (3)
Cancer	2.44% (1)

of concordance. The detailed results are shown in Table 2. The findings revealed that in the domain of activities, Kendall coefficients exceeded 0.8, indicating very high consistency in the assessment of basic mobility and self-care abilities. In terms of participation, Kendall coefficients also demonstrated high consistency. For example, the Kendall coefficient for paid employment (d850) was 0.456, indicating moderate consistency among the nursing interns in evaluating paid employment. In the domain of body functions and structures, the Kendall coefficients for exercise and tolerance capacity (b455), joint mobility (b710), and muscle power (b730) were 0.849, 0.916, and 0.919, respectively, reflecting very high inter-rater consistency in assessing exercise capacity, joint function, and muscle strength. For sleep functions (b134), emotional functions (b152), and urination functions (b620), the Kendall coefficients were 0.617, 0.655, and 0.773, respectively, indicating high consistency in the evaluation of sleep function, emotional status, and urinary system function. The Kendall coefficients for energy and drive functions (b130) and pain sensation (b280) were 0.461 and 0.541, respectively, suggesting moderate consistency in the assessment of energy levels, motivation, and pain sensation. However, the Kendall coefficient for sexual functions (b640) was 0.159, indicating a lack of consistency in the assessment of sexual function among nursing interns (P > 0.05).

 Table 2
 Kendall coefficients for ICF-RS assessments by nursing interns

Category		Kendall	Ρ
0 1 5		coefficient	0.001
and structures	functions	0.461	< 0.001
	b134 Sleep functions	0.617	< 0.001
	b152 Emotional functions	0.655	< 0.001
	b280 Pain sensation	0.541	< 0.001
	b640 Sexual functions	0.159	0.548
	b620 Urination functions	0.773	< 0.001
	b455 Exercise and tolerance capacity	0.849	< 0.001
	b710 Joint mobility	0.916	< 0.001
	b730 Muscle power	0.919	< 0.001
Activities	d240 Handling stress and other demands	0.867	< 0.001
	d410 Changing basic body positions	0.929	< 0.001
	d415 Maintaining a body position	0.929	< 0.001
	d420 Moving oneself	0.932	< 0.001
	d450 Walking	0.946	< 0.001
	d455 Moving around	1	-
	d465 Moving around using equipment	0.835	< 0.001
	d510 Washing oneself	0.935	< 0.001
	d520 Caring for body parts	0.940	< 0.001
	d530 Toileting	0.938	< 0.001
	d540 Dressing	0.943	< 0.001
	d550 Eating	0.919	< 0.001
	d570 Looking after one's health	0.930	< 0.001
	d640 Doing housework	0.933	< 0.001
Participation	d230 Carrying out daily routine	0.925	< 0.001
	d770 Intimate relationships	0.910	< 0.001
	d470 Using transportation	0.903	< 0.001
	d660 Assisting others	0.843	< 0.001
	d710 Basic interpersonal interactions	0.933	< 0.001
	d850 Paid employment	0.456	< 0.001
	d920 Recreation and leisure	0.882	< 0.001

Kappa coefficients for ICF-RS assessments between nursing interns and experienced nurses

we evaluated the Kappa coefficients to determine the consistency between nursing interns and experienced nurses in their ICF-RS assessments (Table 3). The majority of items had Kappa coefficients greater than 0.4, indicating a moderate level of consistency between the nursing interns and the experienced nurses.

However, certain categories demonstrated a lack of consistency between the interns and the experienced nurses. These categories included energy and drive functions (b130), sleep functions (b134), emotional functions

Condition P Internal Mode	Kappa coeffi	cients											
19.100.010.871.1360.1920.7350.0130.0130.0130.1030.1030.01319.110.1230.0170.0230.0170.0230.0170.0250.0130.0130.01319.120.0130.0130.0130.0130.0130.0130.0130.0130.01319.120.0130.0130.0130.0130.0130.0140.0130.01319.130.0140.0130.0130.0130.0140.0130.0130.01319.100.0140.0130.0130.0130.0140.0130.0130.01319.110.0130.0130.0130.0130.0140.0130.0130.01319.110.0130.0130.0130.0140.0130.0140.01319.110.0130.0130.0130.0130.0140.0130.01319.110.0140.0130.0140.0130.0140.0130.01319.110.0140.0130.0140.0130.0140.0130.01319.110.0130.0140.0130.0140.0130.0140.01319.110.0130.0140.0140.0130.0140.0130.01319.110.0130.0140.0140.0140.0140.0140.01319.110.0130.0140.0140.0140.0140.0140.01419.110.0130.014 </th <th>Category</th> <th>Intern1/Nurse</th> <th>ط</th> <th>Intern2/Nurse</th> <th>ط</th> <th>Intern3/ Nurse</th> <th>ط</th> <th>Intern4/ Nurse</th> <th>ط</th> <th>Intern5/ Nurse</th> <th>ط</th> <th>Intern6/Nurse</th> <th>ط</th>	Category	Intern1/Nurse	ط	Intern2/Nurse	ط	Intern3/ Nurse	ط	Intern4/ Nurse	ط	Intern5/ Nurse	ط	Intern6/Nurse	ط
101 0.017 0.027 0.071 0.030 0.017 0.030 0.019 0.039 0.039 0.039 0.039 0.039 0.039 0.039 0.039 0.039 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0.039 0.037 0	b130	-0.016	0.87	0.136	0.192	0.245	0.02	0.05	0.625	0.012	0.912	-0.035	0.742
10120.0330.0440.0440.0440.0430.0170.0350.0170.0350.0470.0350.04710200.0330.0770.0350.0770.0350.0770.0350.0470.0350.04710500.0340.0350.0470.0350.0470.0350.0470.0350.04710500.3460.4460.0470.0350.0470.0350.0470.0350.04710500.3460.4460.5370.5770.5670.5370.4460.6610.44510500.3460.4450.5370.5370.5310.530.4450.6570.03510500.3540.5670.5370.5310.5330.530.530.4230.04710500.3540.4460.5610.530.530.530.540.540.7510500.3540.5660.440.5610.540.530.440.6610.4410500.5540.530.540.530.540.530.440.6610.4410500.5540.5560.540.530.540.540.540.540.5410500.5460.5460.540.540.540.540.540.540.5410500.5460.5460.540.540.540.540.540.540.5410500.5460.5460.540.540.540.54 <td< td=""><td>b134</td><td>-0.117</td><td>0.222</td><td>-0.077</td><td>0.430</td><td>-0.002</td><td>0.984</td><td>-0.18</td><td>0.055</td><td>-0.137</td><td>0.149</td><td>-0.136</td><td>0.139</td></td<>	b134	-0.117	0.222	-0.077	0.430	-0.002	0.984	-0.18	0.055	-0.137	0.149	-0.136	0.139
bbb0.020.010.0	b152	-0.039	0.664	-0.044	0.630	0.017	0.851	0.006	0.949	0.039	0.659	0.047	0.608
(b) (0) (0,4) (0,1) (0,3) (0,1) (0,4) (0,1) (0,	b280	-0.025	0.777	0.025	0.778	0.047	0.604	0.022	0.805	0.016	0.863	-0.025	0.782
660 0.540 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.641 • 0.645 0.046 0.046 0.645	b620	0.055	0.496	0.021	0.793	-0.027	0.725	-0.059	0.444	-0.061	0.433	-0.122	0.117
Def3 0.481 • 0.113 0.223 • 0.184 • 0.113 0.228 0.239 • 0.165 • 0.165 <	b640	0.540	*	0.692	*	0.527	*	0.511	*	0.681	*	0.451	*
by100.684•0.517•0.616•0.651•0.649••by300.685•0.532•0.613•0.615•0.6150.615by4100.685•0.384•0.532•0.613•0.615•0.613•by4100.5730.679•0.732•0.732•0.732•0.613•0.615•0.615d+500.5730.679•0.732•0.733•0.613•0.613•0.613d+500.573•0.434•0.732•0.733•0.733•0.473d+510.463•0.464•0.733•0.733•0.473•0.733d+510.473•0.733•0.733•0.733•0.433•d+510.433•0.733•0.733•0.733•0.733d+510.533•0.733•0.733•0.733•0.733d+510.533•0.733•0.733•0.733•0.733d+510.533•0.733•0.733•0.733•0.733d+510.533•0.733•0.733•0.733•0.733d+510.533•0.733•0.733•0	b455	0.481	*	0.113	0.228	0.293	*	0.184	0.058	0.336	*	0.165	0.098
by 30 0.665 0 0.540 0 0.616 0 0.615 0	b710	0.684	*	0.617	*	0.616	*	0.651	*	0.685	*	0.649	*
dd10 0.556 • 0.584 • 0.532 • 0.543 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.584 • 0.583 • 0.533 • 0.533 • 0.473 • 0.473 · 0.433 · 0.433 · 0.433 · <td>b730</td> <td>0.685</td> <td>*</td> <td>0.580</td> <td>*</td> <td>0.616</td> <td>*</td> <td>0.614</td> <td>*</td> <td>0.615</td> <td>*</td> <td>0.615</td> <td>*</td>	b730	0.685	*	0.580	*	0.616	*	0.614	*	0.615	*	0.615	*
dd1 0679 + 0522 - 0441 - 0533 + 0533 + 0472 + 0473 +	d410	0.626	*	0.584	*	0.532	*	0.543	*	0.543	*	0.584	*
440 0.74 0.445 0.446 0.45 0.468 0.468 0.466 0.468 0.478 0.478 0.478 0.478 0.478 0.478 0.479 0.478 0.479 0.478 0.479 0.474 0.474 0.474 0.474 0.474 0.476 0.476 0.474 0.474 0.474 0.474 0.474 0.474 0.474 0.474 0.474 0.474 0.474 0.474 0.4	d415	0.679	*	0.592	*	0.491	*	0.593	*	0.593	*	0.472	*
450 060 • 044 • 046 • 0433 · 0433 · 0433 · 0433 · 0433 · 0433 · 0433 · 0433 · 0433 ·	d420	0.574	*	0.445	*	0.36	*	0.438	*	0.52	*	0.486	*
d46 0.481 - 0.445 - 0.445 - 0.445 - 0.445 - 0.441 - 0.445 - 0.441 - 0.445 - 0.441 - 0.441 - 0.441 - 0.441 - 0.441 - 0.441 - 0.441 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.442 - 0.443 - 0.443 - 0.443 - 0.443 - 0.441 - 0.443 - 0.443 - 0.443 - 0.443 - 0.443 - 0.443 - 0.443 - 0.443 - 0.443 - 0.443 - 0.443 - 0.444 - 0.444 - <td>d450</td> <td>0.608</td> <td>*</td> <td>0.464</td> <td>*</td> <td>0.465</td> <td>*</td> <td>0.383</td> <td>*</td> <td>0.428</td> <td>*</td> <td>0.536</td> <td>*</td>	d450	0.608	*	0.464	*	0.465	*	0.383	*	0.428	*	0.536	*
d45 0463 + 0325 + 0425 - 0437 + 0437 + 0439 + 0439 + 0439 + 0437 + 0437 + 0439 +	d465	0.481	*	0.445	*	0.468	*	0.537	*	0.505	*	0.419	*
d5100416+0.338+0.239+0.286+0.260+0.375+d520053300.33300.350000.31801d520053300.32400.324000.31800d5300.52400.324000.40110.42010.35010.3181d5400.530000.40110.40310.40110.3481d5400.530000.42010.33010.44110.3481d5400.53200.75810.34210.40310.3491d5400.53200.75810.35010.34610.346d5400.75810.73310.44310.44310.3461d5400.64310.52410.44310.44310.3461d7300.68310.54410.44310.44310.3431d7100.65210.54010.54010.33311d7100.65310.54010.44310.443111d7100.65410.54010.54010.53311d7100.65	d455	0.463	*	0.325	*	0.425	*	0.375	*	0.402	*	0.419	*
d50 0.533 + 0.324 + 0.424 + 0.333 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.318 + 0.324 + 0.326 + <td>d510</td> <td>0.416</td> <td>*</td> <td>0.338</td> <td>*</td> <td>0.299</td> <td>*</td> <td>0.286</td> <td>*</td> <td>0.260</td> <td>*</td> <td>0.375</td> <td>*</td>	d510	0.416	*	0.338	*	0.299	*	0.286	*	0.260	*	0.375	*
d5300.524*0.401*0.408*0.408*0.404*0.348*d5400.530*0.420*0.348*0.441*0.348*0.348d5400.532*0.420*0.348*0.348*0.346*0.346d5400.532*0.368*0.330*0.330*0.464*0.369*d5400.532*0.759*0.330*0.463*0.466*0.369d5400.532*0.532*0.533*0.464*0.464*0.469d5700.643*0.543*0.533*0.469*0.470*0.569d7000.689*0.434*0.513*0.432*0.470*0.513d7100.583*0.441*0.525*0.432*0.432*0.433d7100.568*0.568*0.536*0.536*0.533*d7100.658*0.569*0.536*0.536*0.533*d7100.658*0.568*0.536*0.533**0.533d7100.658*0.669*0.414*0.533**0.533d510*0.568*	d520	0.533	*	0.324	*	0.424	*	0.353	*	0.350	*	0.318	*
d540 0530 * 0420 * 0348 * 0343 * 0320 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0296 * 0309 * 0296 * 0309 * * 0309 * * 0309 * 0309 *	d530	0.524	*	0.401	*	0.408	*	0.470	*	0.441	*	0.348	*
d50 0.532 * 0.368 * 0.330 * 0.463 * 0.309 * 0.309 * d640 0.758 * 0.757 * 0.713 * 0.639 * 0.309 * d540 0.758 * 0.757 * 0.713 * 0.639 * 0.309 * d570 0.643 * 0.532 * 0.713 * 0.639 * 0.630 *	d540	0.530	*	0.420	*	0.348	*	0.493	*	0.520	*	0.296	*
d640 0.758 * 0.757 * 0.713 * 0.639 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.680 * 0.670 * 0.570 * 0.571 * 0.524 * 0.630 * 0.630 * 0.515 * 0.570 * 0.574 * 0.573 * 0.573 * 0.573 * 0.573 * 0.573 * 0.573 * 0.573 * 0.573 * * 0.573 * * 0.573 * * 0.573 * * 0.573 * * 0.533 * * 0.533 * * 0.533 * * 0.533 * * 0.533 *	d550	0.532	*	0.368	*	0.330	*	0.463	*	0.464	*	0.309	*
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d240 0.475 * 0.432 * 0.432 * 0.432 * 0.432 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.325 * 0.326 * 0.325 * 0.326 * 0.325 * 0.326 * 0.323 * 0.326 * 0.323 * 0.323 * 0.323 * 0.533 * 0.533 * 0.533 * 0.533 * 0.533 * * 0.533 * * 0.533 * * 0.533 * * 0.533 * * 0.533 * * 0.533 * * * * * * * * * * * * </td <td>d570</td> <td>0.643</td> <td>*</td> <td>0.525</td> <td>*</td> <td>0.570</td> <td>*</td> <td>0.524</td> <td>*</td> <td>0.460</td> <td>*</td> <td>0.515</td> <td>*</td>	d570	0.643	*	0.525	*	0.570	*	0.524	*	0.460	*	0.515	*
d230 0.689 * 0.434 * 0.441 * 0.440 * 0.434 * 0.471 * 0.471 * 0.471 * 0.471 * 0.423 * 0.414 * 0.471 * 0.423 * * 0.423 * * 0.423 * <th< td=""><td>d240</td><td>0.475</td><td>*</td><td>0.432</td><td>*</td><td>0.513</td><td>*</td><td>0.432</td><td>*</td><td>0.429</td><td>*</td><td>0.325</td><td>*</td></th<>	d240	0.475	*	0.432	*	0.513	*	0.432	*	0.429	*	0.325	*
d770 0.583 * 0.508 * 0.532 * 0.542 * 0.538 * 0.533 * d470 0.622 * 0.542 * 0.536 * 0.533 * d660 0.490 * 0.542 * 0.536 * 0.533 * d710 0.654 * 0.234 * 0.336 * 0.192 * 0.234 * d710 0.654 * 0.510 * 0.336 * 0.192 * 0.234 * d710 0.658 * 0.619 * 0.6192 * 0.533 * d850 0.658 * 0.6114 * 0.313 * 0.477 * 0.421 d820 0.506 * 0.414 * 0.418 * 0.421 * * 0.421 *	d230	0.689	*	0.434	*	0.441	*	0.440	*	0.434	*	0.474	*
d470 0.622 * 0.542 * 0.424 * 0.536 * 0.540 * 0.533 * d660 0.490 * 0.204 * 0.257 * 0.336 * 0.192 * 0.534 * d710 0.654 * 0.508 * 0.510 * 0.534 * * 0.534 *	d770	0.583	*	0.508	*	0.525	*	0.542	*	0.508	*	0.533	*
d660 0.490 * 0.204 * 0.257 * 0.336 * 0.192 * 0.234 *	d470	0.622	*	0.542	*	0.424	*	0.536	*	0.540	*	0.533	*
d710 0.654 * 0.508 * 0.510 * 0.583 * 0.532 * 0.532 * d850 0.658 * 0.614 * 0.313 * 0.477 * 0.421 * d820 0.506 * 0.421 * 0.458 * 0.421 * <	d660	0.490	*	0.204	*	0.257	*	0.336	*	0.192	*	0.234	*
d850 0.658 * 0.659 * 0.414 * 0.313 * 0.477 * 0.421 * 4020 * 0.506 * 0.486 * 0.421 * 0.458 * 0.483 * 0.392 *	d710	0.654	*	0.508	*	0.510	*	0.583	*	0.523	*	0.532	*
d920 0.506 * 0.486 * 0.421 * 0.458 * 0.483 * 0.392 *	d850	0.658	*	0.659	*	0.414	*	0.313	*	0.477	*	0.421	*
	d920	0.506	*	0.486	*	0.421	*	0.458	*	0.483	*	0.392	*

Table 4	Consistency c	omparison	of nursing i	interns'	assessment
of three	dimensions an	d overall fu	nctioning ir	n study	participants

Category	Kendall coefficient	Ρ
Body Functions and Structures	0.877	< 0.001
Activities	0.964	< 0.001
Participation	0.924	< 0.001
Overall Functioning	0.926	< 0.001

(b152), pain sensation (b280), sexual functions (b640), and urination functions (b620).

Comparison of consistency in three domains and overall functioning levels among nursing interns

The results of the consistency comparison among nursing interns regarding their assessments of the three functional domains and overall functioning are presented in Table 4. The findings showed high consistency among the nursing interns, with Kendall coefficients greater than 0.8 (P < 0.001).

Additionally, Table 5 presents the consistency comparison between the nursing interns and the experienced nurses in the three domains and overall functioning assessments. The results demonstrated good consistency between the two groups, with Kappa coefficients greater than 0.3 (P < 0.05).

Discussion

This study was primarily designed to assess the functional capabilities of elderly residents in a care facility in Guangzhou using the ICF-RS and to explore the consistency between nursing interns and an experienced nurse in their assessments. The analysis revealed that nursing interns demonstrated high consistency across most assessment categories, especially in the domains of body functions and structures, activities, and participation. However, consistency was lacking in the evaluation of sexual functions. When compared to the experienced nurse, consistency was lower in several key functional categories, including energy and drive functions, sleep functions, emotional functions, pain sensation, and urination functions. These findings highlight the need to improve nursing interns' proficiency with the ICF-RS tool, especially by strengthening training and understanding in these key areas.

This research is, to the best of our understanding, the first investigation to examine the consistency of nursing interns in applying the ICF-RS. Nursing interns play a crucial role in clinical practice and will form the backbone of the future nursing workforce. Achieving inter-rater consistency is essential for the widespread application of the ICF-RS [30, 31]. In this study, the Kendall coefficients for categories such as b130 energy and drive functions, b134 sleep functions, b152 emotional functions, and d850 paid employment ranged from 0.4 to 0.6, indicating moderate consistency among the nursing interns. However, for other categories, the Kendall coefficients exceeded 0.8, reflecting very strong interrater consistency. These results confirm the consistency of nursing interns in ICF-RS assessments. Specifically, in the b640 sexual functions category, nursing interns lacked consistency. This inconsistency may stem from the interns' limited professional sensitivity and preparedness in assessing this area, as well as challenges in discussing sensitive topics with patients. Additionally, the lack of systematic training could contribute to these difficulties.

Clinical experience, assessment methods, and professional background are key factors influencing inter-rater consistency [30, 31]. Thus, we further evaluated the consistency between nursing interns and an experienced nurse in using the ICF-RS.

Previous studies have reported that the length of work experience and clinical expertise significantly impact nurses' understanding of scoring criteria and the interpretation of assessment tools [32, 33]. Short internship periods and insufficient practical experience may reduce the consistency of evaluations. Experienced nurses accumulate more comprehensive assessment skills through daily practice, leading to more accurate evaluations, and may thus calibrate the scores of nursing interns.

In this study, we observed a lack of consistency between nursing interns and experienced nurses in several categories, including energy and drive functions (b130), sleep functions (b134), emotional functions (b152), pain sensation (b280), sexual functions (b640), and urination functions (b620). Specifically, the inconsistency in energy and drive functions (b130) may stem from the subjective nature of assessing energy levels in elderly patients, which can vary greatly. The lower consistency in sleep

 Table 5
 Consistency comparison between nursing interns and experienced nurse in assessing three dimensions and overall functioning in study participants

 Kanna coefficient*

Rappa coenicient						
Category	Intern 1/Nurse	Intern 2/Nurse	Intern 3/Nurse	Intern 4/Nurse	Intern 5/Nurse	Intern 6/Nurse
Body functions and structures	0.509	0.461	0.423	0.423	0.386	0.370
Activities	0.658	0.622	0.544	0.587	0.587	0.542
Participation	0.735	0.544	0.536	0.696	0.696	0.544
Overall functioning	0.848	0.658	0.693	0.810	0.810	0.696
*0 0.05						

*P-values are all < 0.05

functions (b134) may indicate common challenges, such as elderly patients experiencing insomnia or reluctance to disclose their true sleep patterns, leading to incomplete assessment information. The issues in emotional functions (b152) and pain sensation (b280) suggest that these assessments require a higher level of professional expertise, which might be challenging for less experienced nursing interns. In terms of sexual functions (b640), both nurses and interns may find this a sensitive topic, potentially leading to difficulties in engaging patients in meaningful discussions.

This study recommends strengthening the specialized training of nursing interns in the use of the ICF-RS assessment tool, particularly focusing on categories with lower consistency. Providing detailed clinical case analyses and practical guidance for these specific categories could improve the consistency between nursing interns and experienced nurses in applying the ICF-RS.

Conclusion

Currently, there are limited reports on the application of the ICF-RS, and this study offers a new perspective on consistency evaluation for the use of ICF-RS in geriatric nursing. The findings suggest that there is a certain level of consistency between nursing interns and experienced nurses in applying the ICF-RS scale, but further training is needed to enhance their assessment capabilities. This is essential for the broader dissemination and implementation of the ICF-RS. Additionally, the study highlights the influence of clinical experience on nurses' understanding of the assessment tool. However, this study has certain limitations. The sample size is limited, consisting of only 41 residents from a single care facility, which may restrict the applicability of the findings to a wider demographic. The outcome might be effected by the particular setting of the institution. Looking ahead, larger-scale empirical studies are needed to validate the robustness and generalizability of these conclusions. It will be particularly important to compare the consistency between nursing interns and nurses across different types of care facilities and in more diverse healthcare settings.

Abbreviations

ICF International Classification of Functioning, Disability and Health ICF-RS International Classification of Functioning, Disability and Health Rehabilitation Set

Author contributions

S.F.P. had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. S.Y.X. J.L.Z. and D.X.S. was responsible for the study concept and manuscript writing. Y.H., B.G., C.Y.L., Yingna Li, and D.N.L. contributed to data collection and implementation of the study protocol. C.Y.T. and S.F.P. performed the statistical analysis. All authors made substantial contributions to the design of the study, data analysis and interpretation, and manuscript preparation.

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None.

Data availability

The datasets used and analyzed during this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was carried out in compliance with the guidelines set forth by the Declaration of Helsinki and received formal approval from the Ethics Committee of Guangzhou Geriatric Hospital (Approval No. LW-L20231208). Informed consent was obtained from each participant, who had the right to withdraw from the study at any time. The participants' names and other confidential information were protected, and no harm was caused to the participants.

Consent for publication

Consent was obtained from all participants, permitting the publication of their data exclusively in an anonymized format.

Competing interests

The authors declare no competing interests.

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