The Impact of Psychological Interventions on Mood and Coping Following Moderate to Severe Acquired Brain Injury in Adults

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Abstract
Acquired brain injury (ABI) can result in mood disturbances that significantly impact on psychological adjustment following ABI. Anxiety and depression are commonly reported and are associated with negative outcomes. Coping styles are also associated with emotional adjustment. Literature has shown that maladaptive or dysfunctional coping, specifically avoidant coping is prevalent among people with ABI. This short review examines the relationship between psychosocial outcomes and coping strategies following ABI in adults. The impact of psychological intervention at post-acute rehabilitation stage on mood and coping is also examined. Specifically, this review focuses on follow-up studies that compare psychosocial outcomes in people with ABI who have received psychological intervention and people with ABI who did not receive such intervention, with a view to identifying effective intervention that attenuates the mood difficulties following ABI. A brief discussion on psychosocial outcomes in the absence of psychological intervention is also included in this review.

Introduction
Acquired brain injury (ABI) can be broadly defined as a condition arising from traumatic brain injury (TBI) and its direct consequences, cerebrovascular accident (CVA; stroke), or other acute incidents such as hypoxia (e.g., due to drowning, electrocution, anaesthetic accident), hypoglycaemia, viral encephalitis, injury arising from neurological operations, radiotherapy, cerebral abscess, bacterial
meningitis and gunshot wounds (Turner-Stokes, Nair, Sedki, Disler, & Wade, 2011). The exact incidence of ABI is difficult to ascertain due to the lack of a comprehensive database although some prevalence data exist. It is reported that the annual worldwide incidence of TBI alone is approximately 10 million (Ownsworth et al., 2011).

Mood and coping impact significantly on the quality of life of individuals with ABI. For instance, greater mood disturbances such as depression and anxiety are associated with greater difficulty for individuals who have experienced TBI to return to work (Franulic, Carbonell, Pinto, & Sepulveda, 2004; McCrimmon & Oddy, 2006). The resulting financial difficulties are clinically identified as a major source of anxiety and depression (Klonoff et al., 2006). Employment has also been linked to quality of life (Steadman-Pare, Colantonio, Ratcliff, Chase, & Vernich, 2001), specifically to life satisfaction (Corrigan, Bogner, Mysiw, Clinchot, & Fugate, 2001). Moreover, individuals with TBI who are depressed or anxious report more suicidal ideation and lower psychosocial functioning (Tsaousides, Cantor, & Gordon, 2011).

Follow-up studies have compared psychosocial outcomes of adults with ABI who received post-acute psychological rehabilitation and those who did not. This review aims to examine these studies in order to identify the benefits of psychological intervention on mood issues following ABI. Studies that examined the relationship between psychosocial outcomes, specifically mood, and coping strategies are also included.

**Mood and coping**

Mood difficulties can develop as late as five years after ABI (Lincoln et al., 2013) and can persist up to 30 years after injury (Koponen et al., 2002). Post-injury depression and anxiety are commonly reported, and are associated with poor psychosocial outcomes (Bombardier et al., 2010; Draper, Ponsford, & Schönberger, 2007; Fleminger, Oliver, Williams, & Evans, 2003; Hoofien, Gilboa, Vakil, & Donovick, 2001; Ownsworth & Fleming, 2005; Ownsworth et al., 2011). For example, emotional problems such as frequent mood changes predict low community integration (Winkler, Unsworth, & Sloan, 2006). In contrast, Koskinen (1998) found that both individuals with TBI and their significant others report a high quality of life despite on-going emotional problems.

Coping style is associated with emotional adjustment after brain injury. Anson and Ponsford (2006a) found that maladaptive coping styles such as avoidance, worry, wishful thinking, self-blame and use of drugs and alcohol are associated with poor psychosocial outcomes (e.g., higher levels of anxiety and depression) and lower
self-esteem. Lower premorbid intelligence and greater self-awareness are associated with maladaptive coping style (i.e. non-productive, avoidant coping). This association between self-awareness and maladaptive coping style could possibly be mediated by perception of locus of control (Anson & Ponsford, 2006a). On the other hand, adaptive coping style is not associated with premorbid intelligence and self-awareness. In contrast, Ownsworth and Fleming (2005) found no association between awareness and emotional adjustment at over 2 years post-injury. However, higher premorbid intelligence is associated with lower levels of anxiety and depression (Anson & Ponsford, 2006a). Furthermore, adaptive coping styles (such as actively working on the problem, use of humour and engagement in enjoyable activities) are associated with higher self-esteem. This is consistent with Kendall and Terry’s (1996) predictive model which includes self-esteem as one of the personal resources that predict psychosocial adjustment through appraisal and coping.

Maladaptive coping strategies predict depression and anxiety in individuals with TBI one to five years post-injury (Curran, Ponsford, & Crowe, 2000). However, Curran and colleagues (2000) found that adaptive coping (such as problem-focused coping) was weakly associated with less anxiety. There was no association found between problem-focused coping and depression. On the other hand, a coping strategy involving the use of self-control and positive reappraisal is associated with lower mood disturbance and lower levels of depression (Moore & Stambrook, 1992). Contrary to these findings, Spatt, Zebenholzer, and Oder (1997) found that preserved self-control is associated with depression. These two studies used different measures of depression and self-control, and are therefore not comparable. The use of different measures could also possibly account in part for the different outcomes. Rutterford and Wood (2006) found that coping and appraisal alone cannot predict the outcomes but a combination of these two factors and other variables such as personality and self-efficacy is able to predict psychosocial outcomes in the domains of community integration, life satisfaction and quality of life.

Individuals with ABI who show depressive symptoms focus on negative emotions and display more avoidant coping such as mental disengagement (Finset & Andersson, 2000). It is also less common for individuals with ABI to use an approach-oriented coping style such as seeking social support. Furthermore, a simulated real-world stress test revealed that a high proportion of people with moderate to severe TBI engage more in avoidant coping than neurologically healthy individuals (Krpan, Stuss, & Anderson, 2011). Tomberg, Toomela, Pulver and Tikk’s (2005) study also revealed that the use of task-oriented strategy in conjunct-
ion with social and emotional support is diminished in individuals with TBI while the use of avoidance strategies is greater compared to neurologically healthy individuals. In this study, the support network of individuals with TBI tended to be smaller, and it is suggested that this is possibly due to changes in mood, behaviour and inter-personal relationships as well as reduced social activity. However, the quality rather than the extent of support (i.e. size of network) is more important to the individual’s satisfaction with support. Satisfaction with support is associated with health-related quality of life (Tomberg et al., 2005). A follow-up study two years later revealed an increase in seeking social or emotional support. However, the use of an avoidant coping style remained more prevalent than the task-oriented style. In this context, the increase in seeking emotional support is maladaptive because of the focus on reducing stress-related emotional reactions without addressing the causes of stress (Tomberg, Toomela, Ennok, & Tikk, 2007). At follow-up, those with fewer emotional and physical problems showed an increase in the use of task-oriented strategies while those who had a limited support network showed an increase in the use of avoidant coping styles.

**Effects of Intervention on Outcomes**

Psychological interventions after ABI seem to be beneficial. It has been shown that a multi-disciplinary approach to rehabilitation hastens improvement in problem areas including emotional difficulties (see Turner-Stokes et al., 2011 for review). Svendsen and Teasdale (2006) compared a group of rehabilitated and non-rehabilitated adults with ABI 12 to 22 years post-injury. The post-acute rehabilitation programme was an interdisciplinary, holistic approach tailored to the individual’s needs based on neuropsychological assessments. The ABI adults in the rehabilitated group (n = 37) and their significant others both reported lower levels of brain injury symptoms and a higher degree of personal competency compared to the non-rehabilitated adults (n = 13) and their significant others. The rehabilitated group also reported a higher degree of internal locus of control and self-efficacy. Lower levels of anxiety and depression were also found in this group. However, ABI adults had a higher level of anxiety and depression compared to their non-brain injured significant others. Notwithstanding, this study provided evidence that post-acute rehabilitation can alleviate the levels of depression. The rehabilitated group also reported a better quality of life with a medium effect size of rehabilitation. Interestingly, the ABI adults enrolled in the rehabilitation programme were those who were unable to return to work after the injury. Previous studies have indicated that the inability to return to work impacts on the quality of life of the ABI adults (Corrigan et al., 2001; Klonoff et al., 2006). This suggests that post-acute rehabilitation can moderate the impact of)
unemployment on psychosocial outcome following ABI.

Cognitive behaviour therapy (CBT) also has a potential to improve the understanding and management of emotional issues experienced by individuals with ABI, and improve their ability to use adaptive coping strategies (Doering & Exner, 2011; Fleminger et al., 2003). This is the case if the treatment specifically targets emotional issues and coping skills (see Waldron, Casserly, & O’Sullivan, 2013 for review). Anson and Ponsford (2006b) found that participants in a CBT-based intervention programme significantly improved in their use of adaptive coping skills. However, these gains were not stable and declined at five weeks post-intervention follow-up but increased again at a later follow-up. This pattern is possibly due to cognitive difficulties and behavioural rigidity that led to a failure in implementing the strategies previously learned. However, these fail to account for the later increase in adaptive coping (Anson & Ponsford, 2006b). Levels of anxiety, depression, self-esteem and psychosocial functioning did not significantly change over time. It was suggested that this lack of improvement could be due to an increase in self-awareness brought about by the intervention. However, self-awareness was not measured at follow-up. Thus it was not possible to verify an increase in self-awareness among the participants. Increased self-awareness has been shown to be associated with anxiety and depression (Wallace & Bogner, 2000) and emotional dysfunction in general (Godfrey, Partridge, Knight, & Bishara, 1993). Another possible explanation is that the outcomes do not generalise to domains that were not specifically targeted (Waldron et al., 2013). Nonetheless, this study has shown that adaptive coping strategies can be learned through a CBT-based intervention, given that it is the aim of the programme.

Ownsworth, McFarland and Young (2000) found improved psychosocial outcomes in people with ABI who were, on average, 8.6 years post-injury and had attended a 16-week group support programme. This programme aimed at improving self-awareness deficits and psychosocial functioning, specifically on the areas of social interaction, cognitive abilities, emotional well-being and communication skills. The approach was a combination of CBT, cognitive rehabilitation and social skills. Specifically, participants were taught techniques in problem-solving and relaxation, and participated in guided self-reflection, role plays and developing compensatory strategies, as well as practicing new behaviours within the workshop. Results of the study showed improved levels of self-regulation skills and psychosocial functioning. A 6-month follow-up showed that these gains were maintained within that period. Ownsworth and colleagues (2000) suggested that the programme facilitated learning of coping
strategies which enhanced these self-regulation skills, enabling them to manage emotional and behavioural difficulties.

A mindfulness-based intervention was also found to significantly improve levels of depression in a small group of TBI patients (n = 10). Bédard and colleagues (2003) found an improvement of depressive symptoms and quality of life among those who received the intervention. However, such an intervention is only beneficial to those who do not have impaired self-awareness since the intervention involves insight meditation. This limits the utility of a mindfulness-based intervention since a lack of insight or self-awareness is common after brain injury (see Bach & David, 2006 for review).

Physical activity has also been shown to improve mood problems after brain injury. Driver and Ede (2009) compared a group (n = 8) who had undergone an 8-week aquatic programme and a control group (n = 8) who had undergone an 8-week vocational rehabilitation class. There was a significant improvement on levels of tension, depression, anger, vigour, fatigue and confusion among those who engaged in physical activity and the effect size was large. There were no significant changes in any area among those who engaged in vocational rehabilitation. It was suggested that participation in physical activity as part of rehabilitation promotes self-efficacy through mastery of physical and psychological skills (Driver & Ede, 2009). However, the stability of positive change in mood could not be established from this study due to the lack of follow-up.

Participation in a self-help group was also found to improve mood in people with ABI. Man, Yip, Ko, Kwok and Tsang (2010) suggested that social connections and social support from members of the self-help group make a significant improvement to mood difficulties. This study showed that those who were at a longer time post-injury (i.e. over five years) showed a greater intensity of positive affects and focused more on looking for positivity rather than changing the negative mood.

Outcomes Following No Intervention

Positive outcomes can be observed over time even without post-acute rehabilitation intervention. Individuals with TBI at 10 to 12 years after injury reported more positive outcomes in terms of relating to others, personal strength, new possibilities and greater appreciation of life and spirituality compared to individuals with TBI at one to three years after injury (Powell, Ekin-Wood, & Collin, 2007). Social support and personal skills (e.g., determination, belief in self) were the two most important factors associated with these outcomes, consistent with findings that strong social support is associated with
high positive affect (Man et al., 2004). Specifically, emotional support had the strongest association with quality of life 8 to 24 years after TBI (Steadman-Pare et al., 2001). A population-based survey also found better mood and quality of life at, on average, 29 years after injury (Brown et al., 2011). Furthermore, injury severity had no significant impact on mood or quality of life. Similarly, a population-based study of individuals with stroke and TBI also revealed a better quality of family relationships and other social relationships at 15 years post-injury compared to earlier follow-up (Teasdale & Engberg, 2005a,b). It was suggested that this finding could be partly due to a higher long-term survival rate among those who have family and social support, implying that social support impacts on the long-term survival of stroke patients. However, the population-based studies discussed above did not examine possible engagement in interventions as a factor.

**Conclusion**

Follow-up studies have consistently found an association between mood problems and poor outcomes, as well as the prevalent use of avoidant coping among the brain injured population. However, as these studies are correlational, it is impossible to conclude whether mood problems can be attributed to poor outcomes or poor outcomes can be attributed to mood problems. The use of different cohorts with varying numbers of years post-injury and the use of different measures and different dimensions of psychosocial outcomes make it impossible to compare these studies. Moreover, these outcomes can be subjective and are operationally defined in different ways in different studies. For example, in terms of quality of life, there is no universal definition of what this term means (Seibert et al., 2002). Although differences in sampling and methodology exist, the consistency in their findings clearly indicates that mood and coping can impact on psychosocial outcomes post-ABI. An assessment of mood and coping is warranted at the post-acute rehabilitation stage.

While some evidence exists that positive outcomes are possible even without psychological intervention, it is generally shown that post-acute rehabilitation is beneficial to people with ABI. This review discussed intervention studies that included a multi-disciplinary approach, CBT-based programme, a group support programme using a combination of various approaches, a mindfulness-based intervention, physical activity, and participation in a self-help group. The studies discussed here seem to suggest that a combination of various approaches has more therapeutic value than a single approach (e.g., CBT alone) since it addresses several domains while a single approach may target speci-
fic domains with results that do not generalise to other difficulties that need to be addressed. However, given the relatively small sample sizes in the studies discussed above, it is difficult to make conclusions based on these studies. Furthermore, the data on the stability of outcomes are limited. Thus, there is an issue of whether the efficacy of the intervention is temporary or permanent. This raises further questions on the duration of intervention programmes and how often the individual must attend in order to gain and maintain the desired outcomes. These highlight the need for longitudinal studies.

It is also important to note that these studies show performance as a group. This implies that not everyone achieved the same outcomes and that the specific intervention may suit some more than others. Rehabilitation may be most beneficial if it is tailored according to the participants’ needs. The challenge therefore is to determine which issues need to be addressed in order to design an intervention that suits a particular individual.

References


IMPACT OF INTERVENTIONS ON MOOD AFTER BRAIN INJURY


