Psychological complications in sickle cell disease

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Summary

This review examines the evidence for some of the common psychological complications found across the life span of patients with sickle cell disease (SCD), which are likely to be encountered by haematologists responsible for their medical management. Electronic searches of medical and psychological databases were conducted with a focus on three main areas: psychological coping, quality of life and neuropsychology. Psychological complications were identified in both children and adults with SCD, and included inappropriate pain coping strategies; reduced quality of life owing to restrictions in daily functioning, anxiety and depression; and neurocognitive impairment. There were wide variations in design and consistency of the studies, therefore, some caution needs to be observed in the findings. Moreover, interventional studies were lacking in some areas such as neuropsychology. Utilization of psychological interventions including patient education, cognitive behavioural therapy, and special educational support to help improve the quality of life of patients are recommended.

Keywords: sickle cell disease, psychology, neuropsychology, complications, coping, quality of life.

The management of sickle cell disease (SCD) continues to pose a challenge to both haematologists and affected patients. Treatment advances over a generation have greatly improved the quality of life and longevity of patients. Nonetheless, the current position in terms of the identification of the clinical implications of psychological complications and management within a multidisciplinary context remains unsatisfactory. Haematologists have only begun to address this issue recently.

Psychological impact of SCD

Psychological complications in patients with SCD mainly result from the impact of pain and symptoms on their daily lives and society’s attitudes towards them. Early research in psychological aspects of SCD examined the extent of its impact on both children and adults, and the functioning of affected families. These studies showed that the most frequent psychological problems encountered include increased anxiety, depression, social withdrawal, aggression, poor relationships and poor school performance (Treiber et al., 1987; Evans et al., 1988; Armstrong et al., 1993; Brown et al., 1993). A few case reports also indicated high levels of parental anxiety, overprotection, excessive feelings of responsibility and guilt (Whitten & Fischoff, 1974; Graham et al., 1982).

The psychological impact of SCD on individuals may be grouped into a set of illness-related tasks (Moos & Schaefer, 1984): adjusting to the symptoms and incapacities; maintaining adequate relationships with health professionals; and managing the emotional and social consequences of the illness. The extent to which individuals are affected by SCD may therefore be determined by their coping responses, as dealing with its continuous demands requires the acquisition of new skills and modifications to daily life.

Methods

This review is based only on published work. An electronic search of relevant psychological literature relating to SCD was conducted in Medline, Embase, Psychinfo, Psychlit, Cinahl and the Cochrane Library. Peer-reviewed publications from other sources such as the Department of Health were also accessed.

The main objective of the review was to examine the evidence for psychological complications with a focus in three key areas of current interest and relevance to haematologists, namely psychological coping, quality of life and neuropsychological problems, employing a developmental approach with these complications categorized in terms of children (including adolescents) and adults. The practical implications for the management of patients with SCD are also discussed.

Results

Psychological coping

Theoretical approaches to coping can help to outline how patients live with and psychologically overcome SCD. Two
areas of comprehensive work in coping were identified. First, using an adaptation of the pain coping strategies questionnaire (CSQ) developed by Rosentiel and Keefe (1983); Gil et al (1989) devised a coping inventory for SCD that consisted of 13 subscales (CSQ-SCD). Higher-order factor analyses in a USA population of children and adults indicated that these subscales fell into two groups: ‘coping attempts’ (e.g. distraction and increased activity) and ‘negative thinking/passive adherence’ (negative thoughts and feelings, coupled with ‘passive’ psychological but useful coping methods typically recommended by haematologists for example, rest and taking fluids). In a series of studies, ‘negative thinking/passive adherence’ was shown to be positively associated with pain severity and health service utilization (emergency visits, hospitalizations, etc.) in both children and adults, and prospectively (Gil et al., 1989, 1991, 1992, 1993). In addition, another study found negative thinking and passive coping as separate factors to be associated with frequent pain episodes and hospitalizations in adult patients (McCrae & Lumley, 1998).

By contrast, in a UK population of children and adults, three higher order factors emerged from analyses: ‘active coping’ for example, distraction and increased activity; ‘affective coping’ for example, negative thoughts and feelings; ‘passive adherence coping’ for example, rest and taking fluids (Anie et al., 2002a,b). Pain severity was predicted by passive adherence coping in both children and adults, while utilization of hospital services were predicted only by active coping in children. This research in two countries is important in suggesting that psychological coping strategies are related to pain and health service utilization, independently of clinical markers of SCD.

Coping and adjustment. Secondly, the application of the ‘transactional model’ of stress and coping (Lazarus & Folkman, 1984) to SCD was suggested (Moise, 1986), and used to outline the processes associated with good and poor adaptation to SCD (Thompson et al., 1992, 1993a,b, 1994, 1996). In this model, SCD is viewed as a potential stressor to which the individual and family attempt to adapt. Psychological adjustment is then a result of the relationship between illness parameters (SCD severity – phenotype, complications and pain frequency), demographic parameters (age, gender and socio-economic status), and hypothesized adaptation processes (stress appraisal, coping methods and family support) that mediate the illness/demographic factors and outcome. Good psychological adjustment in children and adults was indicated by various factors, including lower levels of perceived daily stress, reduced negative or passive coping strategies and appropriate family functioning (increased family support and lessened family conflict). It has also been shown that children with SCD exhibit fewer behavioural problems and less maladjustment than adolescents with SCD (Hurtig & White, 1986), and that adolescent boys have more frequent behavioural and social adjustment problems than adolescent girls (Hurtig & Park, 1989).

Medication use. The relationship between medication use and the pain experienced as a result of SCD seems to be complex, especially regarding opioid analgesia. For example, studies have shown that patients with SCD use more opioids as pain intensity increases (Porter et al., 1998; Dampier et al., 2002), yet the concerns of some sickle cell patients who are overtreated with opioids in hospital (Maxwell et al., 1999), and the issue of dependency on opioids as a result of hospital treatment (Konotey-Ahulu, 1998) have been documented. It may be the case that health professionals have poorly understood pain and medication use in patients with SCD (Shapiro et al., 1997; Agble et al., 1998; Maxwell et al., 1999). Many doctors, including haematologists, have found it difficult to treat patients with severe pain who require frequent hospitalizations. These patients, sometimes referred to as ‘problem patients’, usually demand very high doses of opioids. In addition, the notion that a considerable number of patients may be psychologically dependent on opioids is unfounded (Elander et al., 2003), and rather seems to be associated with other factors such as mood and activities (Anie & Steptoe, 2003), and inappropriate pain-related behaviour or coping strategies (Elander et al., 2004).

Quality of life

Activity and functioning. Impaired psychological well-being, limitations in social activity, work and domestic roles have been identified in research using measures specially developed for problems in SCD (Gil et al., 1992; Ohaeri et al., 1993; Reese & Smith, 1997), and standard health status measures in children (Panepinto et al., 2004) and adults (Anie et al., 2002a). Health-related quality of life is significantly reduced in adults with SCD as compared with the UK general population (Jenkinson et al., 1993), although by comparison, this may not be much different from patients with other chronic haematological illness such as arthritis resulting from hereditary haemochromatosis (Adams & Speechley, 1996; Anie et al., 2002b) (Fig 1). In spite of this, SCD pain, clinical status and health service utilization seem to make only a limited contribution to understanding the pattern of poor quality of life, suggesting that haematologists should examine other factors such as coping strategies, for example, increased use of affective coping.

Anxiety and depression. Mood is a component of SCD pain experience, related quality of life and medication use (Anie & Steptoe, 2003). Haematologists usually perceive anxiety and depression as psychological complications of SCD with important consequences. However, the evidence of clinical anxiety and depression in children remains unclear. Some studies have shown high rates of anxiety and depression in children with SCD (Yang et al., 1994), while others have failed to show significant levels of anxiety and depression in children with SCD as compared with non-affected peers or those with other chronic illnesses (Kumar et al., 1976; Alao & Cooley, 2001). This is also the case in adults with SCD, whereby some
Neuropsychological complications

Cerebrovascular disease, particularly ischaemic brain injury or stroke is reported to be the most disabling complication in SCD, with younger children generally developing infarcts while older patients are more inclined to haemorrhage (Powars, 2000). Cerebrovascular accidents are related to SCD severity (Ohene-Frempong et al, 1998) and hypoxaemia (Kirkham et al, 2001). There is considerable evidence for neuropsychological complications as a result of cerebrovascular accidents in children with SCD (Kral et al, 2001). These have been shown to result in significant neuropsychological deterioration (Craft et al, 1993, 1994; Cohen et al, 1994; Schatz et al, 1999; Boni et al, 2001). Subtle neuropsychological decline was associated with silent cerebral infarcts (DeBaun et al, 1998; Brown et al, 2000; Wang et al, 2001). Generally, children with SCD are at risk educationally (Brown et al, 1993; Schatz et al, 2001; Schatz, 2004) because of possible cognitive and intellectual impairment as compared with siblings or non-affected peers (Schatz et al, 2002a). There is also some evidence to suggest that children with a history of cerebrovascular accidents tend to perform worse than those with silent infarcts on neuropsychological assessments (Armstrong et al, 1996).

The SCD children with overt strokes usually have neuropsychological complications that have been shown to relate to the location and size of the lesion in the brain. Language and verbal problems are associated with the left hemisphere, visual/motor deficits are related with the right hemisphere (Cohen et al, 1994), while attention and executive function are linked to the frontal lobe (Craft et al, 1994; Schatz et al, 1999). In the case of silent infarcts (silent strokes) in children with SCD, which are usually determined by abnormal magnetic resonance imaging (MRI), these tend to result mainly in more subtle frontal lobe problems of attention/concentration and executive function (DeBaun et al, 1998; Brown et al, 2000). However, other areas of dysfunction, include learning deficits in reading and mathematics, have also been identified (Armstrong et al, 1996). Lesion size in relation to intellectual functioning has been documented in children with silent infarcts (Schatz et al, 2002b).

Studies on neuropsychological complications in adults with SCD are limited, although cognitive impairment including dementia has been demonstrated, irrespective of normal or abnormal MRI results (Manfre et al, 1999). Evidence from children with SCD suggests that lesion size and related neuropsychological complications tends to increase with age (Wang et al, 2001), and could suggest similar problems in adults. In addition, frontal lobe abnormal blood flow has been shown in adults with SCD despite normal MRI results (Prohovnik et al, 1995). This could indicate attention/concentration and executive function problems, and therefore should not be ignored by haematologists.
Psychological interventions

Psychoeducation. Psychoeducational interventions primarily focus on improving the knowledge and understanding of patients regarding their illness, while at the same time providing psychological support. The assumptions underlying this approach emphasize that firstly the information can lead to improved knowledge and better coping with the condition. Secondly, patients who feel isolated may benefit from the support and motivation of others through shared experience. Psychoeducation can be offered to children and adolescents with SCD in peer or family groups. It has been demonstrated that group interventions help to identify issues and concerns in children and adolescents with SCD (Anie et al., 2000), while family interventions improve knowledge in children and adolescents with SCD (Kaslow et al., 2000).

Cognitive behavioural therapy. Cognitive behavioural therapy (CBT) comprises two psychological approaches, that is, cognitive and behavioural techniques. The premise underlying CBT is that difficulties in living, relationships, general health, etc., have their origin in (and are maintained by) thoughts, emotions and behaviours. The aim of cognitive interventions is to challenge and ultimately change, inappropriate self-defeating thoughts to enable the patient to lead a more productive and satisfying life. On the contrary, behavioural methods arise from the premise that inappropriate behaviours are learnt, and therefore can be unlearnt. CBT seems appropriate for treating patients with SCD, as the illness and pain cause much distress and suffering to them. CBT can be offered to patients with SCD individually or in groups. There is some evidence to suggest that CBT helps to reduce health service utilization in both children and adolescents with SCD (Broome et al., 2001). CBT in adults with SCD reduces pain (Thomas et al., 1999), and improves mood and psychological coping ability (Anie et al., 2002c).

Neuropsychology. There is a dearth of evidence in terms of studies of neuropsychological intervention. Based on other studies, it seems the risk of neurocognitive impairment is particularly important in children and adolescents because of educational implications. Consequently, there is a need for comprehensive neuropsychological assessments to complement neurological examinations, and to be used as a basis for treatment.

Discussion

The findings of this review have considerable clinical relevance. Support has been provided for the assumption that, in addition to disease severity, the assessment of psychological factors is important. In particular, psychological coping and quality of life as a framework for intervention has emphasized the need for more research in this area. For example, comprehensive research in psychological coping has been conducted in the USA (Gil et al., 1989, 1991, 1992, 1993), and extended in the UK (Anie et al., 2002a,b). However, the same cannot be said for quality of life and neuropsychological studies.

The methodological qualities of non-interventional studies are difficult to evaluate as these encompass a wide range of designs. Many studies are correlational and, therefore, limited because causal sequences are usually speculative. For example, does anxiety or depression result from living with SCD, and lead to a worsened pain experience, or is it frequent pain and hospitalizations that result in depression? Longitudinal studies could help tease out some of these problems but have mostly not been conducted. Quality of life research in people with SCD is usually not overtly stated; in addition, many studies have not employed standard measures (disease-specific or generic) to allow replication. Randomized controlled interventional studies are only restricted to psychoeducation in children (Kaslow et al., 2000), and CBT in children (Broome et al., 2001) and adults (Thomas et al., 1999). Besides, these studies are rather disparate in design and outcome measures to enable generalizations to be made across demographics and clinical features (Anie & Green, 2002). In the case of neuropsychology, most non-interventional studies have been controlled with siblings or peers, but were generally of small cohorts, and no randomized controlled interventional studies have been identified.

Nonetheless, advances have been made in psychological research in SCD over the recent decades. Studies have demonstrated that there is considerable variability in the ability of SCD patients to cope with their condition (Gil et al., 1989, 1991; Anie et al., 2002a,b). People with SCD experience different levels of health, and such variations can lead to differences in psychosocial functioning. Some people cope relatively well, are able to attend school or work, and are active physically and socially. Their efforts should be recognized and encouraged where necessary. Others cope inadequately and lead more restricted and secluded lives. Nonetheless, this may not necessarily be a consequence of severe disease, and the reasons for these should be sought and addressed. Impairments in quality of life may not be specific to SCD and are common to chronic painful conditions. However, people with SCD seem to have more problems than the general population, and with severe disease, this is likely to deteriorate as with the approach of adulthood. As quality of life is dependent on the symptoms and the impact that an illness or condition has on an individual, early intervention is very crucial for people with SCD. Medical treatment, as well as adequate psychological support, could help to improve an individuals’ quality of life; however, psychological interventions should be directed at the specific aspects of their lives that are deemed important at the time.

Psychological interventions should be offered as standard care in the management of SCD, adjutantive to routine medical treatment. Research has shown encouraging results (Anie & Green, 2002), although these are currently restricted to psychoeducation and CBT. The overall goal is to help patients...
cope better, fulfil roles and to achieve a better quality of life. These interventions should be age-appropriate, and available in both hospital- and community-based settings. Clinical psychologists working with the sickle cell team should formalize assessments and therapies with children at the age of about 7 years, which is developmentally suitable for both individual and group/family work. However, if the team does not include a psychologist, haematologists should seek the help of other health professionals such as specialist nurses, to assess patients initially and then refer them to a psychology service as appropriate.

Neuropsychological screening for patients with SCD provides a useful means of identifying those who require support, particularly adequate educational provision. Measures of attention/concentration and executive functioning tend to be valuable as predictors of neurological pathology, and should be included in the initial assessments. These assessments should be initiated at 5 years of age, when a child starts school. Neuropsychological rehabilitation should be considered following any assessments, and patients should be referred to a Neuropsychology Service where indicated. Additional or special educational support should also be considered, this could compensate for the effects of strokes and silent infarcts. Liaison with education departments, educational psychologists and schools is very important.

**Conclusion**

Psychological complications in patients with SCD are common. These range from inappropriate coping strategies, reduced health-related quality of life as a result of negative mood, and daily activity and role limitations, to neurocognitive impairment. Haematologists need to learn more about the manner in which SCD patients adapt to their condition. This can be achieved through combining medical treatment with investigations that assess daily psychosocial experience, and the long-term effects of both medical and psychological therapies. In the absence of a universal cure, it is recommended that psychological interventions should be incorporated into protocols for the management of patients with SCD and offered as standard care to help improve their general quality of life.

**References**


