Disability and Rehabilitation
An international, multidisciplinary journal

http://informahealthcare.com/dre
ISSN 0963-8288 print/ISSN 1464-5165 online

Disabil Rehabil, Early Online: 1–9
 DOI: 10.3109/09638288.2014.923527

informa
healthcare

PERSPECTIVES IN REHABILITATION

Lessons learned from different approaches towards classifying personal factors

Rachel Müller[1] and Szilvia Geyh[1,2]

[1]Swiss Paraplegic Research (SPF), Nottwil, Switzerland and [2]Department of Health Sciences and Health Policy, University of Lucerne, Nottwil, Switzerland

Abstract

Purpose: To examine and compare existing suggestions towards a classification of Personal Factors (PF) of the International Classification of Functioning, Disability and Health (ICF). *Methods*: Qualitative and quantitative content analyses of available categorizations of PF are conducted. *Results*: While the eight categorizations greatly differ in their background and structure, the broad content areas covered seem to be similar and reflect the ICF definition of PF. They cover to various degrees 12 broad content areas: socio-demographic factors, behavioral and lifestyle factors, cognitive psychological factors, social relationships, experiences and biography, coping, emotional factors, satisfaction, other health conditions, biological/physiological factors, personality, motives/motivation. *Conclusions*: In comparing these categorizations, a common core of content issues for a potential ICF PF classification could be identified and valuable lessons learned. This can contribute to future classification development activities in relation to PF.

➤ Implications for Rehabilitation

- Personal Factors (PF) are part of the bio-psych-social framework of the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF).
- Eight existing suggestions towards a classification of the ICF's PF are identified, described and compared: they differ in their background and structure, but also cover a common core of similar topic domains.
- Findings from this study can contribute to future PF classification development activities.

Keywords

Controlled vocabulary, International Classification of Functioning Disability and Health, psychological factors

History

Received 3 October 2013
Revised 12 March 2014
Accepted 8 May 2014
Published online 26 May 2014

Introduction

Personal Factors (PF) are part of the contextual factors within the bio-psych-social framework of the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF) [1]. Together with the components health condition, body functions and structures, activity, participation and environmental factors, PF partake in the complex interactions that constitute functioning and disability (Figure 1). PF can be understood as determinants, predictors, mediator or moderator variables, and even outcomes in relation to functioning and disability. However, in contrast to the other components of the framework, PF are not implemented by an according taxonomy and classification system. Although the general meaning of PF can be traced in the ICF document [2], a precise conceptualization is missing. Consequently, there is uncertainty about what is contained in this component of PF and what specific concepts may or may not be subsumed under its title.

Address for correspondence: Rachel Müller, PhD, Swiss Paraplegic Research, Guido A. Zäch-Strasse 4, CH-6207 Nottwil, Switzerland. Tel: +41 41 939 65 65. E-mail: rachel.mueller@paraplegie.ch

However, PF are relevant and useful. A review of the literature points to the potential of PF in enhancing our understanding of functioning, disability, and health, improving assessment and documentation of health-related information, thereby enhancing interventions and services for persons with disabilities, and strengthening the individual's perspective in the application of the ICF [3].

Beside these potential benefits of considering PF, the notion of PF has also been discussed in relation to major ethical concerns regarding the protection of individuals. These concerns include burdening the responsibility of disability on the individual (''blaming the victim'') and denying access to services for persons in need of them on grounds of their specific PF. It is suspected that classifying PF may bear the risk of stigmatization, labelling, in summary, of discrimination of persons with disabilities [4–8].

In contrast, it has been argued that disregarding PF likewise raise ethical concerns as it would mean neglecting the person's individuality and the full background of the person's life and living, which represents the context of functioning and disability [4]. In other words, disregarding PF would mean reducing the person to his or her functioning status. PF could significantly

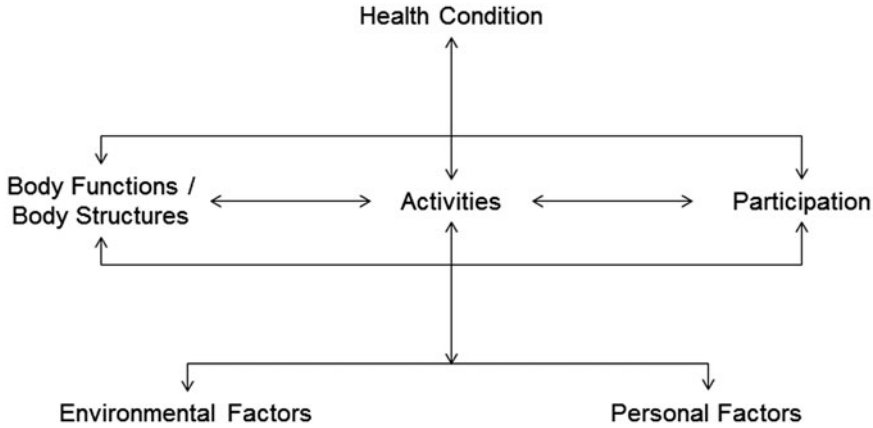

Figure 1. The ICF's integrative model of functioning, disability and health.

contribute to the comprehensive and in-depth understanding of functioning and disability in the ICF.

Today, different suggestions towards a classification of PF exist: PF in audiological rehabilitation [9,10], PF as the subjective dimension of functioning and disability [11,12], PF in work [13,14], inherent and acquired PF [15], PF in individual socio-medical expertise [16], PF referring to individual-centeredness [17–19], PF in motor neuron disease (MND) and PF as health-related habits and lifestyle [20].

Now questions arise, such as, is there a common ground between the different suggestions of PF categorizations that already exist? Do they reflect the conceptualization of the ICF? What can be learned from these approaches for a future development of an ICF classification of PF?

Therefore, the purpose of the current study is to examine and compare existing suggestions towards a classification of the ICF's PF. The specific aims are to describe (1) the background, content and (2) structure of the categorizations; (3) to compare the content and structure of the categorizations among each other, and (4) with the ICF's definition of PF.

Methods

Design

Qualitative and quantitative content analyses of available categorizations of PF are conducted.

Procedure

This work is derived from a systematic literature review conducted to identify papers about ICF's PF, which is previously published elsewhere [3]. This literature search has been updated to include documents up to 2012. Publications containing suggestions about the content of the PF component of the ICF were selected and further investigated. The ICF definition of PF is stated as follows: PF refer to ''. . .the particular background of an individual's life and living, and comprise features of the individual that are not part of a health condition or health states. These factors may include gender, race, age, other health conditions, fitness, lifestyle, habits, upbringing, coping styles, social background, education, profession, past and current experience (past life events and concurrent events), overall behavior pattern and character style, individual psychological assets and other characteristics, all or any of which may play a role in disability at any level'' [2].

The term ''categorization'' is used to differentiate from ''classification'' referring to the requirements of a full ICF classification described in *The WHO Family of International Classifications* [21].

Analyses

To examine and describe the background and content of the categorizations, information about the field of development, frame, method of development, top level categories, and envisaged scope of application was extracted from the publications. As a quantitative approach to address the structure of the different categorizations, all concepts and examples considered in the categorizations were entered into a database and counted according to their level of specification. For the qualitative comparison of the categorizations, a suitable grid of content topics was developed inductively using the 1st and 2nd top-level headings of the categorizations by discussion and agreement between the authors. Based on the grid, the contents of the categorizations were cross tabulated. All concepts included in the categorizations were compared to the ICF definition and entered the predefined grid of content topics.

Results

From the literature, eight different categorizations of PF have been identified and included in the analyses. Table 1 provides an overview of the categorizations. The contents of each categorization are briefly summarized in the following paragraphs.

PF in audiological rehabilitation

Stephens et al. [9,10] point at the need of a classification of PF to assess the effects of hearing problems on a person's life. Based on their findings from audiological research and their experience with the application of the ICF, they propose five categories of PF. Personal and demographic characteristics describe the role of personal demographic and audiological aspects in differentiating persons in the experience of their disability (e.g. age, age at onset of hearing loss, social class). Cognitive factors refer to the influence of psychological factors on body function and structure, the performance of communication, and participation (e.g. denial, reluctance). Behavioral responses reflect communicative problems, such as efforts to conceal the hearing loss, avoiding social situations or employing communication strategies. Emotions are revealed by the experience of auditory disablement. They include emotional responses to the onset of hearing loss (e.g. depression, anxiety) or the consequences of changed communication (i.e. embarrassment, fear, marginalization, loneliness). Coping is described as changing the meaning of hearing loss, including psychological responses, such as social comparison, the acquisition of new skills, self-image, using hearing loss to one's advantage; finding fulfilment through association with new social groups.

DOI: 10.3109/09638288.2014.923527

Table 1. Overview of the eight categorizations of PF according to field, method of development, formal characteristics, top-level categories and scope of application.

	Stephens et al. [9,10]	Ueda & Okawa, [11,12]	Heerkens et al. [13,22]	Badley [15]	Viol et al. [16]	Grotkamp et al. [17–19]	Ng & Khan [23]	Salvador-Carulla et al. [20]
Field of development:	Audiological rehabilitation	General	Work	General/Research	Socio-medical expertise in Germany	Social Medicine and Prevention	Motor neuron disease (MND)	Health-related behavior
Frame	ICF	Subjective experience			ICF, bio-psycho-social perspective	ICF, bio-psycho-social perspective		ICF, models of person-centeredness and change
Method of development:	Based on research in audiology	Based on theoretical considerations, actual and fictional case histories	Theoretical considerations	Theoretical considerations	Working group discussion	Working group discussion	Cross-sectional survey	Working group discussion, multidisciplinary focus groups, pilot study
Top level categories	Personal and demographic characteristics, Cognitive factors, Behavioral responses, Emotions, Coping	Inherent characteristics, Legal control or regulation Qualifications, careers and experiences, General behavior patterns, General mood and feelings, Satisfaction and expectations	Socio-demographic factors/general personal data, Psychological assets/mental health Personal factors related to disease/disorder, General lifestyle (behavior), Work-related personal factors	Scene-setting personal factors, Support and relationships, Contingent personal factors	Socio-demographic and biographic factors, Genetic factors, factors of age and aging, Physical factors Psychological factors, Factors of lifestyle and protection of health, Medical history	General personal characteristics, Physical factors, Mental factors, Attitude, basic skills, behavioral pattern, Life situation and socio-economic/-cultural factors, Other factors of health	Demographic factors Emotional factors Coping strategies and styles Personality Beliefs Attitudes ''Other''	Health descriptors, Cognition, Vitality and stress, Sleep, Diet and exercise, Substance use, Other health risk habits
Envisaged scope of application:	General framework to develop research of PF in general and in hearing impairments	General/Research	Work participation, reintegration, prevention of absenteeism	General/Research	General (guidance, ''work hypothesis'')	General (guidance, ''work hypothesis'' in the application of the ICF)	Research/ Rehabilitation	Assessment

Subjective dimension of functioning and disability

The subjective dimension of functioning and disability is seen as a missing element in the ICF by Ueda and Okawa [11,12]. Their categorization of PF is based on theoretical considerations and the analysis of actual and fictional case histories, and consists of six chapters. The first two chapters are demographic features of the person. Inherent characteristics include age, gender, ethnicity, nationality, birth place and religion. Marital status, being under adult age, rights for social security services are characteristics which are under legal control or regulation. Qualifications, careers and experiences form the biographical history of the person. General behavior patterns include cognitive and action-controlling aspects of personality, such as self-control, self-reliance, coping styles, styles of attribution, morality, value system, faith, goals and general life style. General mood and feelings focus on the emotional aspect of a person (e.g. happiness, hope, sense of belonging, security, acceptance, confidence). Finally, appraisals or evaluations of the current status of functioning and disability are described as the individual's satisfaction and expectations.

PF in work

Heerkens et al. [13,14] set out to apply the ICF to the working situation with the purpose of explaining and preventing absenteeism from work in specific groups. The authors integrated notions of work load, work capacity [22,23], and the ICF into one model. PF in their first suggestion [13] comprise the personal psycho-social and physical carrying capacity, general PF, such as age, gender, and education, but also life style, and mental factors (e.g. coping, self-efficacy, temperament). The willingness to exertion, motivation, work experience, the need for absenteeism are together with cognitions and the personal meaning of work described as work-related PF.

Based on later research projects, the first categorization has been generalized and elaborated by Heerkens and Van Ravensberg [14,24]. Five different categories are listed: socio-demographic factors/general personal data (e.g. age, gender, education but also partnership and marriage, income, major life events), psychological assets/mental factors (e.g. coping, self-efficacy, attitude, purpose in life, quality of life), PF related to disease/disorder (e.g. coping with illness, attribution, beliefs), general lifestyle and behavior (e.g. movement habits, use of drugs, relaxation behavior), and work-related PF (e.g. meaning of work, profession, job satisfaction, need for work). The present analyses use the second suggestion by these authors, as the more current and more differentiated version, which also includes all aspects of the first one.

Inherent and acquired PF

Badley [15] presents a categorization of PF in three broad domains. Scene-setting PF comprise socio-demographics, body function and structure. The socio-demographic factors consist of attributed factors (e.g. age, gender, ethnicity, marital status), social and cultural factors (e.g. language, social background, upbringing, religion), and individual aspects (e.g. living arrangements, previous experience, life events). Body function and structure describe the person's physical characteristics (e.g. body size, strength, energy) and psychological traits (e.g. temperament and personality, ''talent'', resilience, intelligence). The category of support and relationships is considered as an interpersonal aspect defining the individual's life, such as societal involvement and task, and as part of the resources that a person brings to living with a disability. The contingent PF influences the disablement process. General characteristics are related to the outlook and knowledge of the person, such as goals, expectations and health knowledge. Behaviors and lifestyle (e.g. physical activity, smoking, alcohol consumption, social behaviors) is a group of contingent modifiable aspects of the person. Consequences on a health condition or disability relate to both positive and negative psychological reactions, such as self-efficacy, self-esteem, coping, frustration, anger and body image.

PF in individual socio-medical expertise

Viol et al. [16] compiled a highly comprehensive categorization of PF for the social health insurance medical advisory boards in Germany. The authors state that PF are important in individual socio-medical expertise to achieve suitable insurance coverage and benefit. They are facilitators or barriers and interact with activities and participation, therefore influence the outcome of interventions.

The socio-demographic and biographic factors include age, gender, ethnicity, prenatal factors, early childhood factors, upbringing, education, family status, place of residence, employment, income, social class. The genetic factors are gender, ethnical background, genetic characteristics, or genetic markers, such as the blood group system. Gestational, developmental and biological ages are defined as factors of age and aging. The physical factors comprise height, weight, body mass index, anthropological body type (e.g. limb or waist-hip-ratio) and proportion of body structure (e.g. fat, muscle, bone mass). The psychological factors include personality, intelligence, motives and interests together with vegetative factors such as type of sleeper, regulation of temperature, heart rate and sexual function. Nutrition, personal and mental hygiene, attitude towards health and disease and social competences are seen as factors of lifestyle and protection of health. The last chapter describes the medical history of the person (e.g. past diseases, injuries, or interventions).

PF for individual-centeredness

Grotkamp et al. [17–19] argue that a classification of PF is required to emphasize individual-centeredness in the context of social medicine and prevention. They further develop the categorization by Viol et al. [16] using the conceptual and structural principles of the ICF and complement the categorization with selected examples of PF serving as a facilitators or barriers. Their suggestion first describes unchangeable general factors such as age, gender and genetic factors. The person's inherent physical (e.g. mass, shape, movement, cardiovascular and respiratory functions) and mental factors (e.g. extroversion, emotionality, optimism, cognitive and mnestic factors) constitute the second and third chapter. As modifiable factors attitudes (e.g. ideology, life satisfaction), basic skills (e.g. social and methodological skills) and behavioral patterns (e.g. nutrition, physical and sexual habits) are described in the fourth category. Life situation and socio-economic/-cultural factors include the immediate life situation (e.g. family or housing situation) and the socio-economic and socio-cultural status (e.g. verbal communication, educational level). Past diseases, health conditions, injuries, trauma or interventions are summarized under other factors of health.

PF in motor neuron disease

Ng and Khan [25] describe PF as important barriers and/or facilitators in relation to self-empowerment and helping patients adapt to the long-term progressive neurological condition of motor neuron disease. In a cross-sectional survey of persons with motor neuron disease, the authors used an open-ended questionnaire to identify PF. Categories of PF are demographic factors (gender, race, age, educational and socio-economic status), emotional

Table 2. Comparison of the 8 categorizations of PF according to their structure.

	Stephens & Kerr [9,10]	Ueda & Okawa [11,12]	Heerkens & Ravensberg [13,14]	Badley [15]	Viol et al. [16]	Grotkamp et al. [17–19]	Ng & Khan [23]	Salvador-Carulla [20]
Structure of categorization:								
Number of entries overall	54	130	73	61	546	82	48	240
Number entries at								
1st level[a]	5	6	5	3	7	6	7	7
2nd level[b]	–	70	68	5	36	54	–	43
3rd level[c]	–	–	–	7	199	23	–	141
4th level	–	–	–	–	210	–	–	49
5th level	–	–	–	–	68	–	–	–
6th level	–	–	–	–	19	–	–	–
Instances/examples[d]	49	54	–	46	–	104	41	–

[a]1st level includes entries referring to *chapters*, *domain* and *categories.*
[b]2nd level includes entries referring to *dimensions.*
[c]3rd level includes entries referring to *subdimensions.*
[d]Instances/Examples are counted only if they are not integrated in the explanation of the categories at different levels.

factors (e.g. depression, anxiety, hope, gratitude), coping strategies and styles (e.g. problem-solving, acceptance, humour), personality (e.g. stubborn and easy-going), beliefs (i.e. religious beliefs and self-esteem), attitudes (e.g. grateful and fighting attitude, attitudes towards assisted, being organized) and ''other'' (e.g. perceived social support). Some factors are listed under two categories: for example, self-esteem which could encompass a belief (that the patient is worthy) and an emotion (of pride).

PF as health-related habits and lifestyle

Salvador-Carulla et al. [20] consider PF from a clinical-epidemiological perspective and argue that it is important for the development of targeted prevention and intervention programs to assess multiple risk factors of mortality and disease, especially health-related habits and lifestyle of the person. Based on working group discussions, multidisciplinary focus groups and a feasibility study, the authors present a taxonomy for health-related habits and related determinants of longevity. The taxonomy contains the domain health descriptors (socio-demographics, family, developmental and medical history), the domain cognition (e.g. attention, memory and learning), the domain vitality and stress with dimensions for social reserve (i.e. positive relationships, isolation, social support), major life events or basic allostatic load (e.g. blood pressure, waist-to-hip ratio, cholesterol), and the domain sleep about sleep habits and quality. An additional main domain consists of information about diet and exercise, which includes, body composition, experiences and habits. The domain substance use (e.g. medication, nicotine, alcohol) and other health risk habits (e.g. non-adherence to treatment, sexual behaviors, and dangerous sports) complete the taxonomy.

Table 2 shows the structure of the eight categorizations. The categorizations greatly differ in the number of concepts they address, but also in how these concepts are structured. For example, the approach of Viol et al. contains 546 concepts in 6 levels; in contrast, the approach by Ng and Khan contains 48 concepts, i.e. 7 categories and 41 examples within the categories. The categorization of Viol et al. is highly nested and uses up to 6 levels in depth, while the Stephens et al. and Ng and Khan define the top level only.

Table 3 shows the comparison of the eight categorizations with regards to their content. The content comparison of the eight approaches is based on a grid of twelve topics: socio-demographic factors, behavioral and lifestyle factors, cognitive psychological factors, social relationships, experiences and biography, coping, emotional factors, satisfaction, other health conditions, biological/physiological factors, personality, motives/motivation. All eight categorizations address ''socio-demographic factors'', ''behavior/lifestyle'' and ''coping''. Seven of the eight categorizations deal with ''cognitive/psychological factors'' and ''emotion''. Six of the eight include ''social relationships'', ''experiences/biography'' and ''personality''. ''satisfaction'', ''other health conditions'' and ''motives/motivation'' are included in five of the eight categorizations. ''biological/physiological factors'' are considered in four of the eight suggestions.

The content topics which are addressed in the eight categorizations largely reflect the definition and the examples of PF in the ICF. However, the categorizations also add further content topics, which are not mentioned in the ICF's definition of PF: six add ''social relationships'', four add ''emotions'', three ''satisfaction'' and ''biological/physiological factors'' and two add ''motives/motivation'' as an additional PF content topic.

Discussion

Eight categorizations of PF have been identified.

The eight approaches represent constructive and innovative contributions to the discussion about the PF of the ICF in disability, rehabilitation and health behavior. The categorizations greatly differ in their background, development and structure. They include practical and theoretical approaches, from different professional fields and countries, addressing different perspectives of functioning, disability and health. Categorizations differ in length and detail and in some cases raise the question, if they intend to provide a complete list of factors included in theories of human behavior. Such questions, however, remain open, since none of the authors provided a clear conceptualization of their understanding of PF.

Still, the broad content areas covered by the eight categorizations seem to be similar and reflect the ICF definition of PF. More specifically, socio-demographic factors, behavior/lifestyle, cognitive/psychological factors and coping are commonly addressed. This common core across different application fields and countries counter the argumentation that PF are not classified in the ICF because of the large social and cultural variance associated with them [26].

The categorizations also add content topics, which are not explicitly included in the ICF definition of PF, for example, social relationships, aspects of emotions, biological/physiological factors, satisfaction and motives/motivation. These added content areas should be further examined and discussed with regards to their fit with the conceptualization of PF and the ICF.

Table 3. Comparison of the eight categorizations of PF and the PF-examples of the ICF according to content topics.

Content topics	ICF PF definition	Stephens et al. [9,10]	Ueda & Okawa [11,12]	Heerkens & van Ravensberg [13,14]	Badley [15]	Viol [16]	Grotkamp et al. [17–19]	Ng & Khan [23]	Salvador-Carulla et al. [20]
Socio-demographic factors	Examples: Gender, race, age, social background, education, profession	1. Personal demographic characteristics	1. Inherent characteristics 2. Common legal status	1. Socio-demographic factor/general personal data 5. Work-related personal factors/ Example: occupation/profession	A. Scene-setting personal factors/A1. Socio-demographic factors	1: Socio-demographic and biographic factors	i1 General personal characteristics i5 Life situation and socio-economic/ socio-cultural factors	Demographic factors	h.1. Socio-demographics
Behavior/Lifestyle	Examples: Fitness, lifestyle, habits, overall behavior pattern	3. Behavioral responses	4. General behavior patterns/ Lifestyle	4. General lifestyle (behavior)	C. Contingent personal factors/C2. Behaviors and lifestyle	6. Factors of lifestyle and protection of health	i4 Attitudes, basic skills and behavioral patterns i450-479 Behavioral patterns	Attitudes/Example: being organized	All 6 domains (excl. h. health descriptors)
Cognitive/Psychological factors	Example: psycho-logical assets	2. Cognitive factors		2. Psychological assets/ mental factors	C. Contingent personal factors/C1. General/ Examples: Goals, expectations, knowledge	5. Psychological factors	i3 Mental factors i350–369 Cognitive and mnestic factors	Beliefs/Example: self-esteem	C. Cognition
Social relationships			3. Qualifications, careers and experiences/ Qualifications, careers and experiences concerning interpersonal interactions and relationships	1. Socio-demographic factors/General personal data/Social network (formal and informal)	B. Support and relationships	6. Factors of lifestyle and protection of health/Factors of social wellbeing		''Other'' perceived social support	v.3. Social reserve
Experiences/ Biography	Examples: Upbringing, past and current experience		3. Qualification, careers and experiences	1. Socio-demographic factors/general personal data/Example: major life events, life course	A. Scene-setting personal factors/A1. Socio-demographic/ A1.4 Other/ Example: Life events, current experience	1. Socio-demographic and biographic factors	i5 Life situation and socio-economic/-cultural factors i610 Past disease, health conditions, injury and trauma		v.4. Major life events h.4. Past medical history
Coping	Example: Coping styles	5. Coping	4. General behavior patterns/Coping styles	2. Psychological assets/ mental factors/ Example: coping style 3. Personal factors related to disease/ disorder/Example: coping with illness	C. Contingent personal factors/C3. Consequent on the health condition/ Example: Coping	5. Psychological factors/see chapter description 6. Factors of Lifestyle and health protection/Personal and mental Hygiene/see chapter description	i433 Methodical skills/ incl.: coping strategies	Coping strategies and styles	v.1.Vitality
Emotion		4. Emotion	5. General mood and feelings		C. Contingent personal factors/C3. Consequent on the health condition/ Example: Emotional reaction	5. Psychological factors/Personality factors/Emotionality	i315 Factors of emotionality	Emotional states	v.5.1. Emotional stability v.5.5. Emotional State

DOI: 10.3109/09638288.2014.923527

Satisfaction			6. Satisfaction and expectation	2. Psychological assets/ mental factors/ Examples: quality of life/life satisfaction 5. Work-related personal factors/ Example: job satisfaction		6. Factors of lifestyle and protection of health/Factors of social wellbeing/Job satisfaction	i413 Life satisfaction		v.1.1. Happiness
Other health conditions	Example: other health condition		3. Qualifications, careers and experiences/ Experiences concerning health conditions		A. Scene-setting personal factors/A2. Body function and structure/A2.3 Other health conditions	7. Other health problems and interventions	i6 Other factors of health		d.3./e.3. Health-related conditions
Biological/ Physiological factors					A. Scene-setting personal factors/A2. Body function and structure/A2.1 Physical characteristics	4. Physical factors 2. Genetic factors 3. Factors of age and aging 1. Socio-demographic and biographic factors/Prenatal factors 5. Psychological factors/Vegetative factors	i2 Physical factors		v.6. Basic allostatic load
Personality	Example: Character style	2. Cognitive factors/Example: Personality			A. Scene-setting personal factors/A2. Body function and structure/A2.2 Psychologic traits	5. Psychological factors/Personality factors	i3 Mental factors i310–349 Personality factors	Personality	v.5. Psychological resistance to stress/e.g. v.5.2. Extraversion
Motives/Motivation			4. General behavior patterns/ Attributional styles, Morality, Value system, Faith, Goals		C. Contingent personal factors/C3. Consequent on the health condition/ Example: Effort	Chapter 5: Psychological factors/Motives	i410–429 Attitudes[a]		v.1.4. Sense of purpose

The grey-marked cells contain the top-level categories at the first and second levels. The white cells contain categories at more specific levels.
EF, environmental factors; BF, body functions; BS, body structures.
[a]Grotkamp et al. (2012) state that motivation is a multimodal factor including elements of, e.g. attitude and willingness action and effort.

Different public health theories are reflected in the eight categorizations. For example, Salvador-Carulla et al.'s categorization about PF as health-related habits can be placed within public health models for disease prevention [27] or health promotion models for supporting healthy lifestyles [28]. The social cognitive theory which describes an interaction effect between person, environment and behavior [29] is found, for example in Heerkens et al.'s approach about work situation or Ng and Khan's suggestions for PF in MND.

The eight suggestions towards a categorization of the ICF's PF and their common core of similar topic domains underpin the possibility of classifying PF. The categorizations provide pragmatic solutions to the problem of a lacking PF classification. However, they do not yet fully adhere to conceptual, formal, application and ethical principles of classification development according to ICF, WHO or UN standards [1,21]. In some cases the methodology of development was not transparent, or scientifically grounded, and limited to certain disorders, application fields, countries, professions, or subsets of PF. A clear and comprehensive conceptualization of PF was not elaborated. Furthermore, the categorizations are afflicted by the most significant challenge in the development of a PF classification, namely the potential overlap of certain PF with other components of the ICF. However, mutual exclusivity of categories is one of the basic conceptual requirements in any classification development.

For example, socio-demographic factors are addressed as PF, but may have some overlap with other ICF components and categories. Overlap could be seen for example with ICF categories, such as ''s630 Structure of reproductive system'' for gender, ''d820 School education'' for education, ''d850 Remunerative employment'' for employment status, or ''d930 Religion and spirituality'' for religious affiliation. However, these examples also show that the overlaps are only partial and differentiating aspects could be identified when the concept of PF is further clarified: While ''d850 Remunerative employment'' is used to code the information, how much difficulty a person with a health condition has to do his or her work, this information obviously differs from the PF ''employment status'', e.g. being self-employed, employee, homemaker, student, retired or unemployed.

Social relationships and social support were identified in several of the categorizations as PF, but may partially overlap with activities and participations in the ICF chapter ''d7 Interpersonal interactions and relationships'' or environmental factors in the ICF chapter ''e3 Support and relationships''. Coping skills, strategies and styles have been seen in all eight categorizations as PF, but can also relate to the ICF category ''d240 Handling stress and other psychological demands''. Emotionality, mood, feelings and emotional reactions have been addressed as PF, but may also be coded using the ICF category ''b152 Emotional functions'' among the mental body functions. Moreover, the information about ''other health conditions'' mentioned by five of the eight categorizations as well as by the definition of PF in the ICF, might also be covered by the component health condition and coded using the International Classification of Diseases (ICD-10) [30], which complements the ICF. Finally, the majority of categorizations list education, profession or employment as socio-demographic factors which are also addressed as a main focus in the International family of economic and social classifications (i.e. International Standard Classification of Occupation [31] and International Classification of Status in Employment [32]. These instances of potential overlap can be further examined and represent a valuable source and important basis for theoretical discussion in order to further clarify the conceptual understanding and demarcation of PF.

The authors of the eight categorizations argue that focusing on the individual by examining PF as facilitators (e.g. effective coping) or barriers and risks factors (e.g. substance use) can contribute to the understanding of functioning, disability and health in the ICF. The authors' argumentation can be placed in relation to ethical concerns about PF bearing the risk of stigmatization compared to those ethical concerns about non-consideration of PF and thereby neglecting individuality. Using the examples above, focusing on an individual's substance abuse can lead to stigmatization and discrimination of the individual. In contrast, identifying this information can help provide targeted and effective treatments to support the individual. Focusing on facilitators of a person, such as effective coping, can give valuable information on a person's individuality and acknowledge strengths. Non-identifying such information would mean missing out on opportunities to support the individual with targeted interventions to foster individual strengths and empowerment. In addition, discrimination and stigmatization is created by society and based on subtle interpersonal processes, but they are sanctioned by the law. Classifying PF can bring transparency into documentation and can clarify such interpersonal processes. Transparent communication between patients, health professionals, policy and law makers may diminish the potential of stigmatizing and discriminating individuals. In other words, by examining PF as both facilitator and risk factors and responsibly use this information as a tool to increase transparency, ethical concerns could be balanced out in further development of ICF's PF classification.

The eight categorizations taken together provide a valuable data base of several hundred concepts and suggestions of PF. However, the large differences of the eight categorizations in how the concepts are arranged into a categorical structure also indicate that the contents of PF do not lend themselves ''naturally'' to a certain way of classification. Obviously, various solutions are possible. The use of sophisticated classification methodologies may be necessary to arrive at a common agreed solution that is capable of serving as a harmonized and standardized reference for PF (e.g. ontological engineering).

Limitations

This study is subject to some limitations. First, certain categorizations (e.g. [13]) did not contain detailed explanations for the entries analyzed. Therefore, the allocation of categories to content topics was based on interpretation and judgment in discussions among the authors. Future suggestions towards a categorization of PF should contain clear conceptual descriptions and definitions. Second, categorizations which simply grouped the PF from the ICF definition, for example, into changeable and unchangeable [33] or focusing on the individuals self-perception of his or her health condition [34] were not included into the study.

Conclusions

First steps have been undertaken by different researchers to categorize the ICF's PF. In comparing these approaches, a common core of content issues could be identified, which could build the basis for further development. We conclude that future classification development activities in relation to PF should critically consider the topic domains that have been found common among the existing categorizations, should be based on an explicit conceptualization of PF, should clarify the problem of potential overlap of PF with other ICF components, should follow conceptual, formal, application and ethical principles of classification development according to WHO standards, and use empirical data and modern classification development methodology. In such a future development, those experts who have

already elaborated suggestions for a classification of PF should be involved and provide their advice as there is no objectively true answer to the question what is contained in the component of PF and which specific concepts may or may not be considered under its title.

Acknowledgements

We are much indebted to Prof. Dr. Alarcos Cieza, who provided us with her valuable advice in drafting the article.

Declaration of interest

This study has been funded by the Swiss Paraplegic Research (SPF), Nottwil, Switzerland. The authors report no declarations of interest.

References

1. WHO. International Classification of Functioning, Disability and Health: ICF. Geneva: World Health Organization; 2001.
2. WHO. Contextual Factors. International Classification of Functioning, Disability and Health: ICF. Geneva: World Health Organization; 2001:17.
3. Geyh S, Peter C, Muller R, et al. The Personal Factors of the International Classification of Functioning, Disability and Health in the literature – a systematic review and content analysis. Disabil Rehabil 2011;33:1089–102.
4. Duchan FJ. Where is the person in the ICF? Adv Speech Lang Pathol 2004;6:63–5.
5. Medicine Io. The National Academies. In: Field MJ, Jette A, eds. The future of disability in America. Washington (DC): National Academies Press; 2007.
6. Whiteneck G. Conceptual models of disability: past, present, and future. In: Field MJ, Jette AM, Martin L, eds. Workshop on disability in America: a new look. Washington (DC): National Academic Press; 2006:50–66.
7. Link BG, Phelan JC. Stigma and its public health implications. Lancet 2006;367:528–9.
8. Stuber J, Meyer I, Link B. Stigma, prejudice, discrimination and health. Soc Sci Med 2008;67:351–7.
9. Stephens D, Gianopoulos I, Kerr P. Determination and classification of the problems experienced by hearing-impaired elderly people. Audiology 2001;40:294–300.
10. Stephens D, Kerr P. Auditory disablements: an update. Audiology 2000;39:322–32.
11. Ueda S, Okawa Y. The subjective dimension of functioning and disability: what is it and what is it for? Disabil Rehabil 2003;25: 596–601.
12. Ueda S, Okawa Y. The ICF: its theoretical development and practical implementation in the health and long-term care system in Japan; 2008. Available from: http://www.doh.gov.tw/ufile/doc/20090313Ueda_Slides.pdf [last accessed 26 Jan 2012].
13. Heerkens Y, Engels J, Kuiper C, et al. The use of the ICF to describe work related factors influencing the health of employees. Disabil Rehabil 2004;26:1060–6.
14. Heerkens Y, Van Ravensberg D. List of personal factors. WHO Family of International Classifications (FIC). Newsletter 2012:15.
15. Badley E. More than facilitators and barriers – fitting the full range of environmental and personal contextual factors into the ICF model; 2006. Available from: http://secure.cihi.ca/cihiweb/en/downloads/Elizabeth%20Badley%20-%20Looking%20Ahead.pdf [last accessed 26 Jan 2011].
16. Viol M, Grotkamp S, van Treeck B, et al. Ein erster Versuch zur systematischen, kommentierten Auflistung von geordneten Anhaltspunkten für die sozialmedizinische Begutachtung im deutschen Sprachraum. Gesundheitswesen 2006;68:747–59.
17. Grotkamp S, Cibis W, Behrens J, et al. Personal contextual factors of the ICF draft from the Working Group ''ICF'' of Specialty Group II of the Geman Society for Social Medicine and Prevention. Gesundheitswesen 2010;72:908–16.
18. Grotkamp S, Cibis W, Nuchtern E, et al. Personal factors of the ICF. Gesundheitswesen 2012;74:449–58.
19. Grotkamp S, Cibis W, Nuchtern E, et al. Personal factors in the international classification of functioning, disabiltiy and health: prospective evidence. Austra J Rehabil Counsel 2012;18:1–24.
20. Salvador-Carulla L, Walsh CO, Alonso F, et al. eVITAL: a preliminary taxonomy and electronic toolkit of health-related habits and lifestyle. SciWorldJ 2012;2012:379752 (1–14).
21. Jakob R, Ustun B, Madden R, Sykes C. The WHO Family of International Classifications. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 2007;50:924–31.
22. van Dijk TJH, van Dormolen M, Kompie MAJ, Meyman TF. Hewaadeing model belasting-belastbaaheid (Revaluation of the model of work load and work capacity). J Soc Gezondheidszong 1990;68:3–10.
23. van der Beek A. Assessment of workload in lorry drivers. Thesis. Amsterdam: University of Amsterdam; 1994.
24. Heerkens Y, Van Ravensberg D, Stallinga H, et al. Personal factors in the ICF: Dutch analysis and approach. WHO – Family of International Classifications Annual Network Meeting Brasilia, Brazil; 2012.
25. Ng L, Khan F. Identification of personal factors in motor neurone disease: a pilot study. Rehabil Res Pract 2011;2011:871237 (1–8).
26. Organization WH. International Classification of Functioning, Disability and Health (ICF). Geneva: World Health Organization; 2001.
27. Sleet DA, Hopkins KN, Olson SJ. From discovery to delivery: injury prevention at CDC. Health Promot Pract 2003;4:98–102.
28. Liller KD, Sleet DA. Health promotion research approaches to the prevention of injuries and violence. Am J Health Behav 2004;28: S3–5.
29. Bandura A. Health promotion by social cognitive means. Health Educ Behav 2004;31:143–64.
30. WHO. ICD-10 Classifications of Mental and Behavioural Disorder: Clinical Descriptions and Diagnostic Guidelines. Geneva: World Health Organisation; 1992.
31. International Labour Organization (2014). International Standard Classification of Occupation (ISCO). Available from: http://www.ilo.org/global/statistics-and-databases/classifications/lang–en/index.htm [last accessed 12 Mar 2014].
32. International Labour Organization (2014). International Classification by Status in Employment (ICSE). Available from: http://www.ilo.org/global/statistics-and-databases/classifications/lang–en/index.htm [last accessed 12 Mar 2014].
33. Howe T. The ICF contextual factors related to speech language pathology. Int J Speech-Lang Pathol 2008;10:27–37.
34. Huber JG, Sillick J, Skarakis-Doyle E. Personal perception and personal factors: incorporating health-related quality of life into the International Classification of Functioning, Disability and Health. Disabil Rehabil 2010;32:1955–65.