ORIGINAL ARTICLE

Rehabilitation goals of people with spinal cord injuries can be classified against the International Classification of Functioning, Disability and Health Core Set for spinal cord injuries

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Study design: Cross-sectional study.
Objectives: To establish whether inter-professional rehabilitation goals from people with non-traumatic spinal cord injury (SCI) can be classified against the International Classification of Functioning, Disability and Health (ICF) SCI Comprehensive and Brief Core Sets early postacute situation.
Setting: Neurological rehabilitation unit.
Methods: Rehabilitation goals of 119 patients with mainly incomplete and non-traumatic SCIs were classified against the ICF SCI Core Sets following established linking rules.
Results: A total of 119 patients generated 1509 goals with a mean (and s.d.) of 10.5 (9.1) goals per patient during the course of their inpatient rehabilitation stay. Classifying the 1509 rehabilitation goals against the Comprehensive ICF Core Set generated 2909 ICF codes. Only 69 goals (4.6%) were classified as 'not definable (ND)'. Classifying the 1509 goals against the Brief ICF Core Set generated 2076 ICF codes. However, 751(49.8%) of these goals were classified as 'ND'. In the majority of goals (95.7%), the ICF code description was not comprehensive enough to fully express the goals set in rehabilitation. In particular, the notion of quality of movement or specificity and measurability aspects of a goal (usually described with the criteria and acronyms SMART) could not be expressed through the ICF codes.
Conclusion: Inter-professional rehabilitation goals can be broadly described by the ICF Comprehensive Core Set for SCI but not the Brief Core Set.

INTRODUCTION

Spinal cord injuries may have profound effects on the physical functioning of an individual and cause activity limitations and participation restrictions.[1] The level of lesion and the degree of neurological completeness/incompleteness influence the physical ability following a spinal lesion, but quality of life in spinal cord injury (SCI) is largely determined by activity and participation issues, such as personal care, community transportation and stable relationships.[2] The ability to describe, classify and code information and measurements on such a broad range of health issues requires a common framework and language. The Word Health Organisation endorsed the International Classification of Functioning, Disability and Health (ICF) as a member of the family of international classifications and was designed to provide such a framework; it aimed to 'establish a common language for describing health-related states in order to improve communication' (p3).[3] The ICF understands human functioning to be the result of complex interactions between health conditions and environmental and personal factors.

Although the ICF is intended to be a document for use in clinical practice, its length and complexity make this a practical challenge. Tailored useful applications have therefore emerged and continue to be under development; the ICF should therefore be seen as a living tool.[4] The need for such tailoring has led to the creation of condition-specific Core Sets[5] that aim to contain a practically useful number of ICF codes, which are comprehensive enough to cover the range of health issues relevant to a particular condition.

Core Comprehensive and Brief Sets for individuals with SCI have been developed for the early postacute[6] and the long-term situations.[7] The Comprehensive early postacute Core Set consists of 162 ICF codes of which 63 are from 'body functions', 14 from 'body structures', 53 from 'activities and participation' and 32 from 'environmental factors'. The Brief Set consists of 26 codes with 8 from 'body functions', 3 from 'body structures', 9 from 'activities and participation' and 5 from 'environmental factors'. The Comprehensive Core Set has been validated for use by physiotherapists as well as occupational therapists who found that this Set covered the majority of patient

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problems they encountered.[8,9] More recently, Chen et al.[10] developed an alternative Core Set as they felt that the existing ones were too influenced by western values and were not fully applicable to people from Asia who were seen as being more conservative and having closer family relationships.

Goal setting, defined as 'the formal process whereby a rehabilitation professional or team together with the patient and/or their family negotiate goals',[11] is widely practiced in rehabilitation settings even though its effectiveness has so far eluded formal unequivocal confirmation.[12] The process of goal setting has been described as complex and frequently dominated by the professionals in the team.[13] Challenging and yet achievable goals, frequently described with the acronym SMART (Specific, Measurable, Achievable, Relevent and Timed), have the potential to maximise the goal setting process.[14] Attempts to classify patient goals against the ICF within the acute and postacute general rehabilitation settings have concluded that they broadly map against ICF domains.[15,16] Wallace et al.[17] found that the goals of people with SCI are represented by the ICF, although they did not actually classify these goals against the Core SCI Sets. The aim of this study was therefore to specifically classify inter-professional rehabilitation goals from people with mostly non-traumatic and incomplete SCI against the ICF SCI Comprehensive and Brief Core Sets.

MATERIALS AND METHODS

This study utilised anonymised data from a clinical database of 1458 patients admitted to an inpatient neuro-rehabilitation unit. The database[18] contained diagnostic information, gender, age, length of stay, admission and discharge destination, rehabilitation goals and standardised clinical outcome measures (Barthel Index, Functional Independence Measure) of 1458 patients with a variety of neurological conditions admitted consecutively over a 13-year period.

From this database, we extracted the information of all 119 patients with a diagnosis of 'SCI' and classified their rehabilitation goals against the ICF SCI Comprehensive and Brief Core Sets. The rehabilitation goals are developed by the multi-disciplinary team in partnership with the patient, at weekly meetings. The process of goal planning broadly follows the principles described previously by others[19,20] and involves the agreement of relevant goals that are measureable, achievable and can be expressed in behavioural terms. These short- and long-term goals are reviewed on a two or three weekly basis, and the outcome of a goal is documented as either 'Achieved', 'Not achieved', 'Ongoing', 'Goal revised' or 'Goal abandoned'.

Classification of the goals followed the linking rules recommended by Cieza et al.[21] involving the following steps:

- Prior to classification, the researchers developed good knowledge of the conceptual and taxonomical fundaments of the ICF, as well as of the chapters, domains and categories of the detailed classification, including definitions.
- Each individual goal was carefully inspected and analysed to ascertain the overall goal and divide the overall goal into a primary goal, a secondary goal aspect and a tertiary goal aspect as appropriate. For example, the overall goal 'To walk to local shop, to purchase a newspaper' was divided into the primary goal 'To walk to local shop' and the secondary goal aspect 'to purchase a newspaper'.
- Each primary, secondary and tertiary goal was then classified against the Comprehensive ICF Core Set for SCI—early postacute situation as well as the Brief ICF Core Set for SCI—early postacute situation.

This classification was conducted by two researchers (BH, JF) who independently classified a sub-sample of 40 goals. These were then compared and discussed to ensure a common interpretation. The remaining goals were then analysed independently, and any uncertainties or discrepancies were resolved by discussion.

- The use of any assistive devices, orthoses, standing frames and so on described within a goal was identified by applying the ICF code 'e115—Products and technology for personal use in daily living'.
- Some goals required the support or assistance of another person, for direct physical assistance, facilitation, supervision or for giving prompts. In these cases, we added the ICF codes 'e340—Personal care providers and personal assistants' or 'e355—Health professionals' where this support was specifically provided by a health professional.
- Where the content of a goal was more specific or precise than any of the available categories from a Core Set, we initially allocated the category that most closely matched the overall sentiment of the goal and then recorded that the precise nature of the goal could not be classified.
- Where the content of a goal could not be matched against any of the available ICF codes from the Core Sets it was allocated 'ND—not definable'.

Data analyses utilised descriptive statistics, providing frequency data of the goals against ICF domains of the component body functions, activities and participation and environmental factors from the SCI Core Sets. The frequency of goals, which could not be classified according to the existing codes, was also determined.

RESULTS

The sample comprised 119 patients with a SCI diagnosis, 46 (38.7%) of whom were female. For the vast majority (114 or 95.8%), the underlying cause of their SCI was of a non-traumatic nature and included spinal tumours, cord compression and inflammation. In 45 patients (37.8%), the lesion was in the cervical area, and in 62 (52.1%) it was in the thoracic/lumbar area. For 12 (10.1%) patients, the database information was not clear enough to ascertain the precise level of lesion. A total of 102 (86.7%) patients had an incomplete lesion, and 8 (6.7%) had a complete lesion. For nine patients, the database information was not clear on their level of completeness. The mean (s.d., median, range) age on admission was 53.3 (16.4, 54.5, 67) years and their mean (s.d., median, range) length of stay was 43.6 (38.4, 36.0, 368) days. The median (interquartile range) Functional Independence Measure score on admission was 93.0 (34) and on discharge it was 113.0 (21). The median Barthel Index score on admission was 12.0 (9) and on discharge it was 18.0 (7).

These 119 patients generated 1509 goals with a mean (s.d.) of 10.5 (9.1) goals per patient during the course of their inpatient rehabilitation stay. Ninety-five of these goals had a secondary aspect and 5 also had a tertiary aspect. By the end of their stay, 1279 (77.7%) of these goals had been achieved, 154 (9.4%) had not been achieved, 45 (2.7%) were still ongoing, 13 (0.8%) had been revised and 18 (1.1%) were abandoned as they were inappropriate.

The majority of goals were multifaceted and were expressed through more than one ICF code; for example, the goal 'to be transferring with minimal assistance from a nurse using a sliding board' would have been expressed by three ICF codes (d420 for the transferring activity, e355 for the assistance provided by a health professional and e115 for the use of a product of personal use). Classifying the 1509 rehabilitation goals against the Comprehensive ICF Core Set therefore generated 2909 ICF codes. Only 69 goals (4.6%) were classified as 'ND'. All 65 goals (95.7%) in the ICF SCI Core Sets were not specific enough to fully express the goals set in rehabilitation; for example, the goal 'To transfer from sitting to standing, using my arms to push up and taking weight through my feet before taking hold of Carter Rollator' (walking appliance) was classified as d420 (transferring oneself) and e120 (products and technology for personal indoor and outdoor mobility and transportation). However, the detailed description goes much beyond this simple code and expresses the notion of quality of

Table 1 Frequency of codes applied against the early postacute situation Spinal Cord Injury Core Sets

ICF code	Code title	Frequency of codes applied against the COMPREHENSIVE—early postacute situation Core Set	Frequency of codes applied against the BRIEF—early postacute situation Core Set
b440	Respiratory functions	NA	2
b445	Respiratory muscle function	2	NA
b510	Ingestion functions	6	NA
d230	Carrying out daily routine	24	NA
d360	Using communication devices and techniques	29	NA
d410	Changing basic body position	NA	108
d4100	Lying down	1	NA
d4103	Sitting	31	NA
d4104	Standing	64	NA
d4105	Bending	1	NA
d4106	Shifting the body's centre of gravity	6	NA
d4153	Maintaining a sitting position	104	NA
d4154	Maintaining a standing position	124	NA
d420	Transferring oneself	209	209
d430	Lifting and carrying objects	10	NA
d4401	Grasping	3	NA
d4402	Manipulating	7	NA
d4403	Releasing	1	NA
d445	Hand and arm use	NA	32
d4450	Pulling	2	NA
d4451	Pushing	6	NA
d4452	Reaching	8	NA
d4453	Turning or twisting the hands or arms	5	NA
d450	Walking	NA	284
d4500	Walking short distances	280	NA
d4502	Walking on different surfaces	4	NA
d455	Moving around	31	NA
d4602	Moving around outside the home and other buildings	2	NA
d465	Moving around using equipment	40	NA
d470	Using transportation	5	NA
d475	Driving	1	NA
d510	Washing oneself	88	88
d520	Caring for body parts	81	NA
d530	Toileting	NA	71
d5300	Regulating urination	37	NA
d5301	Regulating defecation	34	NA
d540	Dressing	136	136
d550	Eating	26	26
d560	Drinking	7	7
d570	Looking after one's health	122	NA
d610	Acquiring a place to live	2	NA
d620	Acquisition of goods and services	29	NA
d630	Preparing meals	146	NA
d640	Doing housework	30	NA
d660	Assisting others	3	NA
d760	Family relationships	1	NA
d920	Recreation and leisure	37	NA
d930	Religion and spirituality	1	NA
e115	Products and technology for personal use in daily living	290	290
e120	Products and technology for personal indoor and outdoor mobility and transportation	220	220
e340	Personal care providers and personal assistants	30	30
e355	Health professionals	573	573
	Total	2909	2076
ND	Not definable	69	751

Abbreviation: ICF, International Classification of Functioning, Disability and Health. Note: NA here means that a particular ICF code is 'not applicable' to that ICF Core Set because that code is not available in that set. This is not a complete list of all the codes from the Comprehensive or the Brief Core set, but only codes that had goals linked to are included.

Table 2 Frequency and the percentage of codes from the comprehensive postacute Spinal Cord Injury ICF Core Set used against major ICF domains

ICF domain	Frequency of codes used (and the percentage of goals relating to this ICF domain)
Body function group 4: Functions of the cardiovascular, haematological, immunological and respiratory systems	2 (0.1%)
Body function group 5: Functions of the digestive, metabolic and endocrine systems	6 (0.4%)
Activity and participation group 2: General tasks and demands	24 (1.6%)
Activity and participation group 3: Communication	29 (1.9%)
Activity and participation group 4: Mobility	945 (62.6%)
Activity and participation group 5: Self-care	531 (35.2%)
Activity and participation group 6: Domestic life	210 (13.9%)
Activity and participation group 7: Interpersonal interactions/relationships	1 (0.1%)
Activity and participation group 9: Community, social and civic life	38 (2.5%)
Environmental factors: Products and technology (=use of equipment)	510 (33.8%)
Environmental factors: Support and relationships (=support from health professionals or others)	603 (40.0%)

Abbreviation: ICF, International Classification of Functioning, Disability and Health.

achieving this transfer and the exact nature/type/brand of equipment to be used.

Classifying the goals against the Brief ICF Core Set generated 2076 ICF codes. However, 751 (49.8%) of these goals were classified as 'ND'.

Table 1 provides a frequency breakdown of codes from the SCI Core Sets used against the 1509 rehabilitation goals from our sample.

When viewed against the major ICF categories, then our results showed that the rehabilitation goals set by the patients in our sample were mostly related to mobility (62.6%) or self-care (35.2%). In 510 (33.8%) goals, products and technology were used, and health professionals or other personal assistants had a significant role in achieving in 603 (40.0%) goals. Table 2 summarises the frequency (and the percentage) of codes from the Comprehensive ICF SCI Core Set against the major ICF domains.

DISCUSSION

This study aimed to determine whether it was possible to classify rehabilitation goals against the ICF Core Sets for SCI. It enabled us to ascertain how many of these goals could be classified onto the ICF SCI Core Data Sets and therefore give an indication of how these Core Sets may reflect inpatient rehabilitation practice. Our findings suggest that for the vast majority of goals an appropriate code from the Comprehensive Core Set could be identified. This supports the findings by Herrmann et al.[8,9] who investigated the applicability of the ICF Core Sets for SCI to physiotherapy and occupational therapy practice and also by Mittrach et al.[22] who concluded that goals of physiotherapy can be described with the language of the ICF.

Classification of goals against the Brief Core Set proved much more difficult, because there was no equivalent code for almost half of the goals. The usefulness of the Brief Core Set therefore seems limited within the context of rehabilitation goal setting. Others have also suggested that the Brief Core Sets for SCI reflect relevant areas of activity and participation in only a limited way and may require revision;[23] alternatively categories from the Comprehensive Set could substitute insufficient Brief Core Set categories.[6] Even though we were able to identify appropriate codes for the majority of goals, we found that in most cases the goal description was more extensive or more specific than the ICF codes permitted. In many cases, an ICF code ending in '8' or '9' ('other specified' or 'unspecified') could have been used. However, the use of these codes ending in 8/9 has been specifically discouraged in the ICF linking rules.[21] Additional elements, beyond the broad goal topic (such as transferring, walking or dressing), were embedded in the goal.v. These elements would contribute to making the goals SMART,[14] by adding specificity on the activity, any support or equipment needed, the time frame and quantification of the performance. In line with the aims of clinical practice, goals also focussed on enhancing the 'quality' of movement, making reference to good posture, expected movement sequence or appropriate weight bearing. This supports the notion that rehabilitation goals are often educational in nature, making explicit to the patient 'how to' achieve particular tasks. Barnard et al.[13] described the process of goal setting as being heavily influenced by members of the rehabilitation team, particularly when describing the quality standards of a goal. This quality element seems less important to the developers of the ICF; it is possible that it represents a unique priority for therapists involved in rehabilitation, although this has yet to be investigated.

The focus of the vast majority of goals was related to activity and participation issues of mobility (62.6%), self-care (35.2%) and domestic life (13.9%). These were similar priorities as found by some[24,25] but not to others.[26,27] In particular, goals relating to employment, leisure activity and personal relationships were infrequent in our sample. Patients at a later stage of their rehabilitation journey, or following return to the community, may well have a greater interest in these areas.

Very few goals (0.5%) focussed on the impairment level, which aims at improving individual body structures or individual body functions. Wallace et al.[17] also found that activity and participation goals were a key focus for individuals with SCI at the transition from hospital to home.

Most of the patients in our sample had an incomplete SCI of non-traumatic origin. Therefore, our findings may not generalise to individuals with complete lesions of traumatic origin. They may therefore also not generalise to patients who undergo rehabilitation in a specialist SCI centre.[28] Our investigation was based on a retrospective analysis of rehabilitation goals against the language of the ICF. The goals in our sample were not necessarily written with a full knowledge of the ICF or the desire to use the language of the ICF by either the patients or the multi-disciplinary team members. Therefore, goals set with the specific intent to utilise the language of the ICF may have produced a much better match. There seems merit in a more

standardised use of the ICF language when setting goals, as this may facilitate better comparisons of outcomes. However, using a standardised language should not limit the content of goal setting, particularly relating to the specificity of such goals.

DATA ARCHIVING

There were no data to deposit.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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