Improving Our Understanding of Motivation and Participation in Neurorehabilitation:
A Review of Self-efficacy in Neurological Conditions

Introduction

The onset of neurological impairment is often sudden or unpredictable, as in the case of stroke or traumatic brain injury. According to the World Health Organisation model,[1] such impairments can restrict people's social or work 'abilities' (formerly termed disability) and their social 'participation' with family and friends (formerly termed handicap). In addition to any physical impairment, these patients face the difficult task of adjusting psychologically to their condition. This process requires the use of various coping mechanisms as individuals reappraise their abilities and self-perceptions. This may be particularly difficult for younger people, whose high expectations can leave them with a greater sense of restriction or handicap.[2] The aim of specialist neurological rehabilitation centres is to help a disabled person to acquire the necessary knowledge and skills in order to maximise their physical, psychological and social functioning.[3] As part of the 'sick role',[4] individuals are expected to take a proactive role in this process, learning new and adaptive behaviours through cooperation with staff and practicing them enthusiastically, so that they can return to 'normal' life. Rehabilitation professionals have long suspected that patients' motivation plays an important role in rehabilitation outcome.[5,6]

Self-Efficacy

One important concept that is believed to influence patients' motivation for and participation in rehabilitation is self-efficacy.[7,8] Self-efficacy can be defined as people's beliefs about their capabilities to perform a task or behaviour that has influence over events affecting their lives.[7] It is similar to the idea of 'self-confidence' and is closely related to the concepts of mastery, self-esteem and locus of control. Self-efficacy is a central concept in Bandura's social cognitive theory,[9] a framework for understanding human functioning and behavioural change, which emphasizes our self-reflective and self-regulatory qualities. Bandura states that people's motivation, mood and behaviours are based more on what they believe than on what is objectively true.[7] For this reason, it is self-efficacy beliefs, rather than actual capabilities, that provide the foundations for motivation and can predict human behaviour.[10] These beliefs influence motivation by determining how much effort people are willing to expend when attempting a task, for how long, and how resilient we are in the face of setbacks or difficulties. People tend to avoid those situations which they believe exceed their perceived capabilities, so self-efficacy beliefs influence our decisions whether or not to attempt a task. People with strong self-efficacy beliefs will set themselves more challenging goals and view difficulties as challenges to be mastered rather than confirmation of their weaknesses or as threats to be avoided.[8]

Bandura identifies four main sources that influence the development of self-efficacy beliefs.[7] The first and most effective way of building self-efficacy is actual mastery of the task in question. Equally, experience of task failure whilst developing efficacy

beliefs can be extremely deleterious to one's confidence. The second way in which individual's inform their self-efficacy judgements is from the vicarious experiences of others facing comparable situations. The strength of this influence obviously depends on how similar the model is perceived to be in relation to the individual concerned. Thirdly, social persuasion from others can also modify self-efficacy beliefs. However, simply blindly encouraging an individual is not effective in the long term, as unrealistically raised expectations are quickly levelled by disappointing results. Furthermore, social persuasion is far more effective at undermining one's confidence than at boosting it. The fourth and final way proposed by Bandura to influence self-efficacy is through the interpretation of one's somatic and emotional states. Stress reactions and symptoms of physical exertion can be perceived as both positive and negative indicators of one's performance or abilities. Likewise, a positive mood can enhance self-efficacy beliefs, while a low or depressed mood is likely to undermine confidence levels.

Measuring Self-Efficacy

In order to harness the predictive qualities of self-efficacy beliefs, it is necessary to develop valid and reliable measures. Validity is concerned with whether a test actually measures what it is intended to measure. Reliability refers to the consistency or stability of a measure or the proportion of observed variation between scores that reflects actual variation in health levels.[11] Several self-efficacy scales have been developed, although their methodology has attracted a number of criticisms.[12] To ensure that it is perceived 'capability' that is being assessed and not 'outcome expectancies' or 'intentions,' scale items must be carefully phrased. Generic measures[13] or those adapted for different subjects fail to incorporate the domain-specificity central to Bandura's original concept and, therefore, risk neglecting different areas of self-efficacy that are important in the particular situations faced by the study population. To produce quality research, an appropriately designed tool, which assesses beliefs and behaviours relevant to the patient group under study must be used. The wide range of functions and disorders of the nervous system limits the usefulness of any universal measure of self-efficacy. To this end, some condition-specific scales have been developed for use in neurological conditions.[14,15] However, some of these are adaptations, which simply reword or supplement scale items based on the literature and 'expert' opinion.[16] More recently, a patient-led methodology has been suggested,[17] drawing on individuals' experiences of living with a condition to ensure that the beliefs being assessed are pertinent to the particular patient group.

Application of Self-Efficacy in Healthcare

Self-efficacy has many obvious applications in a healthcare context from primary through to tertiary levels of care and prevention. In the field of health promotion, people are often asked to make behavioural changes to improve their health prospects. Motivation to initiate and maintain these changes will be influenced by self-efficacy beliefs. For example, self-efficacy has been shown to predict how well participants stick to an exercise regime following cardiac surgery[18] and in a retirement community.[19] Self-efficacy has also been studied in chronic diseases such as arthritis[20] and diabetes.[21] Here, the adoption of self-management behaviours gives patients a chance to limit the impact of their condition on their lives. Better self-efficacy predicts better uptake of these behaviours and has been shown to produce better

disease control. Perhaps most significantly from a rehabilitation perspective, higher levels of self-efficacy were associated with improved performance of activities of daily living (ADLs) in geriatric rehabilitation patients[22] and helped to predict social participation (handicap) among young disabled persons.[23]

There is a growing body of work examining self-efficacy in a variety of neurological conditions. French[24] found that self-efficacy beliefs partly mediated adaptation to headaches by influencing the perceived impact (disability) of headache on daily activities and emotional functioning. Higher self-efficacy for preventing headaches and managing head pain was found among those who actually employed positive, adaptive coping strategies and who had a more internal headache specific locus of control. However, French's scale did not correlate with depression, as would be expected from work in other conditions. Among 100 patients with low back pain, Lackner[25] showed that functional self-efficacy beliefs were better predictors of functional task performance than perceived ability to control pain. Thus demonstrating the significant influence of cognitive processes on the impact of this common condition. Gramstad[26] studied psychological adaptation in 101 patients with epilepsy, which can vary widely in severity and predictability making it harder for individuals to adjust to the condition. Self-efficacy was a significant predictor of emotional adjustment, as observed in multiple sclerosis, as well as psychological functioning and quality of life (QOL). In a large sample of 314 adults, DiIorio[27] found that low self-efficacy for epilepsy self-management behaviours was associated with higher levels of perceived stigma, suggesting that mastering practical tasks is also a factor in psychological adjustment to epilepsy. Finally, using an adapted version of this scale in a further 108 patients, self-efficacy beliefs were found to be independent of disease severity as measured by seizure frequency.[28]

Multiple sclerosis (MS) is a chronic disease with an unpredictable, progressive course, resulting in a variety of neurological impairments to which the individual must adjust both physically and psychologically. Several studies have looked at MS using different self-efficacy scales, trying to explain and predict successful adaptation and the use of coping strategies that can help to minimize the impact of this disease on QOL. Self-efficacy beliefs appear to have a significant influence on adjustment to the disease. Wassem[29] found that self-efficacy scores predicted 24% of the variance in adjustment among 62 patients with moderate disability, although the adjustment scale was of poor quality. Focussing on mood control and maintaining social activity as key components of successful adjustment, Barnwell[30] showed that self-efficacy significantly predicted performance of these behaviours two months later. In two studies,[14,16] higher self-efficacy was seen in patients with less perceived or measured disability, although it was not possible to identify whether disability level influenced self-efficacy beliefs or vice versa. The time since diagnosis may also play a role in shaping efficacy beliefs but both negative[16,17] and positive[14] correlations were observed, so it remains unclear whether self-efficacy increases or decreases with disease duration. Building on these observations, Wassem[31] designed a four week outpatient intervention programme using Bandura's social cognitive theory to try and increase self-efficacy and improve adjustment. In this small trial of only 27 patients, there was no difference in self-efficacy or adjustment levels between subjects and controls and the hypothesis could not be supported. In contrast, Rigby's scale[17] did show sensitivity to change following a brief cognitive behavioural intervention to

boost self-efficacy levels, and may be better suited for further study the role of self-efficacy in MS.

Stroke is characterised by a rapid-onset, focal neurological deficit of vascular origin lasting more than 24 hours and is a major cause of morbidity and mortality. The degree of neurological recovery after stroke is highly variable, prompting some to suggest that psychological compensatory mechanisms, such as high self-efficacy, could help to maximise functional recovery. Robinson-Smith[32] demonstrated an increase in self-care self-efficacy over time that significantly correlated with improved QOL in 63 stroke survivors and accounted for half of the variance in depression scores at 1 and 6 months post-stroke. This relationship between self-efficacy and depression has been shown in MS and repeated elsewhere.[33] However, since several chronic diseases were included in the latter study in addition to stroke, a generic self-efficacy scale was used, not one relating specifically to the beliefs important to stroke victims.[33] In another large study of 831 patients over 40 with a variety of chronic diseases including stroke,[34] a self-management programme produced improvements in self-efficacy to manage various aspects of chronic disease at 1 and 2 years. This was associated with decreased healthcare utilisation that interestingly occurred despite an increase in physical disability over time. In keeping with Bandura's theory, it would seem that the participants' improved self-management self-efficacy enabled them to continue in these behaviours, even in the face of increasing difficulties as their physical health declined, resulting in less need for healthcare utilisation.

Traumatic brain injury (TBI) and spinal cord injury (SCI) are frequent consequences of road traffic accidents (RTAs), resulting in a considerable degree of disability and often involving a lengthy period of rehabilitation. Work on QOL among people with SCI in China[35] has shown that personal beliefs about one's ability to cope with SCI (coping self-efficacy) played an important role in achieving higher QOL. Among 119 outpatients, self-efficacy beliefs contributed towards QOL even after controlling for social support, the most influential determining factor. The fact that social support was such a strong influence on QOL following SCI may reflect its role as a source of self-efficacy beliefs but this study also highlights the importance of improving self-efficacy in individuals who have poor support networks. However, a generic self-efficacy scale was used and none of the instruments used was specifically developed for SCI or for use in Chinese subjects, so may have failed to pick up on other important beliefs particular to this group. Although a literature search failed to reveal any studies of self-efficacy in TBI, a recent paper evaluating the effectiveness of a cognitive rehabilitation programme did look at patients' satisfaction with their cognitive function.[36] This subjective measure significantly correlated with participants' level of community integration but was independent of objectively measured improvements in cognitive function. The authors propose that this self-appraisal of functioning may reflect patients' self-efficacy and call for further work examining how the subjective meanings and values assigned to them by patients modify the relationships between objectively measurable impairments, functional disability and QOL.

Discussion

Findings in the current literature indicate that self-efficacy beliefs have a significant influence on people's psychological adjustment to a variety of neurological conditions, with high self-efficacy beliefs predicting better adjustment. Further work is needed, however, to clarify how this relationship develops over time and whether disease duration plays any role in determining self-efficacy beliefs or adjustment. Self-efficacy was also seen to be a factor in predicting the use of positive coping strategies and self-management behaviours, which can limit the impact of a condition on daily activities, social life and emotions. From these observations, it appears that self-efficacy may be an influential factor in determining QOL in neurological conditions, especially in those individuals who lack social support. The significance of any correlation between disease severity or disability and self-efficacy measures, however, remains uncertain from the current literature, with some studies showing a correlation[14,16,17] and others reporting no differences across a range of disabilities.[20,34] Further study is merited, therefore, in fields which involve significant psychological adjustment and the mastery and adoption of new behaviours, since self-efficacy beliefs are likely to influence success in these areas.

One setting meeting both these requirements is neurological rehabilitation following the often sudden or unpredictable onset of neurological impairment, such as stroke or TBI. Self-efficacy beliefs may be dramatically affected by such neurological disability and will have a significant influence on individual's motivation and participation in rehabilitation. Neurological rehabilitation units, therefore, could benefit significantly from a well-designed, context-specific self-efficacy scale, yet surprisingly little attention has been paid to this concept in relation to neurological disability, as highlighted by Cicerone.[36] Despite the heterogeneity of impairments found in a neurological rehabilitation unit, the circumstances in which these patients find themselves is often very similar. In this setting, a single tool to assess self-efficacy in all patients, perhaps supplemented by condition-specific items, may be of greater practical use.[12] Such a tool could lead to a better understanding of psychological adaptation to neurological disability and identify factors contributing to high or low self-efficacy. Multi-disciplinary team (MDT) members could then easily identify those in whom low self-efficacy is a barrier to optimum rehabilitation. As a reliable outcome measure, it could also be used to evaluate whether current rehabilitation programmes are having any impact on self-efficacy beliefs. Following this, Bandura's proposed four sources of self-efficacy could be used to provide a strong theoretical basis for the design and implementation of new interventions. As has been reported in rheumatoid arthritis[20] and chronic disease,[34] such programmes could help to build and improve upon people's self-efficacy beliefs. By understanding and reinforcing patients' self-efficacy, MDT members will be better placed to help patients to play a more active and enthusiastic role in their rehabilitation, setting higher goals and being more committed to achieving them both before and after discharge in order to maximise their abilities and participation in society.

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