The role of clinical reasoning in understanding and applying the International Classification of Functioning, Disability and Health (ICF)

IAN EDWARDS (1), MARK JONES (2)

**ABSTRACT**

The language of the International Classification of Functioning, Disability and Health (ICF) is a common language for the description and classification of health and health related states. The ICF has as its theoretical underpinning the biopsychosocial model. In this paper obstacles to the implementation by physiotherapy students and practitioners of the biopsychosocial model in clinical practice are identified and their proposed solutions discussed. The manner in which the explicit learning of a collaborative clinical reasoning model assists students and practitioners to overcome these obstacles is outlined. The strengths and limitations of the biomedical paradigm that still dominates traditional medicine and physiotherapy are explored alongside the interpretive perspective with the aim of ultimately assisting physiotherapy students and practitioners to construct a broader understanding of knowledge and reality that will in turn assist their understanding and uptake of the biopsychosocial model and with it, the ICF framework.

**KEYWORDS**

WHO ICF Classification, Biopsychosocial model, Clinical reasoning, Narrative reasoning.

**Introduction**

Whether working with patients having musculoskeletal/sports, neurological, oncological or cardiorespiratory problems from infants through to old age, or when working in health promotion/injury prevention, physiotherapists must consider all factors potentially contributing to a person’s health [1]. While physiotherapists are often perceived as having a focus on the ‘physical’, contemporary biopsychosocial understanding of health and disability [2] means that attention to a patient’s physical health be undertaken with full consideration of environmental and psychosocial factors that may influence physical health within the scope and limits of the therapists’ education. This represents a significant challenge to both educators and practitioners alike. Understanding not only the diversity of the factors influencing health but also the relationship of such factors and how these impact on the person, producing a particular experience of (ill) health, functioning and disability, requires not only an ability to recognise such factors and relationships but a method (or methods) of clinical inquiry which are able to elicit such diverse data.

Jones et al (in press) have discussed the value of situating physiotherapists’ clinical reasoning into a broader framework of health and disability [1]. The World Health Organization (WHO) has published a ‘family’ of international classifications to guide health services, such as the International Classification of Functioning,
Disability and Health (ICF) [2]. The ICF provides a standardised language and framework to facilitate communication about health and health care across professional disciplines and sciences. The ICF is based on a WHO framework of health and disability (Figure 1) that portrays a person’s functioning and disability as outcomes of interactions between health conditions and contextual factors (both environmental and personal). ‘Functioning’ refers to all body functions where activities are the execution of specific tasks such as walking, sitting, lifting or specific body movements like turning your head and neck or lifting your arm overhead. ‘Participation’ is used here to refer to a person’s involvement in life situations such as work, family and leisure but may also manifest in other ways such as the patient’s participation in their health care or decisions regarding their health management. ‘Disability’ is an umbrella term referring collectively to the person’s impairments in body function and structure, activity limitations and, importantly, also participation restrictions. The interpretation of constructs such as ‘impairment’ and ‘disability’ are contested and are therefore further discussed in this paper.

Bidirectional arrows are used in Figure 1 to reflect the reality that a patient’s health condition can both influence and be influenced by their body functions and structures (or physical status), their capacity and performance of functional activities of life, and their subsequent ability to participate in their family, work and leisure roles. Importantly, the person’s physical status, activities, participation and their health condition can be positively or negatively influenced by a variety of factors including: environmental factors (e.g. social attitudes, architectural characteristics, legal and social structures, climate, terrain, etc.) and personal factors (e.g. gender, age, psychological features such as thoughts/beliefs, feelings and coping styles, health and illness behaviours, social circumstances, education, past and current experiences). This framework provides an excellent contextualisation for health care practice in general and physiotherapy practice in particular.

The World Health Organization’s International Classification of Functioning, Disability and Health (ICF) is increasingly accepted as the conceptual framework for understanding and describing health and health states in their complexity and multidimensionality [3-5]. The conceptual underpinning of the ICF [2] is the biopsychosocial model of health [6]. The biopsychosocial model, initially put forward by Engel [7] and later championed in the area of chronic low back pain by Waddell [8], takes the philosophical stance (now well supported by research) that patients’ disease, illness and suffering are affected by multiple levels of influence from society to genetics [6]. It holds that rather than one way linear cause and effect relationships between disease or pathology and clinical presentations, that reciprocal relationships exist that enable the “biomedical” to influence the “psychosocial” and visa versa. A biopsychosocial approach that attends to both biomedical and psychosocial dimensions, and their interactions, provides health practitioners with a more complete understanding necessary for accurate diagnosis, identification of appropriate health outcomes, and direction for holistic and targeted health care. However, whilst there may be in-
increasing acceptance among physiotherapy clinicians regarding the value of the ICF conceptual framework to physiotherapy practice [4, 5], there remain questions firstly about how well the ICF model integrates the biopsychosocial model itself [9, 10] and secondly regarding how to facilitate its application in clinical practice via the biopsychosocial model [11].

Our teaching experience has led to the conclusion that a key to linking the ICF framework to students’/clinicians’ decision making considerations in practice lies in an explicit teaching of clinical reasoning. In broad terms clinical reasoning refers to the thinking and decision making processes in clinical practice. In the context of the ICF framework, clinical reasoning would include the inquiry and decision making processes by which practitioners recognise how diverse contributing factors such as those highlighted in the ICF framework are relevant to individual patients in their particular circumstances in order to make appropriate clinical judgements that will contribute to their optimal health care.

Whilst we do not discuss the actual classification system of the ICF [2] in detail in this paper, we nevertheless outline the benefits and the challenges in using the ICF model as a basis for teaching students how to conceptualise the complex and multidimensional factors which influence a person’s health, functioning and experience of disability. As a corollary, we also propose that the holistic intentions of the ICF model, in endeavouring to incorporate a biopsychosocial understanding of the factors influencing a person’s functioning, disability and health, can be enhanced by adopting a comprehensive clinical reasoning process as a way of thinking both quantitatively and qualitatively about diverse biomedical, psychosocial and contextual data. This paper is based on a premise that the capacity to adopt and effectively use the ICF framework is dependent on a sound understanding of biopsychosocial theory.

Four obstacles to implementing the ICF framework (and biopsychosocial theory) in clinical practice

Understanding the biopsychosocial model

Notwithstanding its general acceptance, there remains residual criticism of the ICF in terms of how convincingly the biomedical and social views of health are integrated [9-11]. For example, a construct such as ‘disability’ still has a contested meaning among health practitioners and other stakeholders, not the least being disabled persons themselves [12, 13]. Traditionally physiotherapists have defined ‘disability’ as the degree of functional ‘outcome(s)’ resulting from the cumulative effects of a physical impairment(s) [13-15]. This in turn affects a person’s ability to participate in social activities such as work and recreation. A social view of disability contrasts sharply with such a biomedical view and explains ‘disability’ as a socially constructed reality where wider social attitudes and beliefs are the most ‘disabling’ of factors and lead to discrimination and exclusion of disabled people from participation in roles and activities which particular social and community groups value [13,15-17]. There is no evidence to suggest that these two views of disability have been reconciled to any great extent or on any larger scale in terms of how physiotherapists practice. Furthermore, for some practitioners, the conception of ‘biopsychosocial’ remains dualistic where the patient’s presentation is viewed as a combination of biomedical and psychosocial problems rather than seeing ‘biopsychosocial’ as a genuine integration of mind and body where each influences the other [6, 7, 18, 19]. Similarly, appreciation and focus may be given to psychological factors without appropriate recognition and attention to the social circumstances that have contributed to shaping those cognitions and which remain as barriers to change [20, 21].

Rigidity of clinical decision making within a prevailing paradigm of professional practice

Physiotherapists’ philosophies of practice and their worldviews in general are often biased toward traditional biomedically oriented practice with its linear, absolute cause and effect thinking about health [22-25]. This perspective can often be traced back to their undergraduate or postgraduate physiotherapy education and the explicit teaching and implicit messages students received regarding disability, physical impairment and pain cause and effect. The traditional biomedical model reduced patient’s health to a simple linear causality that portrayed their disabilities, pain states and physical impairments as the effect or outcome of their illness, disease or health condition without due consideration of the now well recognised influences environmental and psychosocial factors have on patients disabilities and health conditions [6-8]. When examined closer, this dualistic point of view of separating mind and body often has its roots in the person’s ontological perspective, or their view (conscious or unconscious) of knowledge, truth and reality. Typically being associated with the empirico-analytical research paradigm, the biomedical model takes the position that knowledge is absolute and has to be discovered, limited only by the constraints of technology which is in contrast to the interpretive research paradigm that holds that knowledge is context dependent and socially constructed [26]. The person who sees knowledge as absolute will tend to follow the biomedical model of looking for unqualified cause and effect relationships between their patients’ illness or pathology and their disability and clinical presentation. The person who sees knowledge as relative and context dependent will be more comfortable with the biopsychosocial model itself [9, 10] and secondly regarding how to facilitate its application in clinical practice via the biopsychosocial model [11].
chosocial model and multiple determinants of health and disability as portrayed in the ICF framework (figure 1). We discuss the ‘construction of knowledge’ in the clinical reasoning section of this paper.

Translating biopsychosocial and related theory to decision making in clinical practice

Even with a more interpretive ontological perspective of knowledge, many physiotherapists have an incomplete understanding of biopsychosocial theory and the pain science and learning theory that now underpin it. While this presents a clear obstacle to the biopsychosocial practice being promoted in the ICF framework, it is further compounded when the therapist’s understanding of biopsychosocial, pain science and learning theory is not supported by sound clinical reasoning to assist them in applying that theory in practice. Here, incomplete understanding of clinical reasoning theory commonly results in an over-focus on diagnostic, biomedically oriented reasoning and procedurally dominated management. Sometimes the therapist will have a holistic biopsychosocial perspective, with a good grounding in pain science, learning and clinical reasoning theory, but the obstacle is more a lack of procedural or craft knowledge and experience in how to apply all this in practice. This obstacle tends to result in psychosocial assessments that are superficial with clinical judgements that are based on insufficient understanding of the patient’s pain/disability experience, and ineffective management [27]. For example, a patient’s dramatic description of their low back pain, fear of exacerbation and expectations that no one can help them and consequently they won’t ever be able to resume normal activities, could lead some therapists to prematurely conclude the patient’s psychological status (catastrophising, fear-avoidance and negative attitude and expectations) has created a sensitising neuro-modulation of their pain requiring behavioural management including ignoring pain behaviours while reinforcing paced attempts to increase activity levels. Patient accounts such as this, while clearly representing yellow flags [28] that may well predispose to chronicity and present barriers to recovery, must be explored further by the therapist in order to understand the basis for those thoughts and feelings so that any treatment (e.g. cognitive-behavioural therapy) directed to these potential contributing factors is not simply a protocol applied to all like patients, but instead is tailored to the patient’s individual psychosocial circumstances [29, 30].

1. Pain science and learning theory are two distinct fields of research that have been linked to explain the inter-relationships between biomedical and psychosocial. Interested readers are referred to Melzack and Wall’s Textbook of Pain (3rd edn.) for an excellent compilation of contemporary research and theory on this topic.

Psychosocial inquiry and assessment – what are the parameters for physiotherapy practice?

How far should physiotherapists’ inquiry into psychosocial factors go? Recognising there are now helpful questionnaires available to measure patients’ views regarding their health status, quality of life, illness-pain/disability experience and future prospects, such outcome measures, while useful for monitoring change and valuable for identifying patients at risk of progressing to chronicity, are insufficient on their own to guide management. As a physiotherapist it is a challenge to recognise when one’s knowledge and skills with psychosocial assessment and management (including cognitive-behavioural and narrative strategies such as explaining pain, pacing, and graded exposure) are sufficient and when patients’ perspectives reflect larger and more advanced psychosocial contributing factors that require more specialised intervention. For example, when apparent misunderstandings or unhelpful fears emerge as barriers to patients’ activity and participation levels and their recovery, therapists with the necessary pain science, learning theory and cognitive-behavioural management background are often well equipped to address these misunderstandings regarding pain and to employ narratively oriented strategies (discussed later) to assist and encourage new perspectives and increased activity and participation. However, for physiotherapists without this background, this is an area which is often only superficially addressed in their role as teachers in clinical practice. However, it is also true to say that when the exploration of broader influences that pain and disability can have on a person reveals deeper, more complex problems relating to relationships, personal identify/self-worth and psychological health (e.g. depression), responsibility should be to first recognise these potential contributing factors and second, through discussion and with consent of the patient and referring doctor, to offer suggestions for referral to other health practitioners such as psychologists or counsellors [31]. This requires general knowledge of the different professions and services available. Because not all psychologists or counsellors have the necessary education and experience in pain and disability for this subgroup of patients [29, 31] local knowledge of suitable professionals is critical.

We would argue that clinical skills of inquiry and the ability to reason in more than one paradigm, as skills associated with adoption of the biopsychosocial model, assist practitioners to delineate the parameters of physiotherapy practice within presentations which include the presence of significant psychosocial issues. That is, the skills associated with using a biopsychosocial approach, instead of advocating physiotherapists as quasi counsellors or psychologists, actually assist physiotherapists to further define the professional boundaries of
their roles as experts in the analysis and management of movement disorders. This is also to propose that an understanding by the physiotherapist of a person’s interpretation of their illness and/or disability experience is to further enhance the assessment and management of movement disorders beyond an assessment of the movement impairment alone [26, 32]. The concepts of narrative reasoning and critical reflection are discussed below as particular examples of skills which are important to biopsychosocial practice and therefore to an implementation in clinical practice of the ICF framework.

Clinical reasoning and its role in facilitating biopsychosocial understanding

We now present a model of clinical reasoning which, we propose, assists students and practising clinicians to apply the ICF framework and the biopsychosocial model which underpins it, in the decision making of clinical practice. We argue that the description of clinical reasoning which follows enables students and practitioners to recognize the assumptions underlying different paradigms of practice and their subsequent influence on clinical decision making [33]. Health care practitioners’ philosophy of practice and their worldview in general influences their perceptions and their approach to practice [34-38]. For example, based on research into expert physical therapy practice, Jensen and colleagues’ model of expert practice in physical therapy [37] has the therapist’s philosophy of practice as the core ingredient of expert practice that both influences and is influenced by four additional integrated dimensions of expert practice: a dynamic, multidimensional knowledge base; a clinical reasoning process embedded in a collaborative, problem-solving approach; a central focus on movement assessment linked to patient function; and, consistent virtues seen in caring and commitment to patients [37]. The patient-centred expert practice evident in the findings of this research is consistent with the intent and requirements of practicing within a biopsychosocial, as opposed to biomedical, philosophy of health care [2, 6-8].

A biopsychosocially oriented model of clinical reasoning depicting a collaborative process between physiotherapists and patients [39] is presented in Figure 2. In any physiotherapy setting, the physiotherapist’s reasoning begins with the initial data/cues obtained (e.g. referral, medical records, initial observation of the patient). This preliminary information will evoke a range of impressions or working interpretations. While typically not thought of as such, they can be considered hypotheses in the sense that these initial interpretations are not fixed, final decisions. Instead, they are considered against subsequent information (data) obtained that may support or not support the initial impressions. While this is similar to a process of hypothesis testing, depending on their education, not all therapists will be cognizant of this process, or indeed of their reasoning in general. Hypothesis generation involves a combination of specific data interpretations or inductions and the synthesis of multiple clues or deductions. In most settings the initial hypotheses will be quite broad, for example in an outpatient setting: ‘looks like a back or hip problem’. Initial hypotheses may be physical, psychological or socially related, with or without a ‘diagnostic’ implication.

All physiotherapists have an element of routine to their examination. They will have identified through professional education and clinical experience the categories of information which they have found to be particularly useful for problem identification and management decisions (e.g. environmental information along with subjective and physical features of the patient’s physical impairments such as site, behaviour and history of symptoms specific tests of function, structure, cognition, etc). Beyond these routines, specific inquiries and tests are tailored to each patient’s unique presentation. Initial hypotheses will lead to certain inquiries and tests specific to that patient. This cognitive activity of ‘hypothesis testing’ ideally includes the search for both supporting and negating evidence. The resulting data are then interpreted for their fit with previously obtained data and hypotheses considered. Even routine inquiries, tests and spontaneous information offered by the patient will be interpreted in the context of initial hypotheses. In this way the physiotherapist acquires an evolving understanding of the patient and the patient’s problem. Initial hypotheses will be modified and new hypotheses considered. This hypothesis generation and testing process continues until sufficient information is obtained to make a physiotherapy diagnosis regarding the physical and psychosocial presentation, appropriateness of physiotherapy and/or additional health professions referral and the physiotherapy management that will be trialled.

The clinical reasoning process continues throughout ongoing patient management. Re-assessment either provides support for the hypotheses and chosen course of action or signals the need for hypothesis modification/generation or further data collection and problem clarification (e.g. additional physiotherapy examination or referral for other specialist consultation). Within a treatment session therapists are constantly reading patient responses to guide their clinical decisions and reviewing treatment outcomes to test management hypotheses.
Diagnostic and non diagnostic reasoning

Importantly, Figure 2 also highlights that there are two reasoning and interpretive processes at work: the therapist’s and the patient’s. It can be seen in the box on the top right that patients begin their encounter with a physiotherapist with their own ideas and interpretations of the nature of their problem, as shaped by personal experience and advice from medical practitioners, family and friends. Patients’ understanding of their clinical problem has been shown to impact on their levels of pain tolerance, disability and eventual outcome [30, 32, 40]. Physiotherapists therefore have in the clinical reasoning process a responsibility, not only to rigorously engage in their own diagnostic and management oriented reasoning process, but to also ascertain and understand patients’ interpretations of their illness or disability experiences.

Diagnostic reasoning essentially involves a deductive (cause and effect) logic. This form of reasoning is based on assumptions about reality (or knowledge) that consider it objective, measurable, predictive, and generalizable. Such assumptions underlie the biomedical paradigm. For example, consider the measurement of blood pressure or blood counts in the diagnostic task of medicine. The patient’s blood pressure is objectively measurable by means of a sphygmomanometer and is compared to population norms such that the doctor is able to ‘predict’ what this particular patient’s blood pressure should be for their age and gender. The expected value is ‘generalizable’ in the sense that it should be similar, in the absence of disease, for a particular but large population. Physiotherapy measurements and assessments are often of a similar nature. Consider the way in which physiotherapists measure and quantify such impairments as joint range of movement, ligament laxity, and the strength of muscles (including the way they are graded). Particular findings are compared to expected population based norms or, at the very least, if possible, to an unaffected side. Treatment interventions in physiotherapy are often based on similar assumptions about knowledge. The assumptions above are excellent for assessing and addressing physical impairments. It is also not hard to see how the notion of ‘compliance’ will for some therapists fit with this paradigm as the deviation or degree by which patients don’t conform to a preferred, predicted strategy or interven-
Clinical reasoning and ICF

Kinesither Rev 2007;(71):e1-e9

tion. These assumptions and the notion of ‘compliance’ (in contrast to collaboration), however, are not a good basis on which to understand and assist people to make decisions in terms of disability.

Narrative reasoning provides a means by which physiotherapists can ascertain and learn about the lived experience of patients, including their particular experience and interpretation of their illness and disability [41]. Narrative reasoning is considered ‘non-diagnostic’ reasoning in that it does not attempt to categorize or label patients’ experiences, psychological or sociological status. Narrative reasoning is based on a different set of assumptions to that of diagnostic reasoning. These are that reality (or knowledge) is context dependent, socially constructed, and allows for multiple versions of reality [26]. Encountering patients who have similar physical impairments but vastly differing levels of disability is not uncommon. For example, while two patients with back pain can have similar histories and pathological findings, one with particular psychosocial circumstances (e.g., supportive family and employer, financially secure) may present with minimal disability (e.g., allowed to continue work with restricted duties), where the other’s less advantageous circumstances has resulted in unemployment and secondary additional negative effects on his feelings (e.g., anger, sense of self-worth) that in turn further contribute to his overall disability [8].

That is, there is not necessarily a linear or cause and effect relationship between levels of impairment and levels of disability. This lends weight to the notion, discussed earlier, that disability has a significant element of social construction. There is also the recognition in narrative approaches of the manner (often negative) in which dominant narratives (prevailing societal attitudes and beliefs) shape how both individuals and communities learn to interpret their experiences, express their ‘stories’ and, in turn, form identities. Consider how the following groups (to name a few) have struggled over time to have their voices heard and listened to with respect: women and their roles in society [42]; Indigenous peoples and their disenfranchisement [43, 44]; and disabled people and their exclusion from participation in mainstream social life (especially in disadvantaged situations) [12, 17, 45]). The study of narratives includes understanding how certain ‘voices’ and groups in society may be marginalized whilst others are privileged. This has a particular relevance and significance in health systems where patients’ worlds are ‘colonised’ [46] and ‘controlled’ [47] by medical and allied health professions, raising the question: what roles might health practitioners have in either evoking or extinguishing the ‘voices’ of patients or communities and the perspectives they represent [48]? Narrative reasoning assists us to understand how a person’s reality has been ‘constructed’.

Utilizing narrative reasoning, the therapist is able to facilitate a process of critical reflection by the patient on the helpfulness and/or reliability of their current interpretations or perspectives, or points of view in relation to their illness, physical impairments and/or disability experience. Drawing upon principles of adult learning (about which it is beyond the scope of this paper to go into detail), physiotherapists can adopt a biopsychosocial model which enlarges on biomedical reasoning and knowledge to include a narratively based knowledge and reasoning process. Individuals (and communities for that matter) can be assisted to critically reflect on the factors which influence their health, after the manner of the ICF framework, and to work in a collaborative manner using strategies where both physiotherapy practitioner and patients (and, at times, their communities) have contributed knowledge and ‘expertise’ [49].

With Figure 2 in mind once again, it is apparent that when a learning process between therapist and patient is possible it enables the patient and the therapist to not only jointly develop an understanding of the problem and its management but also to share responsibility for the implementation of identified and negotiated goals and strategies. Patient learning (i.e., altered understanding and improved health behaviour) is a primary outcome sought in the collaborative reasoning approach. When the patient is recognised as a source of knowledge for the therapist, reflective therapists will also learn from the collaborative experience [17, 50, 51]. Since narrative reasoning involves reasoning in another paradigm (other than the biomedical), the therapist is more equipped to understand alternative meanings and interpretations of experience of movement and/ or pain problems, which may be given by individuals or groups to their ‘disability’.

We have outlined above how a sound clinical reasoning process allows practitioners to adopt an epistemological (or constructed) view of knowledge which embraces its multidimensionality. This understanding of how knowledge is differently constructed assists practitioners to reflect on what assumptions they have about understanding the nature of reality in the world and therefore what assumptions they also bring to the clinical world and, in particular, to their patients’ worlds. In our opinion, to learn how knowledge is constructed is also to begin to understand the relationship between the diverse types of knowledge; biomedical, personal, social

2. The ICF framework also has an increasingly important role in health populations and systems which are under-resourced. In such situations community-based health and rehabilitation programs aim to facilitate a community understanding about health which, in turn, supports the capacity of individuals within that community to manage their conditions and participate in the community’s life. This kind of community learning also includes an examination of the wider causes and factors influencing ill health and disability.
and environmental knowledge espoused in both the ICF framework and the biopsychosocial model. This means that patient and patient-related data as espoused by the ICF framework is able to be more effectively placed within a relational understanding of the biopsychosocial model rather than a ‘pigeon holed’ or segmented (dualistic) understanding of the model. For example, where one therapist interprets pain behaviours as a reflection of underlying physical impairment or pathology another sees them as product of the patient’s psychosocial status and social learning. Interpretations such as these must be considered relative to the individual patient’s unique presentations and appreciating this point requires a constructivist view of knowledge.

The manner in which health practitioners understand patient data in a given case is critical in order for the relationships between the factors influencing health and disability to be understood from more than one perspective (or paradigm). This is to also propose that the way practitioners understand various patient data influences both the extent and method by which they, in turn, collect further patient and patient related data [26]. Whilst we acknowledge the value of describing the incidence (or not) of various patient data in terms of the universal coding and classification language in the ICF framework, it is an understanding and facility in utilizing the biopsychosocial theory and model which will enable practitioners to synthesize and prioritize this diverse data in the process of identifying goals and management strategies in a collaborative manner with patients.

**Conclusion**

The language of the ICF is a common language for the description and classification of health and health related states. The ICF has as its theoretical underpinning the biopsychosocial model. We have identified obstacles to the implementation by physiotherapy students and practitioners of the biopsychosocial model in clinical practice. In this paper we have proposed that the explicit learning of a collaborative clinical reasoning model can assist practitioners in overcoming these obstacles by learning to construct a broader understanding of knowledge and reality that will in turn assist their understanding and uptake of the biopsychosocial model and with it, the ICF framework.

**References**


