

International Health Classification Family and International Classification of Functioning

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Abstract: The theoretical framework, terminology and coding of the International Classification of Functioning, Disability and Health for Children and Youth are useful tools for content analysis of physical activity guidelines for children and adolescents. The guidelines for physical activity for children and adolescents at home and abroad have their own policy background and health-related theoretical basis for healthy development. The formulation and implementation of physical activity guidelines for children and adolescents should be based on the national health policy, propose programs suitable for children and adolescents, and guide the implementation of the guidelines. This paper summarizes the use in patients with cerebral palsy and those on the autism spectrum. Based on the theoretical framework and methodological system of research rehabilitation guidelines based on the World Health Organization Family International Classifications, pay attention to the policy background and theoretical basis, activity mode and amount, benefits and influencing factors of physical activity guidelines for children and adolescents, and provide theoretical basis and methodological guidance for the formulation and implementation of relevant guidelines.

Keywords: International health classification family; international classification of functioning; world health organization

1 Introduction

In 2017, World Health Organization (WHO) published Rehabilitation in Health Systems as policy guidance for rehabilitation. Advocate that rehabilitation is an integral part of health services, develop rehabilitation-related services, and incorporate rehabilitation services into the tertiary health service system [1]. Cultivate multidisciplinary rehabilitation human resources, improve the availability, affordability and fairness of rehabilitation services, so that rehabilitation services can benefit more people in need. WHO also issued the Rehabilitation in Health Systems: Guide for Action to provide action basis and methodological tools for the planning and development of modern rehabilitation services [2–5].



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The World Health Organization International Health Classification Family (WHO-IHCF) established the theoretical framework, terminology and diagnostic criteria of rehabilitation clinical practice guidelines, as well as methods and tools for rehabilitation clinical assessment.

The goal of WHO-IHCF is to improve health by providing comprehensive health information to support decision-making at all levels and provide a theoretical framework for classifying or potentially classifying areas of information to achieve the desired health and hygiene management goals, it also provides a set of classification categories defined within a theoretical framework and recognized for specific purposes [6]. Facilitate the selection of appropriate taxonomy in a wide range of health fields around the world and establish a common language for improved communication across disciplines and industries and between countries. To facilitate the comparison of data within and between Member States, across health disciplines, service sectors and over time, and encourage relevant research on health and health systems [7].

International Classification of Functioning, Disability and Health for Children and Youth, (ICF-CY) theories and methods are an important part of WHO-IHCF. ICF-CY is a functional classification, and ontology is a function. The categories include the body structure, physical function, activity, participation, environmental factors, and personal factors. The functional categories of ICF-CY at all levels have standardized category names, category codes, definitions, and terminology [8,9].

This article summarizes the progress of the International Health Classification family and ICF-CY in practical rehabilitation work.

2 WHO-IHCF Rehabilitation Service Model

The modern rehabilitation service model breaks the traditional one-way causal model of “injury-disability-disability” and makes full use of the “biological-psycho-social” function, disability and health model. Links patient-specific health conditions to their functional status, disability, and health environment takes into account a combination of patients’ physical structure and function, activity and participation, environmental factors, and personal factors [10–12]. Apply the WHO-IHCF classification system, implement the rehabilitation service model based on the bio-psycho-social model, and analyze the theoretical framework and method system of the rehabilitation service. See [Tab. 1](#).

Table 1: Rehabilitation service components and WHO-IHCF

Elements	Rehabilitation services components	WHO-IHCF system application
Rehabilitation leadership and governance	<ol style="list-style-type: none"> 1. Laws, policies, programs and strategies for rehabilitation 2. Governance structures, oversight mechanisms and accountability processes for rehabilitation issues 3. Plan, collaborate, and coordinate the recovery process for recovery 	<ol style="list-style-type: none"> 1. Tools to formulate strategic planning for rehabilitation development 2. Tools for planning, execution and implementation 3. Cross-industry and multi-domain coordination tools

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Table 1: Continued

Elements	Rehabilitation services components	WHO-IHCF system application
Rehabilitation funding	<ol style="list-style-type: none"> 1. Spending on rehabilitation in health spending 2. Health financing, service charges and payment structures including rehabilitation 	<ol style="list-style-type: none"> 1. Framework construction and overall planning of rehabilitation service financing 2. Rehabilitation fees and payment methods and standards
Rehabilitation human resources	<ol style="list-style-type: none"> 1. Health human resources who can provide rehabilitation interventions-including rehabilitation medicine, rehabilitation therapy and rehabilitation care 	<ol style="list-style-type: none"> 1. Professional system of human resources discipline 2. Professional knowledge, skills and professional ethics
Rehabilitation services provided	<ol style="list-style-type: none"> 1. Health services that provide rehabilitation interventions, including rehabilitation hospitals, rehabilitation centers, wards, and institutions that provide specialized rehabilitation interventions in tertiary and secondary hospitals and clinics, as well as in primary health care facilities and community settings 	<ol style="list-style-type: none"> 1. Theoretical framework and service system of service provision 2. Standards of service provision 3. Evaluation of services
Rehabilitation medicine technology	<ol style="list-style-type: none"> 1. Commonly used medicines and technologies for recovered patients, especially auxiliary products 	<ol style="list-style-type: none"> 1. Rehabilitation technology, equipment and assistive products
Rehabilitation information system	<ol style="list-style-type: none"> 1. Rehabilitation-related data in health information systems, such as data on the functional status of the population, rehabilitation effectiveness and utilization data, and data on rehabilitation outcomes 2. Research related to rehabilitation policies and programs 	<ol style="list-style-type: none"> 1. Data structure and data standard of rehabilitation information system 2. Statistics related to rehabilitation services

Rehabilitation services adhere to the function-oriented principle with function as the core. Focuses not only on physical function, but also more emphasis on overall enhancement of activities and participation, including learning and application of knowledge, general tasks and requirements, communication, activities, self-care, family activities, interpersonal and interpersonal relationships, major areas of life, and community, social and civic life [13]. And pay attention to the impact of environmental factors and personal factors on function.

Rehabilitation services are implemented in certain contexts. According to the International Classification of Service Organizations-Rehabilitation 2.0, the rehabilitation service scenario is mainly

composed of three aspects: service location, service facility and service scenario [14,15]. The locations of rehabilitation services include rural areas, cities and communities; service facilities include health service institutions at all levels in addition to hospitals; treatment methods include inpatient, outpatient, daytime services, family and community services, and telerehabilitation. To improve the quality and safety of rehabilitation services, rehabilitation professionals must use WHO-IHCF-based disease diagnosis, functional description and assessment, and evidence-based intervention methods to manage and control the process and quality of rehabilitation services in different rehabilitation service scenarios [16]. See [Tab. 2](#).

Table 2: Rehabilitation service scenario

Rehabilitation service scenario	Description
Service location	Location characteristics: rural areas, urban areas, communities area of service premises: population, geographic area, administrative area
Service facilities	Building and other facilities, such as laboratories, diagnostic and treatment rooms, beds, etc.
Service scene	Levels of care: primary, secondary and tertiary specializations mode of service delivery: inpatient, outpatient, day hospital/day service, home and community, telerehabilitation, or any other setting where the service is provided Health care stage: rehabilitation, early rehabilitation, acute rehabilitation care, subacute rehabilitation care, subacute rehabilitation care and long-term/chronic disease rehabilitation care

There are many rehabilitations assessment tools available in the rehabilitation field. However, in the front page of the medical record, it is recommended using the standardized functional assessment tool based on WHO-IHCF to conduct statistical analysis and cross-institutional comparison of rehabilitation outcomes, and to achieve standardization and international comparability of the performance evaluation of rehabilitation institutions [17]. According to the recommendations of WHO-IHCF, the functional assessment tools applicable to the first page of medical records are shown in [Tab. 3](#).

Table 3: WHO-IHCF rehabilitation assessment tool

Classification	Scale	Tool
ICD	WHODAS 2.0	6 domains: cognition, mobility, self-care, getting along with people, life activities, and participation and its impact on health issues
	MDS-B	2 major assessment items: Physical Function, Activity and Participation, with total functional score calculated

(Continued)

Table 3: Continued

Classification	Scale	Tool
	VB40	7 domains: learning and applying knowledge, communication, major life areas, community, social and civic life, mental functioning, sensory functioning and pain
ICF	ICF Core Classification Portfolio	3 domains: body structure and function, activity and participation, environmental factors

3 ICF-CY

The ICF-CY is an international classification standard for functioning, disability and health. It constructs a multi-dimensional comprehensive model from a bio-psycho-social perspective and establishes a system of terminology, classification and coding related to functional health. For children and adolescents, the ICF-CY defines health components and some health components related to well-being and establishes a terminology system for classification concepts [18]. Includes ‘function’ (physical functioning, activity and participation), ‘disability’ (impairment, activity limitations and participation limitations), and ‘environmental factors’ (functional impairment and enabling factors) [19] see [Tab. 4](#).

Table 4: Classification of ICF-CY physical activity forms, functions and influencing factors

Categories	Content
Form of physical activity	Muscle strength physical fitness activities, such as dumbbells, squats, vertical jumps, pull-ups, etc.; muscle endurance physical fitness activities, such as long-distance running, swimming, cycling, etc.; cardiorespiratory endurance physical fitness activities, such as brisk walking, jogging and other aerobic activities; flexible physical fitness activities such as yoga, pilates, dance, etc.
Skills	Gross/fine skill activities such as lifting, picking up, pushing, pulling, carrying, grabbing, etc.; basic motor skills activities, such as walking, running, jumping, throwing, crawling, etc.; movement/transfer skills activities such as walking, moving oneself, transportation, etc.
Sports category	Including sports and leisure. Competitive categories include basketball, football, volleyball, tennis, table tennis, badminton, swimming, cycling, weightlifting, boxing, skating, etc.; leisure categories include hiking, yoga, pilates, dance, aerobics, tai chi, running, darts, shuttlecock, billiards, bowling, golf, horse riding, outdoor activities, activities of daily living, etc.

(Continued)

Table 4: Continued

Categories	Content
Body function	The ICF-CY body functions include 8 domains: mental functions, sensory and pain functions, pronunciation and speech functions, cardiovascular, blood, immune and respiratory system functions, functions of the digestive, metabolic and endocrine systems, urogenital and reproductive functions, neuromusculoskeletal and motor-related functions, functions of the skin and related structures
Activities and participation	Activity and participation in ICF-CY consist of 9 areas: learning and applying knowledge, general tasks and requirements, communication, activities, self-care, family life, interpersonal and interpersonal relationships, major life areas, community, social and civic life
Technology	Equipment and accessories needed to participate in physical activities, such as public buildings and facilities, transportation, activity venues, equipment, facilities, auxiliary equipment, sports courts, various types of balls and rackets, yoga mats, dumbbells, barbells, wrist guards, knee pads
The natural environment and man-made changes to the environment	The sports environment for participating in physical activities, including the natural geographical environment, air quality, climatic conditions and the surrounding environment for carrying out activity projects, often including places and venues involved in various activities such as communities, units, and families
Attitude	Psychological environment for participating in physical activities, including attitudes of family members, peers, friends, community members, colleagues, etc., social concepts, participation motivation, self-recognition, self-confidence, sense of security, tension, anxiety, etc.
Support and interrelationships	The social environment for participating in physical activity, often including the support and mutual relationships of family members, peers, friends, community members, colleagues, etc.
Services, institutions and policies	The social environment for participating in physical activities often includes the improvement of systems and policies, the establishment of relevant systems, the development and use of community activity venues, social concerns, social attitudes, information dissemination and promotion, capital management and investment, etc.
Personal reason	Gender, age, race, education, lifestyle, exercise habits, etc.

The forms of physical activity of children and adolescents with disabilities are divided into three categories: physical fitness, skills and sports. The physical activities involved mainly include physical activities in daily life, school physical education courses and rehabilitation training [20].

Daily physical activities mainly include active physical activities, physical activities, recreational activities, leisure activities, leisure and recreational activities, running, family activities, aerobic fitness exercises, etc. Guided educational physical education courses carried out by schools. Targeted rehabilitation training mainly includes electric gait equipment and weight loss walking training, water physiotherapy, functional strength training, structured training and unstructured strengthening of hands training, physical training, passive movement and active movement, online platform exercise

bike training, adaptive trampoline training, rehabilitation training with SPIDER, group task-oriented training, low-and high-intensity treadmill training, etc. Through participation in these physical activities, children with disabilities improve in physical function, activity, and participation, as well as promote health and social inclusion.

According to the ICF-CY theoretical framework and classification system, the promotion of physical activity for the functional rehabilitation of disabled children and adolescents is reflected in two aspects: physical function, activity and participation. Specifically, it improves gross motor function, muscle strength, balance coordination, walking, running, hand dexterity and function, cardiorespiratory fitness, body composition, pain, and more. It can also improve the quality of life, well-being, social support and exercise self-efficacy, actively participate in various leisure and physical activities, and increase the range of activities.

4 Application of ICF-CY in Children's Rehabilitation

4.1 Rehabilitation of Children with Cerebral Palsy

Children with cerebral palsy improved gross motor function and upper limb skills after participating in guided educational physical education courses. Using the electrical gait device LokoHelp to train children and adolescents with impaired walking function after brain injury, spinal cord injury and stroke, walking, lower limb strength, balance and mobility have been improved. Children with cerebral palsy, juvenile idiopathic arthritis, and Prader-Willi syndrome experienced significant improvements in functional mobility, walking endurance, range of motion, muscle strength, and pain with both aquatic and land-based physical therapy interventions. Active lifestyle and sports participation interventions for adolescents with physical disabilities can improve aerobic fitness and promote participation in physical activity. Functional strength training for children with cerebral palsy to improve hip, knee and ankle muscle strength and functional motor ability. Positive changes in hand dexterity and function after structured skill vs. unstructured rehabilitation training in children with unilateral spastic cerebral palsy. Adolescents with spastic cerebral palsy improved cardiorespiratory fitness and body composition after 6 months of lifestyle intervention including physical training and counseling sessions focused on physical behavior and exercise participation. Teenagers with cerebral palsy participating in exercise bike training on the online platform can improve their running ability and cardiovascular health. Adolescents with cerebral palsy are actively engaged in physical activity to improve their quality of life and well-being. Children with cerebral palsy received individualized running training skills intervention for 12 weeks, and their running ability was improved [21]. After participating in adaptive trampoline training, children with cerebral palsy showed positive changes in muscle strength, balance and functional activities, and improved persistence and enjoyment. Using SPI-DER for balance and coordination training for children with neurological dysfunction can improve their mobility and balance and coordination. Children with spastic cerebral palsy improved gross and fine motor function after participating in group task-oriented training.

In terms of activity and participation, participation in active physical activity, leisure, and recreational activities promotes social, recreational, and self-improvement activities in children with cerebral palsy. Lifestyle interventions based on physical training, physical behavior and sports participation can improve the quality of life and social support of adolescents with spastic cerebral palsy. Aerobic exercise can make adolescents with cerebral palsy more likely to engage in active physical activity. Children with cerebral palsy were able to participate more in school activities after 12 weeks of individualized running training. Children with spastic cerebral palsy have improved social function after participating in group task-oriented training. Low-and high-intensity treadmill training

in children with spastic cerebral palsy can improve independent walking and walking-related skills, thereby promoting activity participation.

4.2 Application of ICF-CY in Children with Autism

4.2.1 Speech Rehabilitation

Speech disorder is one of the core symptoms of autism. Using the ICF-CY speech and language cognitive function part to evaluate children with autism, the functional performance and impairment of various aspects of children's speech and language cognition can be obtained, and judge whether children need special assessment and intervention in interpersonal relationship, emotional response, perceptual function, language communication, etc., give full play to children's superior abilities, improve their disadvantaged abilities, and promote the comprehensive development of children's speech and language abilities. Liu Xuyi et al. started from the speech and language function, and combined the ICF-CY speech function assessment with the CARS-2 scale to evaluate the speech function and the rehabilitation effect. 30 autistic children with speech impairment were given rehabilitation interventions appropriate to the assessment results [22]. The study found that the impairment of ICF speech and language cognition was significantly improved. The improvement of speech function can improve the social communication ability of children with autism, better integrate and participate in activities, and is conducive to the establishment of good interpersonal relationships.

4.2.2 Sports Rehabilitation

Most autistic children have motor dysfunction such as low level of basic motor ability, motor development disorder and so on. Using the ICF-CY allows for a more comprehensive assessment of motor function in children with ASD in terms of physical function and structure, activity and participation, and the environment [23]. Choosing targeted sports training or physical activities, or even appliances used in daily life, can better improve children's activity levels. Xu Chenchen et al. designed applicability rhythmic gymnastics according to the ICF-CY physical activity category. Under the guidance of rehabilitation experts, 3 children were trained, 50 min/time, 3 times/week, for 12 weeks. The results showed that the children's attention, motor coordination, body control and perception were enhanced, the stereotyped movements were reduced, the ability to control their own behavior was improved, the activity level was improved, and the interpersonal communication was more active [24,25].

4.2.3 Environmental Intervention

Compared with traditional biomedical models, ICF-CY pays more attention to environmental factors. Environmental factors are physical, social and attitudinal environments in which people live and live and can have a positive or negative effect [26–28]. The growth and development process of children is completed in the family, and the functional state of children is realized by continuous interaction with family members, guardians and the environment. Favorable family environmental factors are crucial to the healthy development of children, and direct contacts such as parents, professionals, and peers are needed to eliminate barriers. Wang Jiaoyan and others conducted a comparative study of two autistic children and found that after changing the influence of parents' attitudes and communication skills in environmental factors from hindrance to promotion, the degree of obstacles in physical function, activity and participation was significantly reduced after half a year [29].

5 Conclusion

ICF-CY is a framework and classification developed on the basis of the International Classification of Functioning, Disability and Health, which comprehensively evaluates the health and function of children and adolescents according to the developmental characteristics of children and adolescents. The ICF-CY codes broader categories to describe functional and health conditions that are characteristic of children and adolescents. This article summarizes the use in patients with cerebral palsy and those on the autism spectrum.

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